No. 23-

IN THE

Supreme Court of the United States

JODI A. SCHWENDIMANN, FKA JODI A. DALVEY,

Petitioner,

v.

NEENAH, INC. AND AVERY PRODUCTS CORPORATION,

Respondents.

ON PETITION FOR A WRIT OF CERTIORARI TO THE UNITED STATES COURT OF APPEALS FOR THE FEDERAL CIRCUIT

PETITION FOR A WRIT OF CERTIORARI

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QUESTION PRESENTED

In conducting an obviousness analysis under 35 U.S.C. § 103, did the Federal Circuit err in holding that there "is no basis in our case law" for requiring an articulated basis for choosing a reference in a prior art combination as the primary reference, when such a basis is required to comply with controlling precedent in *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 421, 127 S. Ct. 1727, 1742, 167 L. Ed. 2d 705 (2007), *WBIP, LLC v. Kohler Co.*, 829 F.3d 1317, 1337 (Fed. Cir. 2016), and *Yeda Rsch. v. Mylan Pharms. Inc.*, 906 F.3d 1031, 1044-45 (Fed. Cir. 2018), and where the choice of primary reference was dispositive?

RELATED PROCEEDINGS

The following proceedings are directly related to this case within the meaning of Rule 14.1(b)(iii):

- *Schwendimann v. Neenah, Inc.*, No. 22-1333, U.S. Court of Appeals for the Federal Circuit. Judgment entered October 6, 2023.

- *Schwendimann v. Neenah, Inc.*, No. 22-1334, U.S. Court of Appeals for the Federal Circuit. Judgment entered October 6, 2023.

- *Schwendimann v. Neenah, Inc.*, No. 22-1427, U.S. Court of Appeals for the Federal Circuit. Judgment entered October 6, 2023.

- *Schwendimann v. Neenah, Inc.*, No. 22-1432, U.S. Court of Appeals for the Federal Circuit. Judgment entered October 6, 2023.

- *Schwendimann v. Neenah, Inc.*, Case No. 19-361 (consolidated), U.S. District Court for the District of Delaware. No judgment entered; stayed pending IPRs.

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STATUTES:

Petitioner Jodi A. Schwendimann ("Schwendimann" or "Patent Owner") respectfully petitions for a writ of certiorari to review the judgment of the United States Court of Appeals for the Federal Circuit in this case.

OPINIONS BELOW

The opinion of the Court of Appeals (App. Nos. 2022-1333, 2022-1334, 2022-1427, 2022-1432) is published in the Federal Reporter at *Schwendimann v. Neenah, Inc.*, 82 F.4th 1371 (Fed. Cir. 2023). App. 1a-26a.

The opinions of the Patent Trial and Appeal Board in the *inter partes* review proceedings are unreported but can be located at *Neenah, Inc. v. Schwendimann*, No. IPR2020-00628, 2021 WL 4877521 (P.T.A.B. Oct. 1, 2021) (App. 27a-77a); *Neenah, Inc. v. Schwendimann*, No. IPR2020-00629, 2021 WL 6297820 (P.T.A.B. Sept. 10, 2021) (App. 78a-143a); *Neenah, Inc. v. Schwendimann*, No. IPR2020-00634, 2021 WL 6299553 (P.T.A.B. Sept. 10, 2021) (App. 144a-197a); and *Neenah, Inc. v. Schwendimann*, No. IPR2020-00915, 2021 WL 5203293 (P.T.A.B. Nov. 1, 2021) (App. 198a-249a).

JURISDICTION

The judgment of the Court of Appeals was entered on October 6, 2023. The jurisdiction of this Court is invoked under 28 U.S.C. § 1254(1).

STATUTORY PROVISIONS

35 U.S.C. § 103(a) (pre-AIA) provides: "A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, 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. Patentability shall not be negatived by the manner in which the invention was made." App. 250a.

35 U.S.C. § 316(e) provides: "In an inter partes review instituted under this chapter, the petitioner shall have the burden of proving a proposition of unpatentability by a preponderance of the evidence."

STATEMENT OF THE CASE

Following allegations by Schwendimann that their products infringed U.S. Patent Nos. RE41,623, 7,749,581, 7,754,042, and 7,766,475 (collectively, the "Asserted Patents"), Respondents Neenah, Inc. ("Neenah") and Avery Products Corporation ("Avery," together with Neenah, "Respondents") filed a number of *inter partes* review proceedings ("IPRs") challenging the Asserted Patents as obvious based upon various combinations in the prior art. The U.S. Patent and Trademark Office's Patent Trial and Appeal Board (the "PTAB" or the "Board") issued Final Written Decisions, finding that each of the challenged claims were rendered obvious by the combination of Kronzer and Oez. The invalidating combination selected Kronzer as the primary reference

and Oez as the secondary reference and used the polymers from the primary reference (Kronzer).

Respondents also filed an IPR challenging U.S. Patent No. 7,771,554 (the "'554 Patent") —which is related to and shares a specification with the Asserted Patents— as obvious. *See Neenah, Inc. v. Schwendimann*, No. IPR2020-00636, 2020 WL 5539857, at *6 (P.T.A.B. Sept. 15, 2020). For purposes of this analysis, the disputed claim limitation (*i.e.*, the "white layer" that provides the white background for the image) has been construed to be the same in both the IPR involving the '554 Patent and in the Asserted Patents. In the IPR involving the '554 Patent, Respondents advanced a combination that cited the same references, but, in this case, selected **Oez** as the primary reference and **Kronzer** as the secondary reference and used the polymers from the primary reference (Oez). *Id.* at *8 ("Obviousness over Oez-US, Meyer, and Kronzer"). For that combination, the Board found that the combination did **not** render obvious the claims of the '554 Patent. *Id.*

The decisions of the Board in the IPR decisions at issue here, on the one hand, and in the IPR challenging the '554 Patent, on the other hand, demonstrate that the selection of Kronzer (instead of Oez) as the primary reference (and resulting use of the polymers from Kronzer (instead of Oez)) was dispositive of the Board's decision to invalidate. *Accord Schwendimann v. Neenah, Inc.*, 82 F.4th 1371, at 1382 n. 10 (Fed. Cir. 2023) (explaining that the combinations in the IPR involving the '554 Patent used Oez's entire polymer layer and were, therefore, "unlike the proposed combination of Kronzer and Oez at issue in the current appeal").

Schwendimann appealed the PTAB's decision to the Court of Appeals for the Federal Circuit. The Federal Circuit had jurisdiction over the appeal pursuant to 28 U.S.C. § 1295(a)(4)(A). On appeal, the Federal Circuit affirmed the PTAB's finding that the asserted claims were rendered obvious by the combination of Kronzer and Oez. *See generally Schwendimann v. Neenah, Inc.*, 82 F.4th 1371 (Fed. Cir. 2023). Among other findings, the Federal Circuit rejected Schwendimann's argument that "Neenah failed to explain—and the Board erred by not explaining—why a skilled artisan would have chosen Kronzer as the 'primary reference' for the proposed combination." *Id.* at 1382-84. The Federal Circuit stated that "the argument has no basis in our case law." *Id.* at 1384.

REASONS FOR GRANTING THE PETITION

The Federal Circuit in this case contravened its own established precedent. Under Federal Circuit law, a tribunal finding a patent claim obvious based on a combination of prior art references must articulate a reason that a skilled artisan would select the primary[1] prior art reference (as well as the secondary references). For example, in 2016, the Federal Circuit held that the question of "[w]hether a skilled artisan would be motivated to make a combination includes **whether he would select particular references** in order to combine their elements."

1. Although some of the Federal Circuit's case law refers to the "primary" prior art reference as the "lead" prior art reference (*see, e.g., Yeda*), the Federal Circuit's decision in this case adopted the "primary" terminology. *Schwendimann v. Neenah, Inc.*, 82 F.4th at 1382 n. 9. For that reason, Schwendimann uses that terminology here, as well.

WBIP, LLC v. Kohler Co., 829 F.3d 1317, 1337 (Fed. Cir. 2016) (emphasis added); *see also id.* ("The real question is **whether that skilled artisan would have plucked one reference out of the sea of prior art** … and combined it … to address some need present in the field …." (emphasis added)). In 2018, the Federal Circuit clarified that – in this analysis as to why each reference would have been plucked out of the sea of prior art references – it is critical that one must not "rely[] on hindsight bias **in selecting a lead prior art reference** after the fact." *Yeda Rsch. v. Mylan Pharms. Inc.*, 906 F.3d 1031, 1044–45 (Fed. Cir. 2018) (emphasis added).

It is undisputed that the Board in this case did not articulate a reason for selecting Kronzer as the primary prior art reference. *See, e.g.*, *Schwendimann v. Neenah, Inc.*, 82 F.4th at 1381-84 (discussing Schwendimann's arguments on appeal).

The Federal Circuit nevertheless strayed from its precedent in *WBIP* and *Yeda* and held that Schwendimann's "Primary Reference Argument" "has no basis in our case law." *Id.* at 1384. The Federal Circuit held that the characterization of a reference as a "primary" reference had "no legal significance."[2] *Id.* (citing *In re Mouttet*, 686

2. The Federal Circuit's opinion acknowledged that, in some cases, there might be some factual reason why the distinction between "primary" and "secondary" references would be important to the analysis. *Id.* at 1384 ("[T]here may be some cases in which relevant factual determinations inhere in such characterization of prior art references [as 'primary' or 'secondary']" (citing *Mouttet*, 686 F.3d at 1333)). However, the Federal Circuit concluded that Schwendimann had not brought any such case to its attention. *Id.* at 1382-84. That conclusion was erroneous.

F.3d 1322, 1333 (Fed. Cir. 2012); *In re Bush*, 296 F.2d 491, 496 (CCPA 1961) (Rich, J.); *In re Cowles*, 156 F.2d 551, 554 (CCPA 1946); *In re Krammes*, 314 F.2d 813, 816–17 (CCPA 1963); *In re Walker*, 324 F.2d 977, 984–85 (CCPA 1963)). The Federal Circuit did not mention or discuss – let alone expressly overrule – its statements regarding the selection of references in *WBIP* and *Yeda*. *See, e.g., Shukh v. Seagate Tech., LLC*, 803 F.3d 659, 663 (Fed. Cir. 2015) (explaining that a three-judge panel cannot overrule a precedential Federal Circuit holding; *en banc* action is required).

The Federal Circuit's rule, as articulated in *WBIP* and *Yeda*, is an essential tool to ensure that litigants and courts follow the Supreme Court's guidance from *KSR Int'l Co. v. Teleflex Inc.*, where the Supreme Court explained that "[a] factfinder should be aware, of course, of the distortion caused by hindsight bias and must be cautious of arguments reliant upon *ex post* reasoning."

Schwendimann had brought to the Board's and the Federal Circuit's attention an explanation of why it matters – as a factual determination – that Kronzer was selected as the primary reference. In particular, Schwendimann had explained that the impact of selecting Kronzer as the primary prior art reference (rather than Oez or some other prior art reference) was that Respondents' proposed combination used the polymers from Kronzer, rather than the polymers in Oez, even though the Oez reference taught that its polymers were preferable. The **only** reason Respondents had articulated for selecting the polymers in Kronzer was because Kronzer was the primary reference, but there was also no articulated reason for selecting Kronzer as the primary reference. As a result, there was **no** reason (beyond hindsight) for making the particular combination that Respondents advanced. Notably, these same arguments by Schwendimann demonstrate why the Federal Circuit's findings as to waiver (id. at 1382-84) were incorrect.

550 U.S. 398, 421, 127 S. Ct. 1727, 1742, 167 L. Ed. 2d 705 (2007) (citing *Graham v. John Deere Co. of Kansas City*, 383 U.S. 1, 36, 86 S. Ct. 684, 684, 15 L. Ed. 2d 545 (1966) (warning against a "temptation to read into the prior art the teachings of the invention in issue" and instructing courts to "'guard against slipping into use of hindsight'" (internal quotation omitted))). The Supreme Court explained that the ultimate inquiry as to obviousness is "whether there was an apparent reason to combine the known elements **in the fashion claimed** by the patent at issue." *Id.* at 418 (emphasis added). Finally, the Supreme Court in *KSR* cautioned that, in order "[t]o facilitate review, this analysis should be made explicit." *Id.* (citing *In re Kahn*, 441 F.3d 977, 988 (C.A. Fed. 2006)).

In this case, however, the Federal Circuit contradicted both its holdings in *WBIP* and *Yeda* and also the Supreme Court precedent in *KSR* when it held that the characterization of a prior art reference as the "primary" prior art reference had "no legal significance." By so holding, the Federal Circuit ignored its prior decisions requiring some reason for selecting each reference, including a reason for selecting the primary reference. Moreover, the Federal Circuit's decision contradicted *KSR*, because it permitted an obviousness finding where the analysis was not only not "explicit," but entirely absent. The Federal Circuit invalidated the claims as obvious even though there was no articulated reason for why a skilled artisan would look to Kronzer at all, let alone select Kronzer as the primary reference (resulting in incorporation of the polymers from Kronzer). Here, the need to articulate some basis for selecting Kronzer as the primary reference is heightened because the Board found that the combination of Oez and Kronzer – in which

Oez is the primary reference and Oez's polymer layer is used – did **not** render obvious the claims of the related '554 Patent. In other words, when the two references are combined in one way, they do **not** render the challenged claimed obvious, but, when combined in a different way, the two references **do** render the challenged claims obvious, but the Board failed to articulate a reason for combining the references in the manner that rendered the claims obvious. This failure violates *KSR*, *Yeda*, and *WBIC* because there is no articulation of why a skilled artisan would lead with Kronzer. The only reason to do so is because of the claims, which is exactly the *ex post facto* reasoning prohibited by the Supreme Court in *KSR*.

The Federal Circuit's decision in this case creates uncertainty and confusion regarding whether litigants – seeking to invalidate a patent claim as obvious based upon a combination of prior art references – must articulate some rationale for plucking the particular references out of the sea of prior art (*WBIP*), including articulating some rationale for selecting the primary prior art reference (*Yeda*) and articulating some reason – other than hindsight reasoning – for combining the known elements in the fashion claimed by the patent at issue (*KSR*). The Federal Circuit's holding that petitioners are not required to articulate why a skilled artisan would have selected the primary reference creates confusion over what was previously settled law. The Federal Circuit's decision is symptomatic of the PTAB straying from the established law on obviousness, resulting in invalidation of patents that should survive. This case presents this Court with an opportunity to clarify the law on obviousness and require the PTAB to apply standards that will more uniformly and consistently assess the patentability of inventions and

comport with the established rule that the claims cannot be used as a roadmap in an obviousness analysis. In sum, this case presents the Court with an opportunity to clarify the obviousness analysis and provide clarity to factfinders and litigants on this important issue.

CONCLUSION

For the reasons set forth herein, Petitioner respectfully requests the Court grant her Petition.

Dated: January 4, 2024

Respectfully submitted,

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APPENDIX A — OPINION OF THE UNITED STATES COURT OF APPEALS FOR THE FEDERAL CIRCUIT, FILED OCTOBER 6, 2023

UNITED STATES COURT OF APPEALS
FOR THE FEDERAL CIRCUIT

2022-1333, 2022-1334, 2022-1427, 2022-1432

JODI A. SCHWENDIMANN, FKA JODI A. DALVEY,
Appellant,

v.

NEENAH, INC., AVERY PRODUCTS CORPORATION,
Appellees.

JODI A. SCHWENDIMANN,
Appellant,

v.

NEENAH, INC.,
Appellee.

Appeals from the United States Patent and Trademark Office, Patent Trial and Appeal Board in Nos. IPR2020-00628, IPR2020-00629, IPR2020-00634, IPR2020-00915.

Decided: October 6, 2023

CLEVENGER, *Circuit Judge.*

Jodi A. Schwendimann owns U.S. Patent Nos. RE41,623 (the "'623 patent"), 7,749,581 (the "'581 patent"), 7,754,042 (the "'042 patent"), and 7,766,475 (the

"'475 patent") (collectively, the "Appealed Patents"). Ms. Schwendimann appeals from four final written decisions of the U.S. Patent and Trademark Office Patent Trial and Appeal Board (the "Board") holding all claims of the '623 patent,[1] '042 patent,[2] and '475 patent[3] and claims 1-6, 8-21, and 24-31 of the '581 patent[4] (the "Challenged Claims") unpatentable as obvious in view of asserted prior art.

After Ms. Schwendimann asserted the Appealed Patents, a fifth, related patent, U.S. Patent No. 7,771,554 (the "'554 patent"), and three other patents from a different, unrelated patent family against Neenah, Inc. and Avery Products Corporation (collectively, "Neenah"),[5] Neenah filed petitions for *inter partes* review with the Board for the Challenged Claims in the Appealed Patents and claims in the '554 patent. Neenah's petitions argued the claims were rendered obvious on multiple separate grounds based on different combinations of prior art, including grounds in each petition based on U.S. Patent No.

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1. *Neenah, Inc. v. Schwendimann*, No. IPR2020-00628, 2021 WL 4877521 (P.T.A.B. Oct. 1, 2021).

2. *Neenah, Inc. v. Schwendimann*, No. IPR2020-00629, 2021 Pat. App. LEXIS 5529, 2021 WL 6297820 (P.T.A.B. Sept. 10, 2021).

3. *Neenah, Inc. v. Schwendimann*, No. IPR2020-00915, 2021 Pat. App. LEXIS 6517, 2021 WL 5203293 (P.T.A.B. Nov. 1, 2021) ("*Decision*").

4. *Neenah, Inc. v. Schwendimann*, No. IPR2020-00634, 2021 WL 6299553 (P.T.A.B. Sept. 10, 2021).

5. Ms. Schwendimann brought suit against Neenah for infringement in the United States District Courts in Delaware and the Eastern District of Michigan.

5,798,179 ("Kronzer") in view of U.S. Patent No. 5,655,476 ("Oez"). Although the Board did not institute an *inter partes* review for the '554 patent, the Board instituted *inter partes* review for all the Challenged Claims in the Appealed Patents and found them unpatentable as obvious over Kronzer in view of Oez. For the reasons below, we affirm.

Background

A. The Appealed Patents

The Appealed Patents relate to transfer sheets and methods for transferring images onto dark-colored fabrics. '475 patent col. 1 ll. 17-19.[6] Multi-layer image transfer sheets for transferring images onto fabrics were well known in the prior art. *Id.* col. 1 l. 20-col. 2 l. 27. The prior art image transfer sheets generally included a base/substrate layer, typically made of paper, and one or more polymer or other layers coated on top of the base/substrate layer. '475 patent col. 1 l. 20-col. 2 l. 27. Using an ink-jet printer, one could print an image on the image transfer sheet, place the transfer sheet on fabric (e.g., a T-shirt), and using an iron or heat press, transfer the image onto the fabric. *Id.*

While such transfer sheets worked well when transferring images onto light-colored fabrics, there was a well-known problem with transferring dark images onto

6. The Appealed Patents share a specification. For ease of reference and to be consistent with the parties' briefs, citations to the Appealed Patents' specification are made to the '475 patent. *See* Appellant's Br. 8 n.2; Appellees' Br. 7 n.4.

dark fabrics because the dark images could not be easily or clearly seen against the dark-fabric background due to the lack of contrast between the image and the fabric. *Id.* col. 3 ll. 37-50. The solution for this problem was a two-step process, in which one would first apply a white or light background onto the dark fabric and then apply the desired image on top of the white or light background. *Id.* col. 3 ll. 37-57.

The Appealed Patents addressed this problem in the prior art and claimed a single-step solution whereby the white background was incorporated into the image transfer sheet, allowing the white background and dark image to be applied simultaneously onto the dark fabric. *Id.* col. 3 ll. 10-21. Specifically, the Appealed Patents claim multilayer image transfer sheets where one or more of the layers contains a white pigment, such as titanium dioxide, and methods of making and using the same. *Id.* col. 2 l. 53—col. 3 l. 6.

Independent claims 1 and 19 are representative:

> 1. An ink-jet transfer article, comprising:
>
> a substrate member including a substrate surface;
>
> an opaque first layer overlaying the substrate surface, the opaque first layer including polyurethane and a white or luminescent pigment; and
>
> a second layer overlaying the opaque first layer and configured to receive indicia, the second

layer including polyurethane and a polymeric material.

Id. col. 11 ll. 34-41.

19. A method of transferring an image to a dark-colored or black receiving member, comprising:

providing an ink-jet transfer article, comprising

a substrate member including a substrate surface;

an opaque first layer overlaying the substrate surface, the opaque first layer including polyurethane and a white or luminescent pigment; and

a second layer overlaying the opaque first layer and configured to receive indicia printed using an ink-jet printer, the second layer including polyurethane and a polymeric material;

wherein the substrate member is peeled away from the opaque first layer and the second layer;

wherein the opaque first layer and the second layer are applied to the dark-colored or black receiving member such that received indicia face upwards;

> wherein the substrate layer, when peeled, or an overlay release paper is positioned over the second layer and the opaque first layer; and
>
> wherein heat is applied to one of the substrate layer or the overlay release paper, the second layer, and the opaque first layer so that received indicia and a substantially white background for received indicia, provided by the opaque first layer, are transferred to the colored or black receiving member at substantially the same time.

Id. col. 12 ll. 40-64.

B. The Prior Art

a. Kronzer

Kronzer is directed to "a heat transfer material, such as a heat transfer paper" for use in the "application of customer-selected design, messages, illustrations, and the like . . . on articles of clothing, such as T-shirts, sweat shirts, and the like." Kronzer col. 1 ll. 6-12. It discloses numerous multi-layered image transfer sheets with varying configuration of layers, as well as examples of polymers and other materials that can be used to create each layer and improve image transfer quality. *Id.* col. 3 l. 11-col. 9 l. 7. Kronzer also includes examples of its claimed image transfer sheets that were created and tested—by making the sheet, printing an image on the sheet, transferring the image to a T-shirt, and then

subjecting the T-shirt to washing cycles—along with the results of those tests, which assessed the final product for image transfer, image quality, and washability. *Id.* col. 9 l. 11-col. 18 l. 6.

Kronzer discloses an image transfer sheet with four layers, wherein the first layer is a base/substrate layer, the second is a release layer, the third is a polymer layer, and the fourth is an ink/image receiving layer. *Id.* col. 2 ll. 33-67. The third and fourth layers include a "thermoplastic polymer," which would melt from about 65°C to about 180°C. *Id.* col. 2 ll. 45-48, 65-67. Further, the layers "may contain other materials, such as processing aids, release agents, *pigments*, deglossing agents, antifoam agents, and the like." *Id.* col. 8 ll. 46-48 (emphasis added).

Kronzer explains that, after printing the image on the transfer sheet and placing the transfer sheet on fabric, one can transfer the image using "heat and pressure" and then remove the base/substrate layer. *Id.* col. 3 l. 67-col. 4 l. 15. Specifically, Kronzer uses a "peel-last" application method, meaning the user (1) prints the desired image as a mirror image onto the transfer sheet, (2) applies the transfer sheet to the fabric image-side down, (3) applies heat and pressure to transfer the image onto the fabric, and then (4) peels the base/substrate and release layers away to reveal the final product. *Id.* col. 1 ll. 1-45, col. 4 ll. 6-15; *see also* Appellant's Br. 11-12.

The Appealed Patents all cite to Kronzer as prior art. '623 patent at (56); '581 patent at (56); '042 patent at (56); '475 patent at (56). Overall, the main difference between

Kronzer and the Appealed Patents is that Kronzer does not expressly teach including a white pigment in one of its layers for transferring an image onto a dark fabric.

b. Oez

Like Kronzer, Oez is directed to multi-layered image transfer sheets and methods of using the same "for transferring photocopies to textiles, such as, in particular, T-shirts." Oez col. 1 ll. 7-18. Oez discloses an image transfer sheet with three layers, wherein the first layer is a base/substrate layer, the second layer is a release layer, and the third layer is plastic/polymer layer that can receive an image. *Id.* col. 3 ll. 14-60.

Critically, Oez teaches including a white pigment, such as titanium dioxide, in the plastic/polymer layer to provide a white background for the image and improve image quality when transferring images onto dark fabrics. Oez explains that "[c]onventional prints are not satisfactory in respect of the brilliance of the image transferred, especially on black textiles." *Id.* col. 1 ll. 19-21. To solve this problem, Oez teaches that one can incorporate a white pigment into the plastic/polymer layer when printing on dark fabrics. *Id.* col. 1 ll. 27-32; *see also id.* col. 1 ll. 52-56 (explaining that by incorporating titanium dioxide in the plastic/polymer layer, an image can be transferred to a dark fabric in in a single-step instead of the previous two-step process for doing the same). Unlike Kronzer, Oez uses a "peel-first" application method, meaning the user (1) prints the desired image positively (i.e., not as a mirror image), (2) peels the base/substrate and release

layers away before image transfer, (3) applies the transfer sheet to the fabric image-side up, and (4) applies heat and pressure to transfer the image onto the fabric. *Id.* col. 1 ll. 48-56, col. 2 l. 63-col. 3 l. 16, col. 3 ll. 30-59; *see also* Appellant's Br. 16.

Procedural History

Neenah filed petitions for *inter partes* review of the Appealed Patents and the '554 patent. *Decision*, 2021 WL 5203293, at *1;[7] Appellant's Br. 6; Appellees' Br. 22. Neenah asserted the Challenged Claims and the '554 patent's claims were rendered obvious on multiple separate grounds based on different prior art combinations, including grounds in each petition based on Kronzer in view of Oez, whereby a skilled artisan would incorporate the white pigment taught in Oez into Kronzer's transfer sheet. *Decision*, 2021 WL 5203293, at *3, *6-7. The Board instituted *inter partes* review on all the Challenged Claims for all the asserted grounds, *Neenah, Inc. v. Schwendimann*, No. IPR2020-00915, 2020 WL 6542027, at *12 (P.T.A.B. Nov. 6, 2020), and construed the term "white layer," which all the Challenged Claims required, 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

7. The Board's decisions at issue in this appeal are substantially similar to one another. For ease of reference and to be consistent with the parties' briefs, citations to the Board decisions are made to the Board's final written decision in IPR2020-00915. *See* Appellant's Br. 17 n.3; Appellees' Br. 7 n.3.

layers during application." *Id.* at *4 (emphasis added).[8] The Board maintained the construction for "white layer" in its final written decisions. *Decision*, 2021 WL 5203293, at *4-5. Ultimately, the Board found Kronzer in view of Oez rendered the Challenged Claims obvious. *Id.* at *19. Because of this finding, the Board did not address the other grounds Neenah asserted against the Challenged Claims. *Id.* (citing *SAS Inst., Inc. v. Iancu*, 138 S. Ct. 1348, 1359, 200 L. Ed. 2d 695 (2018); *Bos. Sci. Scimed, Inc. v. Cook Grp. Inc.*, 809 F. App'x 984, 990 (Fed. Cir. 2020) (nonprecedential)).

The Board explained that Ms. Schwendimann did "not dispute that Kronzer and Oez[] together teach or suggest all of the limitations recited in [the Challenged Claims]." *Id.* at *7. Instead, her only challenges to the combination were directed to whether a skilled artisan would have been motivated to combine the references and whether the combination would have yielded a reasonable expectation of success. *Id.* at *8. The Board meticulously considered and addressed each of Ms. Schwendimann's arguments, explaining why the record contradicted each argument.

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8. The Board, however, did not institute *inter partes* review of the '554 patent because, *inter alia*, the specific ground Neenah asserted in its petition based on Kronzer in view of Oez relied on replacing Kronzer's entire third layer with Oez's entire plastic/polymer layer. *Neenah, Inc. v. Schwendimann*, No. IPR2020-00636, 2020 WL 5539857, at *10 (P.T.A.B. Sept. 15, 2020) ("*'554 Decision*"). The Board found Neenah failed to show that such a combination would result in a transfer sheet whereby the white layer would melt and mix with another layer. *Id.*

First, the Board addressed Ms. Schwendimann's arguments that Neenah did not prove any reason to combine Kronzer and Oez because Oez does not teach a multi-layered transfer sheet with a distinct image receiving layer and the identity of the subject matter between the two references alone is insufficient to establish a motivation to combine the references. *Id.* at *8-9. The Board found Oez did teach multi-layered transfer sheets based on Oez's express disclosure describing multi-layered transfer sheets and admissions by Ms. Schwendimann's expert, Dr. Christopher Ellison, describing Oez's transfer sheets as having a second, optional layer. *Id.* at *8. The Board also found Neenah did not rely on the identity of the subject matter in Kronzer and Oez alone to establish a motivation to combine the references. *Id.* The Board concluded both references were directed to improving the image transfer quality of multi-layered transfer sheets, citing Kronzer, Oez, and Neenah's expert, Dr. Robert A. Wanat, and credited Dr. Wanat's testimony that Kronzer and Oez were "complementary and compatible" with one another "because Kronzer's image transfer sheet can be used *on any color fabric*." *Id.* at *9 (emphasis added).

Second, the Board addressed Ms. Schwendimann's argument claiming Neenah failed to explain *why* a skilled artisan would be motivated to combine Kronzer and Oez and thus improperly used the Appealed Patents as a hindsight roadmap to make the proposed combination. *Id.* at *9-10. The Board accepted Neenah's argument that a skilled artisan would be motivated to combine Kronzer and Oez by incorporating the white pigment taught by Oez into Kronzer's transfer sheet in order to improve the Kronzer

transfer sheet when printing on a dark fabric. *Id.* at *9. The Board found this argument relied on Oez's express teachings that adding a white pigment improves image transfer quality on dark fabrics and Kronzer's express teaching that any of its layers may contain pigments. *Id.* at *10. The Board concluded these were sufficient rational underpinnings to explain why a skilled artisan would be motivated to combine Kronzer and Oez, as Neenah proposed, and Neenah's reliance on express teachings in both references undermined Ms. Schwendimann's argument that Neenah relied on hindsight in making the proposed combination. *Id.* at *9-10.

Third, the Board addressed Ms. Schwendimann's assertions that a skilled artisan would not have been motivated to combine Kronzer and Oez because Kronzer does not solve the problem of transferring an image onto dark fabric. *Id.* at *11-12. The Board explained Kronzer did not need to solve the specific problem addressed by the Appealed Patents because "[t]he test for obviousness is not whether any one or all of the references expressly suggests the claimed invention, but whether the claimed subject matter would have been obvious to [skilled artisans] in light of the combined teachings of those references." *Id.* at *12 (citing *In re Keller*, 642 F.2d 413, 425 (CCPA 1981)). The Board repeated its previous findings as to Kronzer and Oez, including the "complementary and compatible" nature of the transfer sheets taught by the references, and determined the record supported "a finding that a [skilled artisan] would have recognized that the Oez[] technique would improve the similar transfer sheet disclosed in Kronzer, and would have had a reason to combine the

teachings of Kronzer and Oez[]." *Id.* at *12 (citing *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 417, 127 S. Ct. 1727, 167 L. Ed. 2d 705 (2007)).

Fourth, the Board addressed Ms. Schwendimann's argument claiming that a skilled artisan would not be motivated to combine Kronzer and Oez because they involved "fundamental differences in their structures and manufacturing." *Id.* at *14. Referencing its prior findings, which cited to Kronzer, Oez, and Dr. Ellison's testimony, the Board disagreed and again found both references "describe[d] a multi-layered image transfer structure." *Id.* The Board also disagreed with Ms. Schwendimann's assertion that there were "fundamental differences" in the problems Kronzer and Oez solved and the technologies used to solve these problems. *Id.* at *15. Referencing its prior findings, which cited to Kronzer, Oez, and Dr. Wanat's testimony, the Board again found both references were "aligned with a common goal of improving the quality of transferred images." *Id.* Moreover, the Board concluded that "Dr. Wanat's testimony regarding Oez[] and Kronzer being complementary and compatible, which Kronzer supports because it teaches the use of pigments and is not limited to fabric color, undermines [Ms. Schwendimann]'s bare assertion that the technology in the two references is so different that a [skilled artisan] would not have had any reason to combine the teachings of the references." *Id.*

Fifth, the Board addressed Ms. Schwendimann's claims that a skilled artisan lacked a reasonable expectation of success in combining Kronzer and Oez because Oez "teaches away from using white pigment

alone or that Oez[] requires a cross-linking polymer for the white pigment to function." *Id.* at *12-13. The Board explained that for a reference to teach away, it "must discourage [a skilled artisan] from following the path set out in the reference, or lead that [skilled artisan] in a direction divergent from the path taken by the applicant." *Id.* at *13 (citing *In re Gurley*, 27 F.3d 551, 553 (Fed. Cir. 1994)). The Board found that Ms. Schwendimann did "not identify any teaching in Oez[] that either requires use of a cross-linking polymer with its white pigment or discourages using a white pigment without a cross-linking polymer" and its own "review of Oez[] [did] not reveal any such teaching." *Id.* at *13. Accordingly, the Board concluded Oez does not teach away from the proposed combination. *Id.*

The Board also concluded Ms. Schwendimann's argument that a skilled artisan lacked a reasonable expectation of success when adding the white pigment to Kronzer because such an addition would be "unpredictable" to be "similarly unavailing," because there was no evidence to support that titanium dioxide would do anything other than provide a white background when incorporated into Kronzer. *Id.*; *see also id.* at *14 ("[T]itanium dioxide is well-studied, well-understood, and the most widely-used white pigment."). The only evidence Ms. Schwendimann proffered was Dr. Ellison's testimony, which the Board found to be "inconclusive," "conclusory," and "based on an incomplete understanding of the referenced articles," and accordingly it was "entitled to little or no weight." *Id.* at *13-14; *see also id.* at *13 (noting Dr. Ellison's testimony concerning the possibility of titanium dioxide chemically

reacting with Kronzer's layers was "inconclusive and, at best, describes possible interactions in a reactive system—not a non-reactive system," like the one Neenah proposed (emphasis omitted)). The Board also rejected Ms. Schwendimann's unpredictability arguments based on the "failures" in Kronzer's examples because, even accepting this characterization of Kronzer, none of the identified "failures" included layers with a pigment—a fact even Ms. Schwendimann acknowledged—and thus were not significant "to the question of unpredictability based on adding a pigment to Kronzer." *Id.* at *14.

Sixth and finally, the Board addressed Ms. Schwendimann's argument claiming a skilled artisan lacked a reasonable expectation of success in combining Kronzer and Oez because the references use "opposite methods of application" (i.e., Kronzer uses the peel-last method, but Oez uses the peel-first method). *Id.* at *15-16. The Board found that, because Oez "teaches that the printed image should be oriented on top of the white/opaque background," a skilled artisan "would have understood from the references themselves that the image in Kronzer should be positioned such that it does not end up underneath the white/opaque layer when printed." *Id.* at *16. The Board noted that Ms. Schwendimann acknowledged that incorporating a white pigment into Kronzer without modifying Kronzer's peel-last method would obscure the image. *Id.* But the Board disagreed this fact would dissuade a skilled artisan from making the proposed combination "because the '[skilled artisan] is also a person of ordinary creativity, not an automaton,' and does not abandon common sense when considering

the combination of references." *Id.* (quoting *KSR*, 550 U.S. at 421).

Thus, the Board found the record supported "that a [skilled artisan] would have had reason to combine the teachings of Kronzer and Oez[], and would have had a reasonable expectation of successfully doing so to arrive at the subject matter recited in [the Challenged Claims]" and ultimately concluded Kronzer in view of Oez rendered the Challenged Claims unpatentable as obvious. *Id.*

Ms. Schwendimann timely appealed the Board's final written decisions, and we have jurisdiction under 28 U.S.C. § 1295(a)(4)(A).

Discussion

Ms. Schwendimann makes three arguments on appeal: (1) substantial evidence does not support the Board's finding that a skilled artisan would have been motivated to combine Kronzer and Oez, (2) substantial evidence does not support the Board's finding that a skilled artisan would have had a reasonable expectation of success in making the proposed combination, and (3) Neenah and the Board were required to explain why Kronzer (and not Oez) was the primary reference for the proposed combination. Neenah argues that the record amply demonstrates substantial evidence to support the Board's findings on motivation to combine and reasonable expectation of success in making the proposed combination. Neenah further argues that Ms. Schwendimann forfeited her third argument by failing to present the argument to the Board. We will address Ms.

Schwendimann's first two arguments together followed by her third argument.

"We review the Board's legal conclusions de novo and its factual findings for substantial evidence." *MCM Portfolio LLC v. Hewlett-Packard Co.*, 812 F.3d 1284, 1293 (Fed. Cir. 2015). "Obviousness is a question of law based on underlying facts, including the scope and content of the prior art, differences between the prior art and the claims at issue, the level of ordinary skill, and relevant evidence of secondary considerations." *Henny Penny Corp. v. Frymaster LLC*, 938 F.3d 1324, 1331 (Fed. Cir. 2019) (citing *Graham v. John Deere Co.*, 383 U.S. 1, 17-18, 86 S. Ct. 684, 15 L. Ed. 2d 545 (1966)); *see also KSR*, 550 U.S. at 427. Accordingly, the subsidiary obviousness questions of whether a skilled artisan would be motivated to combine prior art references and whether a skilled artisan had a reasonable expectation of success in making such a combination are factual, and we review them for substantial evidence. *PAR Pharm., Inc. v. TWI Pharms., Inc.*, 773 F.3d 1186, 1196-97 (Fed. Cir. 2014). "Substantial evidence is more than a mere scintilla. It means such relevant evidence as a reasonable mind might accept as adequate to support a conclusion." *Consol. Edison Co. v. NLRB*, 305 U.S. 197, 229, 59 S. Ct. 206, 83 L. Ed. 126 (1938).

"[F]orfeiture is the failure to make the timely assertion of a right." *United States v. Olano*, 507 U.S. 725, 733, 113 S. Ct. 1770, 123 L. Ed. 2d 508 (1993). A party forfeits "an argument that it 'failed to present to the Board' because it deprives the court of 'the benefit of the

Board's informed judgment.'" *In re NuVasive, Inc.*, 842 F.3d 1376, 1380 (Fed. Cir. 2016) (quoting *In re Watts*, 354 F.3d 1362, 1367-68 (Fed. Cir. 2004)). Absent exceptional circumstances, *see In re DBC*, 545 F.3d 1373, 1379-80 (Fed. Cir. 2008), we do not consider such forfeited arguments on appeal. *In re Google Tech. Holdings LLC*, 980 F.3d 858, 863 (Fed. Cir. 2020); *In re Baxter Int'l, Inc.*, 678 F.3d 1357, 1362 (Fed. Cir. 2012).

I

First, Ms. Schwendimann argues a skilled artisan would not be motivated to combine Kronzer and Oez because their teachings are "diametrically opposed" and "flatly inconsistent." Appellant's Br. 31. This argument is unpersuasive as it fails to address the substantial evidence supporting the Board's finding that a skilled artisan would be motivated to combine Kronzer and Oez. *Decision*, 2021 WL 5203293, at *8-12, *14-15. Kronzer and Oez expressly disclose multi-layered transfer sheets, which is further supported by Dr. Ellison's testimony. The references share the common goal of improving image transfer characteristics, and Dr. Wanat explained how Kronzer and Oez are "complementary and compatible" because Kronzer is applicable to any color fabric. *Id.* at *9. Critically, Kronzer expressly teaches that pigments can be included in any of its layers, and Oez expressly teaches that including a white pigment in the transfer sheet provides advantages for transferring images onto dark fabrics. As the Board found, the motivation to add the white pigment in Oez into Kronzer's transfer sheet comes from the express teachings in both references. Clearly,

the teachings of Kronzer and Oez are not "diametrically opposed" or "flatly inconsistent," and the express teachings in both references providing a motivation to make the proposed combination negates any hindsight-based argument. *See In re Gartside*, 203 F.3d 1305, 1319 (Fed. Cir. 2000). Thus, Kronzer's and Oez's disclosures as well as Dr. Ellison's and Dr. Wanat's testimonies are substantial evidence supporting the Board's finding that a skilled artisan would be motivated to combine the references.

Second, Ms. Schwendimann argues a skilled artisan would not have had a reasonable expectation of success combining Kronzer and Oez because Oez teaches away from any combination with Kronzer, the proposed combination would be unpredictable, and Kronzer's modified transfer sheet would require significant reengineering. Ms. Schwendimann argues Oez teaches away from the proposed combination because Oez requires using a cross-linking polymer for the white pigment to function. This teaching away argument is the same one the Board considered and rejected. "[A] reference does not teach away if a skilled artisan, upon reading the reference, would *not* be 'discouraged from following the path set out in the reference,' and would *not* be 'led in a direction divergent from the path that was taken by the applicant.'" *Adapt Pharma Operations Ltd. v. Teva Pharms. USA, Inc.*, 25 F.4th 1354, 1370 (Fed. Cir. 2022) (quoting *DePuy Spine, Inc. v. Medtronic Sofamor Danek, Inc.*, 567 F.3d 1314, 1327 (Fed. Cir. 2009)). Although Oez used a white pigment with a cross-linking polymer, it does not discourage a skilled artisan from using the

white pigment without a cross-linking polymer or lead the skilled artisan in a direction divergent from the path taken in the Appealed Patents. Thus, Oez's disclosure is substantial evidence that supports the Board's finding that Oez does not teach away from the proposed combination.

Ms. Schwendimann also argues a skilled artisan would not have had a reasonable expectation of success in combining Kronzer and Oez because adding titanium dioxide into Kronzer's transfer sheet could cause unpredictable chemical reactions that interfere with the transfer process. The only evidence Ms. Schwendimann cites to support this argument is testimony by Dr. Ellison and the "failures" in Kronzer's examples. The Board found Dr. Ellison's testimony was "entitled to little or no weight," because it was "inconclusive," "conclusory," and "based on an incomplete understanding of the referenced articles." *Decision*, 2021 WL 5203293, at *13-14. For example, Dr. Ellison testified that adding titanium dioxide to Kronzer's transfer sheet could lead to possible chemical reactions because titanium dioxide can chemically interact with other components of reactive systems—but the record is clear that including titanium dioxide in Kronzer's layers results in a non-reactive system. The Board also ascribed little weight to the "failures" in Kronzer's examples in assessing Ms. Schwendimann's unpredictability claims because, even accepting Ms. Schwendimann's characterization of Kronzer's examples, the failed trials did not include transfer sheets with pigments—a fact Ms. Schwendimann conceded. The Board instead found that adding titanium dioxide to Kronzer's layers would do nothing more than provide a white background, citing

to Dr. Wanat's testimony and other scientific literature in the record. Overall, there was no error in the Board's analysis, and substantial evidence supports the Board's conclusion that making the proposed combination would not lead to unpredictable results.

Ms. Schwendimann next argues a skilled artisan would not have had a reasonable expectation of success in making the proposed combination because the resulting transfer sheet would need to be significantly reengineered since Kronzer used a peel-last application method, but Oez used a peel-first application method. Although Kronzer teaches printing a mirror image on its transfer sheet and using a peel-last application method, Oez teaches printing a positive image on its transfer sheet and using a peel-first application method to ensure the transferred image is on top of the white background. If Oez relied on a peel-last application method, the white background would obscure the printed image, as Ms. Schwendimann acknowledged. The Board found a skilled artisan would understand that an image printed on a Kronzer transfer sheet containing white pigment must be positioned to be on top of the white layer to avoid obscuring the image "because the '[skilled artisan] is also a person of ordinary creativity, not an automaton,' and does not abandon common sense when considering the combination of references." *Id.* at *16 (quoting *KSR*, 550 U.S. at 421). Again, the Board's analysis is sound, and substantial evidence supports the Board's finding that a skilled artisan would use their common sense when making the proposed combination to arrive at an operable transfer sheet.

Thus, the disclosures of Kronzer, Oez, and the scientific literature in the record along with Dr. Wanat's testimony are substantial evidence supporting the Board's conclusion that a skilled artisan would have had a reasonable expectation of success in making the proposed combination.

II

Ms. Schwendimann's third argument is that Neenah failed to explain—and the Board erred by not explaining—why a skilled artisan would have chosen Kronzer as the "primary reference"[9] for the proposed combination (the "Primary Reference Argument").[10] Ms. Schwendimann

9. The parties use the phrases "lead reference," "lead prior art reference," and "primary reference" interchangeably. *See* Appellant's Br. 28-31; Appellees' Br. 42-50. For clarity and to be consistent with the terminology that occasionally appears in the case law, we will only use "primary reference."

10. Ms. Schwendimann also makes multiple references to the Board's *'554 Decision* denying *inter partes* review of the '554 patent to support her argument that the Board committed reversable error in the current appeal. *See, e.g.*, Appellant's Br. 30-31, 34. The proposed combination of Kronzer and Oez at issue in the *'554 Decision*, however, required replacing Kronzer's entire third layer with Oez's entire plastic/polymer layer, which the Board found would not result in a white layer that melts and mixes with another layer. This is unlike the proposed combination of Kronzer and Oez at issue in the current appeal, which only required adding Oez's white pigment to one of Kronzer's layers. While both proposed combinations use Kronzer and Oez, they are different grounds for assessing obviousness and, accordingly, the *'554 Decision* has no bearing on the outcome of this appeal.

argues that justification for selection of a primary reference is a necessary step to guard against hindsight bias for the motivation to combine references. Neenah responds that Ms. Schwendimann did not raise her Primary Reference Argument to the Board in her Preliminary Responses, Patent Owner Responses, or Sur-Replies, and consequently forfeited the opportunity to present the argument on appeal. Appellees' Br. 42-43. On reply, Ms. Schwendimann asserts that her admitted failure to present her argument directly to the Board is "irrelevant" because the argument was indirectly preserved in three ways: (1) her written arguments to the Board that a skilled artisan would not have looked to Kronzer *at all* to solve the problem addressed by the Appealed Patents, (2) a discussion during the oral hearing before the Board, and (3) a footnote in the Board's decision.

First, Ms. Schwendimann asserts she did not forfeit her Primary Reference Argument because she "expressly and repeatedly" argued to the Board that a skilled artisan would not look to Kronzer *at all* to solve the problem addressed by the Appealed Patents. Appellant's Reply Br. 4-5. This is not persuasive because such an argument concerns whether Kronzer is analogous art.[11] That is plainly not the same as and did not preserve her Primary Reference Argument she now makes on appeal, which concerns whether Neenah (and the Board) sufficiently

11. Ms. Schwendimann did not appeal the Board's finding that Kronzer is analogous art, and, during oral argument, Ms. Schwendimann's counsel stated that "Kronzer is analogous art." Oral Arg. at 10:14-10:22, https://oralarguments.cafc.uscourts.gov/default.aspx?fl= 22-1333_08072023.mp3.

explained why Kronzer was the appropriate primary reference.

Second, Ms. Schwendimann claims she preserved her Primary Reference Argument by raising it to the Board during the oral hearing. During the oral hearing, in a discussion with Neenah's counsel, the Board noted that Ms. Schwendimann contended it was counterintuitive to start with Kronzer instead of Oez, and asked Neenah to explain why a skilled artisan would start with Kronzer. Neenah responded by explaining that the law does not recognize "that you have to give a basis for starting with one reference as the primary," J.A. 567, but that here there was a basis: adding a white pigment to Kronzer's layers would improve Kronzer's transfer sheets for application to dark fabrics. Under these circumstances, the law is clear that arguments raised to the Board at an oral hearing are not preserved. *See Dell Inc. v. Acceleron, LLC*, 884 F.3d 1364, 1369 (Fed. Cir. 2018). But even if arguments raised to the Board at oral hearing could be preserved, Neenah replied to the argument in terms of findings the Board itself made in its decision.

Third, Ms. Schwendimann contends the Board preserved her Primary Reference Argument by describing it as a "red herring." *Decision*, 2021 WL 5203293, at *9 n.8. This footnote, however, related to Ms. Schwendimann's contention that Oez is a preferred primary reference because it directly deals with printing on dark fabrics, and her argument that Neenah failed to show that Kronzer "provide[d] something beneficial that [was] lacking in Oez[]." *Id.* The Board concluded that

this argument was "a red herring, as [Neenah did] not propose to modify or improve anything in Oez[] based on Kronzer," *id.*, but instead successfully proposed to improve Kronzer by adding the white pigment taught by Oez. The Board's "red herring" comment was directed to Ms. Schwendimann's argument that Neenah failed to explain why Kronzer might improve Oez, not to her argument on appeal that the Board must justify using Kronzer as the primary reference. In short, the Board's "red herring" comment was not describing the Primary Reference Argument.

Ms. Schwendimann does not cite any exceptional circumstances that could warrant consideration of her Primary Reference Argument. Therefore, we hold Ms. Schwendimann forfeited her Primary Reference Argument before this court. *See Google*, 980 F.3d at 863.

But to any extent Ms. Schwendimann's Primary Reference Argument was not forfeited, the argument has no basis in our case law. In the context of an obviousness challenge with two or more references, describing one of the references as "primary" means that it is the reference to be modified by the "secondary" or other references. *See, e.g.*, Manual of Patent Examining Procedure § 2677 (I)(I)(4) (9th ed. Rev. 5, Feb. 2023). Using Kronzer and Oez as placeholders, an obviousness challenge based on "Kronzer in view of Oez" means the challenge is based on Kronzer being modified by Oez to reach the claimed invention. In other words, Kronzer is the primary reference and Oez is the secondary reference.

We have made clear that "where the relevant factual inquiries underlying an obviousness determination are otherwise clear," characterizing references "as 'primary' and 'secondary' is merely a matter of presentation with no legal significance." *In re Mouttet*, 686 F.3d 1322, 1333 (Fed. Cir. 2012); *see In re Bush*, 296 F.2d 491, 496, 49 C.C.P.A. 752, 1961 Dec. Comm'r Pat. 609 (CCPA 1961) (Rich, J.); *see also In re Cowles*, 156 F.2d 551, 554, 33 C.C.P.A. 1236, 1946 Dec. Comm'r Pat. 574 (CCPA 1946); *In re Krammes*, 314 F.2d 813, 816-17, 50 C.C.P.A. 1099, 1963 Dec. Comm'r Pat. 354 (CCPA 1963); *In re Walker*, 324 F.2d 977, 984-85, 51 C.C.P.A. 954, 1964 Dec. Comm'r Pat. 86 (CCPA 1963). Although we have acknowledged "that there may be some cases in which relevant factual determinations inhere in such characterization of prior art references," *Mouttet*, 686 F.3d at 1333, Ms. Schwendimann has not brought any such case to our attention, and we could find none. Regardless, this case is certainly not one because, as we explained above, the relevant factual determinations supporting the Board's obviousness conclusions are clear, supported by substantial evidence, and refute any concern of hindsight bias.

Conclusion

We have considered Ms. Schwendimann's remaining arguments and find them unpersuasive. Accordingly, and for the foregoing reasons, we affirm the Board's final written decisions.

AFFIRMED

APPENDIX B — JUDGMENT AND FINAL WRITTEN DECISION OF THE UNITED STATES PATENT AND TRADEMARK OFFICE, BEFORE THE PATENT TRIAL AND APPEAL BOARD, DATED OCTOBER 1, 2021

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)

Appendix B

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

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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").

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. 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

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.

Appendix B

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.

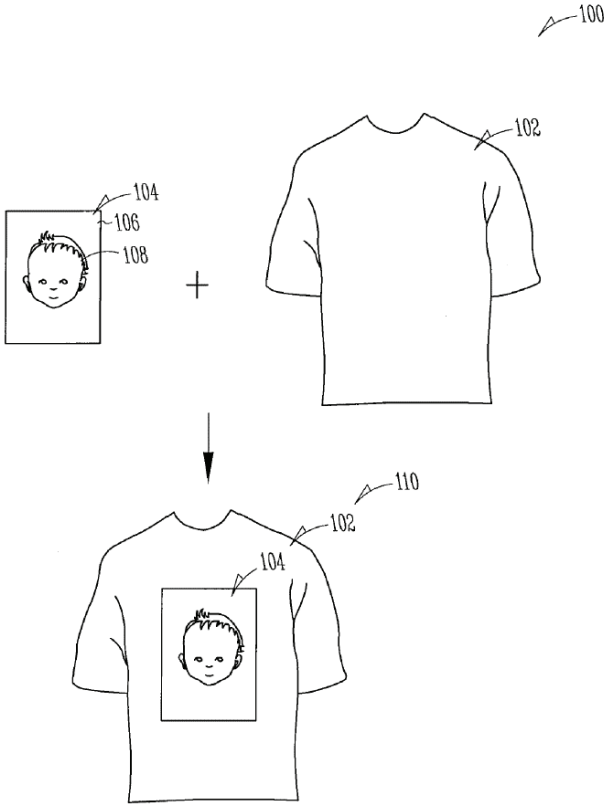

Fig. 1

Appendix B

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.

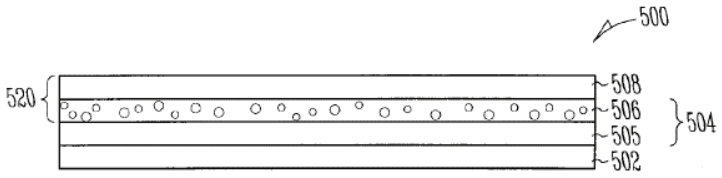

Fig. 5

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

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

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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.

Appendix B

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.

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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

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.

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 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 (TiO_2) 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 TiO_2/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.

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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.

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 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 TiO_2 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 TiO_2 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 TiO_2 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.

Appendix B

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 TiO_2 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 TiO_2, the TiO_2 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 polyproplylene 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, 782[11]); *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 release layer and where the second layer is the release coating and the third layer includes the white pigment. *Id.* at 57.

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

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

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.

two layers would result in 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. CONCLUSION[13]

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.

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.

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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).

Appendix B

In summary:

Claims	35 U.S.C. §	Reference(s)/ Basis[14]	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.

APPENDIX C — JUDGMENT AND FINAL WRITTEN DECISION OF THE UNITED STATES PATENT AND TRADEMARK OFFICE, PATENT TRIAL AND APPEAL BOARD, FILED OCTOBER 21, 2021

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.

IPR2020-00629
Patent 7,754,042 B2

Before JEFFREY W. ABRAHAM, MICHELLE N. ANKENBRAND, and AVELYN M. ROSS, *Administrative Patent Judges.*

ABRAHAM, *Administrative Patent Judge.*

JUDGMENT
Final Written Decision
Determining All Challenged Claims Unpatentable
35 U.S.C. § 318(a)
Denying in Part, Dismissing in Part Patent Owner's Motion to Strike
37 C.F.R. § 42.20

Appendix C

I. INTRODUCTION

Neenah, Inc. and Avery Products Corporation (collectively, "Petitioner") filed a Petition (Paper 2, "Pet.") requesting *inter partes* review of claims 1–22 of U.S. Patent No. 7,754,042 B2 (Ex. 1004, "the '042 patent"). Pet. 12. Jodi A. Schwendimann, formerly known as Jodi A. Dalvey, and NuCoat, Inc., (collectively "Patent Owner") filed a Preliminary Response (Paper 8).

On September 15, 2020, we instituted *inter partes* review of all of the challenged claims based on all of the grounds identified in the Petition. Paper 10 ("Inst. Dec."). Subsequently, Patent Owner filed a Response (Paper 15, "PO Resp."), Petitioner filed a Reply (Paper 20, "Reply"), and Patent Owner filed a Sur-reply (Paper 27, "Sur-reply").

Patent Owner also filed a Motion to Strike (Paper 29), and Petitioner filed a Response to Patent Owner's Motion to Strike (Paper 30).

We held a consolidated oral hearing for this proceeding and related proceedings IPR2020-00628, IPR2020-00634, and IPR2020-00915 on July 12, 2021, and have entered a transcript of the hearing into the record. Paper 38 ("Tr.").

We have jurisdiction under 35 U.S.C. § 6. This Final Written Decision is issued pursuant to 35 U.S.C. § 318(a). For the reasons that follow, we determine that Petitioner has shown by a preponderance of the evidence that claims 1–22 of the '042 patent are unpatentable. We also deny in part and dismiss in part Patent Owner's Motion to Strike.

Appendix C

II. BACKGROUND

A. Related Proceedings

The parties identify the following lawsuits involving the '042 patent:

Jodi A. Schwendimann v. Neenah, Inc., Case No. 1:19-cv-00361-LPS (D. Del.) ("Delaware Lawsuit"); *Jodi A. Schwendimann v. Arkwright Advanced Coating, Inc.*, Case No. 0:11-cv-00820-JRT-HB (D. Minn.) ("Arkwright Lawsuit"); *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.12–13; Paper 9, 2.

Petitioner identifies the following related patents: U.S. Patent No. RE 41,623 ("the RE '623 patent"), U.S. Patent No. 7,749,581 ("the '581 patent"), U.S. Patent No. 7,771,554 ("the '554 patent"), and U.S. Patent No. 7,766,475 ("the '475 patent"). Pet. 12–13.

Patent Owner notes that the '042 patent is at issue in IPR2020-00635, and the related patents are at issue in the following co-pending proceedings: IPR2020-00628 (RE '623 patent), IPR2020-00633 (RE '623 patent), IPR2020-00634 ('581 patent), IPR2020-00641 (RE '623 patent), IPR2020-00644 ('581 patent), IPR2020-00915 ('475 patent), IPR2020-01121 ('554 patent), and IPR2020-01122 ('475 patent). Paper 9, 2.

B. The '042 Patent (Ex. 1004)

The '042 patent, titled "Method of Image Transfer on a Colored Base," issued on July 13, 2010. Ex. 1004, codes (45), (54). The '042 patent is directed to "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." Ex. 1004, 1:18–20.

The '042 patent explains that conventional image transfer processes involving the transfer of an image to a dark base such as a black t-shirt used two-steps: applying a white or light background polymeric material to the colored base with heat and then using another sheet to impart an image to the substantially white polymeric material. Ex. 1004, 3:39–52. According to the '042 patent, the conventional two-step process required careful alignment of an image with the white background, was "exceedingly time-consuming," and produced significant waste of base and image transfer materials. Ex. 1004, 3:53–59.

The '042 patent purports to provide a significant improvement over the conventional two-step image transfer process by transferring an image and background to a colored base in a single step. Ex. 1004, 3:21–23. An exemplary image transfer process of the '042 patent is depicted below in Figure 1.

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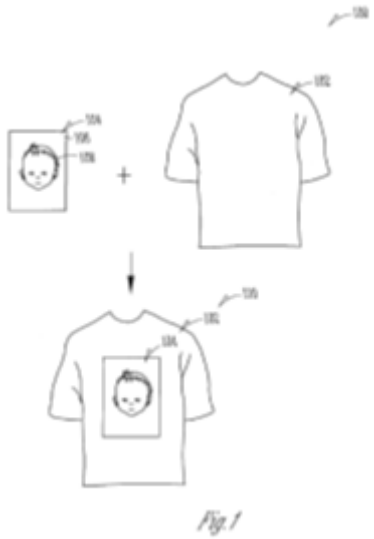

Fig. 1

Figure 1 "illustrates a schematic view of one process of image transfer onto a colored product." Ex. 1004, 2:33–34. Figure 1 depicts colored base material 102 (e.g., a colored textile) and image 104 including substantially white background 106 and indicia 108 disposed on substantially white background 106. Ex. 1004, 3:12–23. The '042 patent states that image 104 is applied to colored base material 102 with heat to make article 110 in a single step. Ex. 1004, 3:12–23.

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

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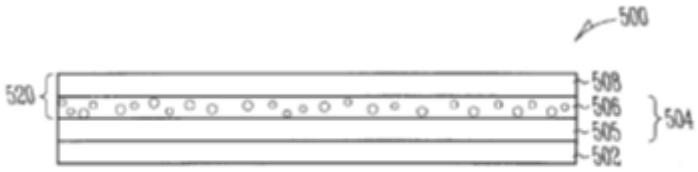


Fig. 5

Figure 5 illustrates "a cross-sectional view of one other embodiment of the image transfer device of the present invention." Ex. 1004, 2:43–44. The '042 patent explains that image transfer sheet 500 is comprised of substrate layer 502 and release layer 504 that comprises silicone coating 505 and white layer 506. Ex. 1004, 8:45–47. Figure 5 also depicts white layer 506 and receiving layer 508 as part of peel layer 520. Ex. 1004, 8:54–57, 9:1–3.

The '042 patent describes white layer 506 as imparting "a white background on a dark substrate." Ex. 1004, 3:37–38. In one embodiment, "the white layer 506 of the image transfer sheet 500 is impregnated with titanium oxide or other white or luminescent pigment." Ex. 1004, 8:51–54.[1] 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." Ex. 1004, 8:54–57. According to the '042 patent,

1. "Titanium oxide," "titanium dioxide," and "TiO2" are synonymous, and used interchangeably in the prior art, the parties' papers, and in this Decision.

> [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.

Ex. 1004, 6:8–20.

Referring once again to the embodiment of Figure 5, the '042 patent describes an image transfer process in more detail. Specifically, the '042 patent discloses "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." Ex. 1004, 9:1–3. The '042 patent states 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. Ex. 1004, 9:11–19. The '042 patent further states that "[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." Ex. 1004, 9:19–25. 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." Ex. 1004, 9:28–32. The '042 patent explains as follows:

> Because 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.

Ex. 1004, 9:33–48.

Appendix C

C. Illustrative Claims

Petitioner challenges claims 1–22 of the '042 patent. Of the challenged claims, claims 1, 10, and 16 are independent. Claims 1 and 16 are illustrative and are reproduced below.

> 1. A method of making an image transfer article, the method comprising:
>
> obtaining a removable substrate;
>
> coating the removable substrate with at least one of silicone, clay, resin, fluorocarbon, urethane, or an acrylic base polymer;
>
> overlaying the coated removable substrate with one or more polymer layers; and
>
> combining at least one of the one or more polymer layers with a pigment, the pigment having a concentration or configuration sufficient to provide an opaque background for received indicia, when transferred to a base.

Ex. 1004, 11:35–46.

> 16. A method of transferring an image to a dark-colored or black base, the method comprising:
>
> obtaining an image transfer article, comprising

an image-imparting member, including at least one surface configured to receive and carry indicia to be transferred and including at least one portion comprising a pigment concentration or configuration sufficient to provide an opaque, non-transparent background for received indicia, when transferred to the dark-colored or black base; and

a removable substrate disposed adjacent the image-imparting member;

peeling the removable substrate away from the image-imparting member;

contacting the image-imparting member, after being separated from the removable substrate, to the dark-colored or black base such that the opaque background is closer to the dark-colored or black base than the received indicia; and

applying heat to at least the image-imparting member so that received indicia and the opaque background having the degree of non-transparency are transferred to the dark-colored or black base at substantially the same time.

Ex. 1004, 12:52–13:8.

Appendix C

D. Reviewed Unpatentability Challenges

We instituted an *inter partes* review to determine whether claims 1–22 of the '042 patent are unpatentable based on the following challenges:

Claim(s) Challenged	**35 USC[2]**	**References/ Basis**
1–3, 5–8, 10–22	§ 103	Oez-US,[3] Meyer[4]
4	§ 103	Oez-US, Meyer, Hare[5]
9	§ 103	Oez-US, Meyer, DeVries[6]
1–3, 5–8, 10–22	§ 103	Oez-PCT,[7] Oez-US

2. 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.

3. US 5,665,476, issued Sep. 9, 1997 (Ex. 1013).

4. US 3,359,127, issued May 9, 1966 (Ex. 1019).

5. US 4,284,456, issued Aug. 18, 1981 (Ex. 1037).

6. US 4,021,591, issued May 3, 1977 (Ex. 1036).

7. WO 97/41489, published Nov. 6, 1997 (Ex. 1014). References to Oez-PCT will be to Exhibit 1016, which is an English-language translation of Oez-PCT with line numbers. Pet. 15.

4	§ 103	Oez-PCT, Oez-US, Hare
9	§ 103	Oez-PCT, Oez-US, DeVries
1–3, 5–8, 10–22	§ 103	Kronzer,[8] Oez-US
4	§ 103	Kronzer, Oez-US, Hare
9	§ 103	Kronzer, Oez-US, DeVries
1–3, 5–8, 10–16, 19–22	§ 103	Kronzer, Meyer
4	§ 103	Kronzer, Meyer, Hare
9	§ 103	Kronzer, Meyer, DeVries
17, 18	§ 103	Kronzer, Meyer, Hare-PCT[9]

E. Testimonial Evidence

Petitioner filed a Declaration of Robert A. Wanat, Ph.D. (Ex. 1020, "Wanat Declaration") with its Petition. Petitioner also filed a Declaration of Robert A. Wanat, Ph.D. in Support of Petitioner's Reply (Ex. 1062, "Wanat Reply Declaration").

8. US 5,798,179, issued Aug. 25, 1998 (Ex. 1018).

9. WO 97/33763, published Sep. 18, 1998 (Ex. 1038).

Patent Owner filed a Declaration of Christopher Ellison, Ph.D. (Ex. 2011) with its Patent Owner Response. Petitioner deposed Dr. Ellison, and filed the transcript of the deposition as Exhibit 1063 in this proceeding.

III. ANALYSIS

A. Legal Standards

"In an [*inter partes* review], the petitioner has the burden from the onset to show with particularity why the patent it challenges is unpatentable." *Harmonic Inc. v. Avid Tech., Inc.*, 815 F.3d 1356, 1363 (Fed. Cir. 2016) (citing 35 U.S.C. § 312(a)(3) (requiring *inter partes* review petitions to identify "with particularity . . . the evidence that supports the grounds for the challenge to each claim")). This burden of persuasion never shifts to 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).

A claim is unpatentable under 35 U.S.C. § 103(a) 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." *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.[10] *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.

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." *KSR*, 550 U.S. at 418; *accord In re Translogic Tech., Inc.*, 504 F.3d 1249, 1259 (Fed. Cir. 2007). However, a 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, a 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

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

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)).

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 invention. *Graham*, 383 U.S. at 17.

In the Institution Decision, we determined that a person of ordinary skill in the art at the time of the invention of the '042 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.

Inst. Dec. 12–13 (adopting Patent Owner's proposed definition).

For purposes of this Final Written Decision, we maintain our determination from the Institution Decision because neither party disputes that determination and that level of ordinary skill is consistent with the record. *See* PO Resp. 15; *see generally* Reply.

C. Claim Construction

In an *inter partes* review, 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) (2019). Under that standard, we construe claims "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). Furthermore, we expressly construe the claims only to the extent necessary to resolve the unpatentability issues before us. *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))).

In the Institution Decision, we determined that each of the claims in the '042 patent requires a "white layer" that melts and mixes with another layer or layers during application. Inst. Dec. 14. Our construction was based

the parties' agreement that the claims of the '042 patent require a white layer that melts and mixes with another layer, and on the claim construction of "white layer" that the district court in the Arkwright Lawsuit adopted. Ex. 1022, 17 (Arkwright Lawsuit Markman Order). In the Institution Decision, we rejected Patent Owner's attempt to modify the interpretation adopted in the Arkwright Lawsuit to include "a polymer that *softens or* melts and mixes *to some degree* with another layer." Inst. Dec. 14 (Patent Owner's modifications indicated with underlining).

In its Response, Patent Owner again requests that we adopt a construction of "white layer" that differs from the construction adopted in the Arkwright Lawsuit and in our Institution Decision. Specifically, Patent Owner's proposed construction 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. 15–16 (Patent Owner's modifications indicated with underlining).

Petitioner contends that we should again reject Patent Owner's attempt to rewrite the construction of "white layer" because it is "completely at odds" with the construction in both the Arkwright Lawsuit and the Delaware Lawsuit, which requires actual melting, not just softening, and construes "mix" to have its plain and ordinary meaning. Reply 2 (citing Ex. 1066, 6).

We agree, and decline to adopt Patent Owner's construction that departs from the construction in the Arkwright Lawsuit and the Delaware Lawsuit. Ex. 1022, 17; Ex. 1066, 6. Accordingly, for purposes of this Final Written Decision, we maintain our construction of the term "white layer" from the Institution Decision. We note, however, 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. 17; Tr. 13:21–14:3; 53:19–21.

We do not need to construe any other terms for purposes of this Decision. *Nidec*, 868 F.3d at 1017.

D. Alleged Obviousness over Kronzer and Oez-US (claims 1–3, 5–8, and 10–22)

Petitioner contends claims 1–3, 5–8, and 10–22 are unpatentable as obvious over Kronzer and Oez-US. Pet. 66. Petitioner directs us to portions of Kronzer and Oez-US that purportedly disclose all the limitations in the challenged claims. Pet. 66–79. Petitioner also relies on the declaration testimony of Dr. Wanat to support its arguments. *See* Pet. 66–79; Reply 2– 12; Ex. 1020; Ex. 1062.

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, Abstract, 2:25–30. According to Kronzer, the heat transfer paper includes a flexible first layer, or

base sheet, that "ha[s] sufficient strength for handling, coating, sheeting, and other operations associated with its manufacture, and for removal after transferring an image." Ex. 1018, 4:15–25. 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. Ex. 1018, 5:23–25. A third layer, overlaying the second layer, includes a thermoplastic polymer, which melts in a range from about 65° C to about 180° C. Ex. 1018, 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." Ex. 1018, 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. Ex. 1018, 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. Ex. 1018, 8:31–46. Additionally, "any of the foregoing film layers may contain other materials, such as processing aids, release agents, pigment*s*, 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." Ex. 1018, 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." Ex. 1013, 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." Ex. 1013, 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." Ex. 1013, 1:47–49. Oez-US describes ironing the film onto a textile "at elevated temperatures." Ex. 1013, 3:56–58.

3. Claim 1

Petitioner contends that the combination of Kronzer and Oez-US suggests the method of making the image transfer article of claim 1. Pet. 67–72. Petitioner argues that Kronzer describes "'a heat transfer paper' (*i.e.*, image transfer sheet) 'for transferring designs, messages, and illustrations' (*i.e.*, images) 'on articles of clothing, such as T-shirts.'" Pet. 67–68 (quoting Ex. 1018, 1:5–11, 9:1–18:6). Petitioner also argues Kronzer teaches how to make its image transfer articles. Pet. 68 (citing Ex. 1018, 4:27–8:46).

Claim 1 requires obtaining a removable substrate and coating the substrate with at least one of silicone,

clay, resin, fluorocarbon, urethane, or an acrylic base polymer. Ex. 1004, 11:37–40. Petitioner explains that "Kronzer teaches that its image transfer article 'includes a flexible first layer having first and second surfaces,' which 'serves as a base sheet or backing' and 'typically will be a film or a cellulosic nonwoven web.'" Pet. 68 (quoting Ex. 1018, 4:15–20, 4:27–31). According to Petitioner, Kronzer also explains that the backing sheet, which can be easily removed after the image has been transferred to the fabric, may include an acrylic base polymer or clay. Pet. 68–69 (citing Ex. 1018, 4:6–14, 5:23–45, 9:49–50, 12:12–43, Tables VI–XIV).

Claim 1 next requires "overlaying the coated removable substrate with one or more polymer layers." Ex. 1004, 11:41–42. Petitioner alleges that Kronzer discloses a third layer that overlays the second layer and includes a thermoplastic polymer, and that "a fourth layer may overlay the third layer in order to provide an ink jet printable heat transfer material," which "typically includes a film-forming binder and a powdered thermoplastic polymer." Pet. 69 (quoting Ex. 1018, 2:45–48, 2:65–67, 7:3–9).

Lastly, claim 1 requires "combining at least one of the one or more polymer layers with a pigment, the pigment having a concentration or configuration sufficient to provide an opaque background for received indicia, when transferred to a base." Ex. 1004, 11:43–46. Petitioner argues that "[a]lthough Kronzer does not expressly disclose that its third layer . . . includes a 'white' pigment that provides an opaque/non-transparent background, this feature is taught by Oez-US." Pet. 70. In particular,

Petitioner explains that "Oez-US teaches combining its polymer layer with a white pigment to provide a white background for an image that is transferred to a base (e.g., fabric)." Pet. 37–38 (citing Ex. 1013, 1:26–31, 1:47–55, 3:22–58; Ex. 1020 ¶¶ 114–116). Petitioner contends that a person of skill in the art would have had reason to combine the teachings of Kronzer and Oez-US because "both Kronzer and Oez-US teach printable multi-layered transfer structures having a removable substrate, release coating, and image-imparting layer, and share the common goal of improving image transfer characteristics." Pet. 67. Petitioner also argues that Kronzer teaches that any of its layers may contain materials such as pigments, and Oez-US teaches that its white-layered sheets "can be used particularly advantageously on dark (black) fabrics." Pet. 70 (quoting Ex. 1013, 1:27–31, 2:50–51; citing Ex. 1018, 8:47–49).

Petitioner additionally asserts that "Kronzer and Oez-US further teach the 'melt and mix' requirement." Pet. 71. Petitioner contends that Kronzer's third and fourth layers can comprise thermoplastic polymers that melt between 65 °C and 180 °C. Pet. 71 (citing Ex. 1018, 2:45–67). According to Petitioner, a person skilled in the art would have understood that the Kronzer/Oez-US transfer sheet would have been heated above 180 °C during application and, therefore, that the white layer (third layer) and image-imparting layer (fourth layer) would melt and mix. Pet. 71–72 (citing Ex. 1020 ¶¶ 38–60, 211–213).

Patent Owner does not dispute that Kronzer and Oez-US together teach or suggest all of the limitations

recited in claim 1. *See generally* PO Resp. 20–42;[11] Reply 1. After considering the full record developed during trial, we agree with Petitioner's undisputed arguments and evidence that Kronzer and Oez-US teach or suggest all of the limitations recited in claim 1.

Patent Owner, however, does contend that Petitioner has not demonstrated a reason to combine just the white pigment from Oez-US (and not the entire cross-linking white layer) with Kronzer's structure or that such a combination would yield a reasonable expectation of success. PO Resp. 27–28. Additionally, Patent Owner

11. In its Sur-reply, Patent Owner states that "Petitioner's main obviousness challenge presents a combination of two references (Kronzer-Oez . . .), **neither of which discloses this key feature**: a white layer that melts and mixes with another layer." Sur-reply 1. Patent Owner also states, "[n]o prior art of record teaches the key feature of the '042 Patent: a white layer that melts and mixes with another layer." Sur-reply 2. We understand Patent Owner's assertions here to mean that neither reference, individually, discloses a white layer that melts and mixes, not that the combined teachings of the references fail to disclose a white layer that melts and mixes. Our understanding is based on Patent Owner's arguments that Kronzer has no need for a white layer at all, and that Oez-US discloses a white layer that does not melt and mix. Sur-Reply 1. Patent Owner's statements in the Surreply do not address Petitioner's actual argument, namely that Kronzer discloses a layer that melts and mixes, and Oez-US discloses the use of a white pigment, such that the references collectively teach or suggest a white layer that melts and mixes. *See In re Merck*, 800 F.2d 1091, 1097 (Fed. Cir. 1986) ("Non-obviousness cannot be established by attacking references individually where the rejection is based upon the teachings of acombination of references.").

affirmatively asserts that a person of ordinary skill in the art would *not* have had a reason to combine the teachings of Kronzer and Oez-US to achieve the invention claimed in the '042 patent. PO Resp. 28. We address Patent Owner's arguments below.

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

Patent Owner acknowledges that Petitioner offers three reasons why a person of ordinary skill in the art would have combined the teachings of Kronzer and Oez-US, and challenges each reason. PO Resp. 28–31.

Patent Owner contends that Petitioner's first reason—that both Kronzer and Oez-US teach "printable multi-layered transfer structures having a removable substrate, release coating, and image-imparting layer"—is incorrect. PO Resp. 28. Patent Owner asserts 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.'" PO Resp. 28 (citing Ex. 1013 generally). Patent Owner additionally argues that mere identity of subject matter between two references is insufficient to establish that the ordinarily skilled artisan would have had a reason to combine the teachings of those references. PO Resp. 28.

Petitioner asserts that Patent Owner's allegation regarding Oez-US being limited to a single layer of plastic is "demonstrably false." Reply 4. 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." Reply 4 (citing Ex. 1013, 2:36–44; 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. Petitioner directs us to specific portions of Oez-US that, like Kronzer, describe multi-layered transfer structures. *See* Ex. 1013, 2:36–44 (describing a polymer layer *between* the paper and the polyurethane layer), claim 12 (same). Testimony from Dr. Ellison likewise indicates Oez-US discloses a multi-layered structure. Ex. 1063, 295:8–296:18 (Dr. Ellison's testimony 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. Nevertheless, we consider Petitioner's discussion of the identity of subject matter to be 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 actually solve fundamentally different problems using fundamentally different technologies." PO Resp. 29. 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.'" PO Resp. 29. According to Patent Owner, Kronzer's solution involved experimenting with transparent transfer materials (i.e., lacking pigment) that can be printed in mirror image and applied image-side down, whereas Oez-US's solution involves incorporating white pigment into its coating and using an image-side up, peel first method. PO Resp. 29–30. 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 the references." PO Resp. 30.

Petitioner maintains that "Kronzer and Oez-US are both directed to improving the image transfer quality of multi-layer transfer sheets." Reply 4 (citing Pet. 66–67; Ex. 1020 ¶¶ 97, 199–200; Ex. 1062 ¶¶ 11–12). Citing our Institution Decision, Petitioner explains that "Kronzer's teachings are applicable to image transfers on any color fabric" and argues 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." Reply 4 (citing Inst. Dec. 21–22; Ex. 1020 ¶¶ 97, 200, 208–210, 223; Ex. 1062 ¶¶ 7–14).

We find Petitioner's arguments persuasive. Contrary to Patent Owner's argument that the references have divergent goals, the evidence of record supports Petitioner's assertion that both Kronzer and Oez-US share the common goal of improving the quality of image transfers. *E.g.*, Ex. 1013, 1:25–31 (referring to a transfer paper that "ensures a greater brilliance of the image"); Ex. 1018, 2:17–48 (referring to "an improved heat transfer paper"); Ex. 1062 ¶¶ 199–200. Additionally, we credit Dr. Wanat's testimony that Kronzer and Oez-US are "complementary and compatible" with one another "because Kronzer's image transfer sheet can be used on any color fabric." Ex. 1062 ¶ 11. As noted in our Institution Decision, we do not discern any specific discussion in Kronzer that its teachings are limited to any color fabric. Inst. Dec. 21. Nor has Patent Owner directed us to any. Instead, Patent Owner acknowledges that Kronzer does not discuss problems with transferring an image to a dark fabric, or the use of dark or black fabric/T-shirts. PO Resp. 22. In view of Kronzer's silence about the color of its T-shirt base, a person of ordinary skill in the art would have understood that Kronzer's teachings are applicable to any color fabric.

Moreover, even if we were to agree with Patent Owner's argument regarding Kronzer and Oez-US solving fundamentally different problems, it would be error to "assum[e] that a person of ordinary skill in the art attempting to solve a problem will be led only to those prior art elements designed to solve the same problem." *KSR*, 550 U.S. at 402. Further, "[c]ommon sense teaches . . . that familiar items may have obvious uses beyond their

primary purposes, and in many cases a person of ordinary skill will be able to fit the teachings of multiple patents together like pieces of a puzzle." *Id.* at 420.

Patent Owner also challenges Petitioner's argument that a person of ordinary skill in the art would have combined the teachings in Kronzer and Oez-US because Kronzer discloses its film layer may contain pigments and "Oez-US teaches that its transfer sheets 'can be used particularly advantageously on dark (black) fabrics.'" PO Resp. 30 (quoting Pet. 67, 70; citing Pet. 68–69). According to Patent Owner,

> nothing in this argument indicates ***why*** a [person of ordinary skill in the art] would be motivated to combine Oez-US ***with Kronzer***. In other words if a [person of ordinary skill in the art] had before it Kronzer and Oez and was looking to solve the problem of transferring to dark fabrics, Petitioners do not explain what would motivate a [person of ordinary skill in the art] to look to Kronzer ***at all***.

PO Resp. 30. Patent Owner faults Petitioner for failing to argue, for example, "that Kronzer's structure provides something beneficial that is lacking in Oez-US" or "that the combination of the two references as Petitioners propose would result in some new desirable feature." PO Resp. 30; Sur-reply 11. As a result, Patent Owner argues that Petitioner's combination of Kronzer and only the pigment from Oez-US uses the claims as a roadmap. PO Resp. 30–31.

We disagree. Petitioner's arguments are based on Oez-US supplying something beneficial that is missing from Kronzer, and therefore improving the system of Kronzer.[12] Thus, contrary to Patent Owner's assertions otherwise, Petitioner has indicated why a person of ordinary skill in the art would have been motivated to combine Oez-US and Kronzer. Furthermore, Petitioner's reliance on express teachings from Oez-US and Kronzer in support of its arguments undermines Patent Owner's assertion that Petitioner improperly relies on hindsight.

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. Petitioner relies on Kronzer's express teaching that any of its layers may contain pigments and Oez-US's express teaching that its layered sheet including a white pigment "can be used particularly advantageously on dark (black) fabrics." Pet. 70 (citing Ex. 1018, 8:47–49; Ex. 1013, 1:27–31 (stating the use of white pigment "ensures a greater brilliance of the image . . . especially for printing black textiles"), 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 achieve the shared goal in Kronzer and

12. In view of this, we agree with Petitioner that Patent Owner's assertion regarding Petitioner's failure to argue Kronzer provides something beneficial that is lacking in Oez-US is a red herring, as Petitioner does not propose to modify or improve anything in Oez-US based on Kronzer. Reply 5.

Oez-US of improving image transfer. Pet. 66–67; Reply 5; Ex. 1062 ¶¶ 11–12.

b) Patent Owner's affirmative arguments that a person of ordinary skill in the art would not have combined Kronzer and Oez-US to yield the invention described in the '042 patent claims

In addition to arguing Petitioner fails to establish that a person skilled in the art would have been motivated to combine Kronzer and Oez-US, Patent Owner affirmatively argues the evidence of record shows a person of ordinary skill in the art would not have been motivated to combine Kronzer and Oez-US. PO Resp. 31. 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 applications.

PO Resp. 31. Patent Owner additionally alleges adding the white pigment from Oez-US to Kronzer would not yield predictable results and a person of ordinary skill in the art would not "expect the combination to succeed"

because Petitioner "incorrectly borrows a single function of the white pigment in Oez (allowing transfer to dark fabrics) while ignoring the impact of the other functions of the white pigment." PO Resp. 31–32. 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 and Oez-US because Kronzer's sheets are transparent and Kronzer does not acknowledge problems associated with transferring an image to 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 '042 Patent . . . because Kronzer does not solve – or even acknowledge – the problem of transferring an image onto dark fabric." PO Resp. 32. 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. PO Resp. 33 (citing Ex. 2011 ¶¶ 41, 137).

Petitioner "asserts that ***Oez-US***—not Kronzer—discloses the solution to the problems with transferring images onto dark fabrics; *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

'042 patent purports to solve. Reply 6. Petitioner further explains that Kronzer is not limited to any fabric color and a person skilled in the art "would have been motivated to improve Kronzer by including a white pigment as taught by Oez-US." Reply 6.

We are persuaded by Petitioner's arguments. Contrary to Patent Owner's assertions, Kronzer need not solve, much less acknowledge, the specific problem of dark image transfer. The test for obviousness is not whether any one or all of the references expressly suggests the claimed invention, 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). Moreover, 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 method. *See KSR*, 550 U.S. at 418 (holding "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 discloses an image transfer sheet, and does not expressly limit its teachings to any color fabric. Oez-US teaches an improvement—the use of a white, opaque pigment that "ensures a greater brilliance of the image . . . especially for printing on black textiles."

Ex. 1013, 1:28–31. The evidence of record discussed above, including the fact that Kronzer teaches including a pigment in any one of its polymer layers (Ex. 1018, 8:46–51), the shared goal of improving image transfer sheets (Ex. 1013, 1:25–31; Ex. 1018, 2:17–48), and the "complementary and compatible" nature of the transfer sheets in Kronzer and Oez-US (Ex. 1062 ¶ 11), supports a finding that a person of ordinary skill in the art would have recognized that the Oez-US technique would improve the similar transfer sheet disclosed in Kronzer, and would have had a reason to combine the teachings of Kronzer and Oez-US. *See KSR*, 550 U.S. at 417.

(2) whether a person of ordinary skill in the art would not have had reason to combine Kronzer with Oez-US's white pigment alone 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 crosslink, i.e., that melts and mixes. PO Resp. 34; Sur-reply 11–12. According to Patent Owner, "[t]he cross-linking reaction in Oez is ***required*** for the white layer in Oez to function," but Petitioner simply ignores it. PO Resp. 34. Patent Owner also argues that "transferring a pigment from a reactive system (Oez) to a non-reactive system (Kronzer) raises significant technical challenges from a chemistry and materials science perspective," such that a person of ordinary skill

in the art would not have had a reasonable expectation of success in taking only the pigment from Oez-US, and not the entire crosslinking white layer. PO Resp. 35 (citing Ex. 2011 ¶ 141).

Patent Owner contends the "numerous failures in the numerous trials in Kronzer" support its argument and further "demonstrate why one cannot simply add a completely different composition (i.e., white pigment) without making other adjustments or accommodating for all of the various effects caused by the pigments." PO Resp. 35 (citing Ex. 2011 ¶ 140). Patent Owner argues that "it is 'extremely rare' to find a 'drop in' replacement for an existing ingredient that will result in the identical finished . . . color." PO Resp. 35–36 (citing Ex. 2011 ¶ 140; Ex. 2012, 3). Additionally, Patent Owner states "that, in the reactive system of Oez[-US], the titanium dioxide performs multiple functions beyond providing whiteness," and can also chemically react with the components of a polymer layer. PO Resp. 36 (citing Ex. 2011 ¶ 144). Patent Owner further argues that titanium dioxide is a particulate, which "would completely change the characteristics" of Kronzer's third layer, including the viscosity and flow properties of the third layer at transfer temperatures and solid state characteristics of the third layer, such as modulus, elasticity, and flexibility. PO Resp. 36–37. As a result, according to Patent Owner, transferring the pigment from Oez-US to Kronzer is not a "like-for-like transfer," the results of the transfer would be unpredictable, and a person would not have had a reasonable expectation that adding pigment to the third layer of Kronzer would be successful. PO Resp. 37.

Petitioner argues that Oez-US does not teach away from using only the white pigment because "Oez-US does ***not*** make ***any*** statement that criticizes, discredits or would discourage a [person of ordinary skill in the art] from the use of a white pigment such as TiO2 in non-crosslinking polymers." Reply 7. Petitioner also argues that "Oez-US does ***not*** suggest that using TiO2 with thermopolymers, such as those disclosed in Kronzer, would not achieve the same improvement to an image transfer sheet." Reply 7 (citing Ex. 1062 ¶¶ 13–20). Instead, Petitioner explains that it is undisputed that Oez-US describes the use of TiO2 to improve image quality on dark substrates and asserts that "Kronzer also ***encourages*** using of pigments in its polymer layers." Reply 7 (citing Ex. 1013, 1:46–55; Ex. 1018, 8:46–51; Ex. 1062 ¶¶ 16–20; Ex. 2011 ¶¶ 87–91). Petitioner further asserts that a person of ordinary 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***," and points to testimony from Patent Owner's declarant, Dr. Ellison, in support. Reply 7–8 (citing Ex. 1063 ¶¶ 17–20; Ex. 1063, 304:8–22). And Petitioner states that neither Patent Owner nor Dr. Ellison cite to record evidence "to support [their assertion] that TiO2 somehow participates in the cross-linking reaction in Oez-US." Reply 8 (citing PO Resp. 34–36; Ex. 2011 ¶¶ 141–148; Ex. 1063, 302:4–303:21).

We do not agree with Patent Owner's arguments that Oez-US teaches away from using white pigment alone or that Oez-US requires a crosslinking polymer for the

white pigment to function. *See* PO Resp. 34–37. 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 crosslinking polymer with its white pigment or discourages use of a white pigment without a crosslinking polymer. Our independent review of Oez-US does not reveal any such teaching. The fact that Oez-US uses a white pigment in addition to a crosslinked polymer does not mean that crosslinking is required nor does it teach away from pursuing the path taken in the '042 patent.

Patent Owner's arguments that transferring a white pigment from a reactive to a non-reactive system would have been unpredictable because the titanium dioxide performs functions beyond providing whiteness and the properties and characteristics of the layer would be altered are similarly unavailing. *See* PO Resp. 34–37; Sur-reply 5–6. Neither Patent Owner nor its declarant, Dr. Ellison, identifies anything in Oez-US that suggests the titanium dioxide performs any function other than

providing a contrasting background. *See generally* PO Resp. 34–37; *see generally* Ex. 2011. Rather, Oez-US consistently refers to the white pigment or titanium dioxide as the material responsible for providing contrast for images transferred to dark-colored textiles. Ex. 1013, 1:25–30, 1:50–54, 2:50–51. In fact, Oez-US states that "[i]f white textiles are to be printed on, the titanium oxide pigment can also be omitted." Ex. 1013, 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 a non-reactive system as Petitioner proposes. Ex. 2011 ¶ 144 (emphasis added).

Furthermore, record evidence supports Petitioner's position that a person of ordinary skill in the art would have understood that incorporating titanium dioxide within a polymer layer provides a white background whether the polymer is crosslinked 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, which is entitled to little or no weight. *See* Ex. 2011 ¶¶ 145–148; 37 C.F.R. § 42.65(a).

Similarly, Patent Owner's argument that "it is 'extremely rare' to find a 'drop in' replacement" for titanium dioxide (PO Resp. 35–36) appears to be based on an incomplete understanding of the referenced articles and is otherwise conclusory. For example, Patent Owner relies on the testimony of Dr. Ellison and Exhibits 2012 and 2013. But Dr. Ellison admits the book excerpted in Exhibit 2013 is not relevant to inorganic pigments such as TiO2, and that he had not "studied" the details of the paper in Exhibit 2012, which identifies the problem with TiO2 only as a possible color shift or variance in lightness of up to 10%. Reply 8–9; Ex. 1063, 343:11–347:7, 350:5–355:2.

On the other hand, Petitioner identifies evidence that suggests titanium dioxide is well-studied, well-understood, and the most widely-used white pigment in response to Patent Owner's unpredictability arguments and arguments that a person of ordinary skill in the art would not have had a reasonable expectation of success. Reply 8–10; Ex. 1062 ¶¶ 19–39 (citing Exs. 1054–1058); *see also* Ex. 2012, 1 ("Titanium dioxide is the most widely used white pigment because of its unique ability to provide exceptional opacity and lend whiteness and brightness."); Ex. 1055 ("Half of all TiO2 pigment produced is consumed by the coatings industry and a quarter by the paper industry.").

We also disagree with Patent Owner's assertion that the alleged "numerous failures" in Kronzer demonstrate why adding a new component to the third layer would be unpredictable. PO Resp. 35; Sur-reply 5. Even if we were to accept Patent Owner's characterization of Kronzer

as including some failures as true, Patent Owner itself acknowledges that none of those trials included a pigment. PO Resp. 31 ("Kronzer's trials all involve transparent, non-pigmented sheets . . . ."), 33 ("In each of the 68 trials in Kronzer, there is no pigment in any of the layers that are transferred . . . ."); *see also* Reply 9 ("Kronzer does not disclose any 'failure' regarding the use of TiO2 or any pigment.") Thus, we fail to see the particular significance of those specific trials to the question of unpredictability based on the addition of a pigment to Kronzer. Moreover, a reference should be considered in its entirety for what it fairly teaches one skilled in the art, which here would include the multiple successful trials in Kronzer. Ex. 1018, Tables VI–XIV (showing transfer sheet trials with characteristics, including image transfer, that are "good" and/or "excellent"); *see In re Wesslau*, 353 F.2d 238, 241 (CCPA 1965).

(3) whether a person of ordinary skill in the art would not have had reason to combine Kronzer and Oez-US because 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. 38. In particular, Patent Owner asserts that "Kronzer is a multilayered 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." PO Resp. 38.

Petitioner argues that Oez-US is not a "single homogenized coating" as Patent Owner suggests. Reply 10. Petitioner asserts that both Oez-US itself and Patent Owner's own declarant describe Oez-US as having a multilayered structure. Reply 10.

For the same reasons discussed above in Section III.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 a multi-layered image transfer structure. *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 Kronzer and Oez-US because the problems being solved, and technology employed to solve them 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. 39.

Petitioner argues that "Kronzer and Oez-US are both directed to improving the image transfer quality of multi-layer transfer sheets." Reply 4; Pet. 66–67 (referring to the "common goal" of improving image transfer sheets). Dr. Wanat testifies that the teachings of Kronzer and Oez-US are "clearly complementary and compatible with one another" because "Kronzer's image transfer sheet can be used on ***any*** color fabric," "Kronzer teaches that 'pigments' can be used in any of its layers," and "[t]here is no structural or chemical characteristic of Kronzer's image transfer sheet that would prevent it from being applied to dark or black fabric, or prevent it from being used with a white pigment as taught by Oez-US." Ex. 1062 ¶¶ 11–12.

For the same reasons discussed above in Section III.D.3.a, Patent Owner's arguments in this regard are unavailing. As we explained above, we consider Kronzer and Oez-US to be aligned with a common goal of improving the quality of transferred images. Additionally, Dr. Wanat's testimony regarding Oez-US and Kronzer being complementary and compatible, which Kronzer supports because it teaches the use of pigments and is not limited to fabric color, undermines 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 Kronzer and Oez-US where the printing and applying method of Kronzer and Oez-US are opposite to one another

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 a person of ordinary skill in the art would not have had a reasonable expectation of successfully adding white pigment to Kronzer's third layer using Kronzer's method of application. PO Resp. 39–40. Patent Owner contends that, with the exception of claim 16, Petitioner does not address how one would have combined the peel later method of Kronzer (where the backing is peeled away from the image transfer sheet after heating) with the peel first method of Oez-US (where the backing is peeled away from the image transfer sheet before heating), or which method an ordinarily skilled artisan would have used. PO Resp. 39. According to Patent Owner, a person of ordinary skill in the art using Kronzer's peel later method would not have had a reasonable expectation of successfully adding a white pigment to the third layer of Kronzer because, in Kronzer, the third layer is between the viewer and the graphic, and, therefore, adding white pigment would "obscure the decorative graphic" and be counterintuitive. PO Resp. 39–40.

Petitioner asserts that "far from being 'counterintuitive' (PO[Resp.] 40), a [person of ordinary skill in the art] (or anyone else possessing a modicum of common sense) would

have understood that the inclusion of an white/opaque pigment in Kronzer's layer would necessitate the image to be positioned positively on top of (not underneath) the opaque/white layer, as expressly taught by Oez-US." Reply 10–11 (citing Ex. 1062 ¶¶ 42–43).

We are persuaded by Petitioner's arguments. Oez-US teaches that the printed image should be oriented on top of the white/opaque background. Ex. 1013, 1:25-31, 1:46-55, 3:1-4. Thus, we agree with Petitioner that a person of ordinary skill in the art would have understood from the references themselves that the image in Kronzer should be positioned such that it does not end up underneath the white/opaque layer when printed. Reply 10–11. Further, as Patent Owner acknowledges, using a white pigment without modifying Kronzer's peel later method would result in the white layer covering the image and therefore, the image would be obscured. PO Resp. 40 (citing Ex. 2011 ¶ 150) ("[A] [person having ordinary skill in the art] would expect that white pigment in the third layer would obscure the decorative graphic."); Pet. Reply 12; Ex. 1062 ¶¶ 42–43. We disagree, however, that this would have dissuaded a person of ordinary skill in the art from making Petitioner's proposed modification because 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).

For all of 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 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. Claims 2, 3, and 5–8

Claims 2, 3, and 5–8 depend from claim 1. Petitioner alleges that the combined teachings of Kronzer and Oez-US would have rendered obvious the subject matter of dependent claims 2, 3, and 5–8. Pet. 72–73. Petitioner directs us to portions of Kronzer and Oez-US that teach or suggest all of the limitations in claims 2, 3, and 5–8, and argues that a person of ordinary skill in the art would have had reason to combine the disclosures in Kronzer and Oez-US and would have had a reasonable expectation of successfully achieving the claimed invention. Pet. 72–73.

Patent Owner does not separately address dependent claims 2, 3, and 5–8 and, therefore, has forfeited any arguments based on these uncontested claims. *See generally* PO Resp. 20–42; *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). Instead, Patent Owner relies on the same arguments addressed above in our discussion of claim 1, challenging Petitioner's arguments and evidence regarding whether a person of ordinary skill in the art would have had reason to combine the teachings of Kronzer and Oez-US, and whether a person of ordinary skill in the art would have had a reasonable expectation of success.

We have reviewed the information Petitioner provides, including the relevant portions of the Wanat Declaration, and agree with Petitioner's undisputed arguments and evidence that Kronzer and Oez-US teach or suggest all of the limitations in claims 2, 3, and 5–8. Additionally, for the same reasons discussed above, 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 disclosures set forth in Kronzer and Oez-US, and that a person of ordinary skill in the art would have had a reasonable expectation of success in achieving the claimed invention. We, therefore, find Petitioner has established, by a preponderance of the evidence, that claims 2, 3, and 5–8 are unpatentable as obvious in view of the combined teachings of Kronzer and Oez-US.

5. Claims 10–15

Petitioner also alleges that the combined teachings of Kronzer and Oez-US would have rendered obvious the subject matter of independent claim 10 and claims 11–15, which depend therefrom. Pet. 67–74. Independent

claim 10 is similar to claim 1, and additionally requires an "image-imparting member including at least one surface configured to receive and carry indicia to be transferred." Ex. 1004, 12:24–28. For the common limitations between claims 1 and 10, Petitioner relies on the same arguments and evidence discussed above with regard to claim 1. Pet. 67–72. Additionally, Petitioner argues that Kronzer's fourth layer, which "is useful for a printable heat transfer material on which an image is to be placed by an ink jet printer," corresponds to the "image-imparting member" with a surface for receiving/carrying indicia to be transferred, as recited in claim 10. Pet. 69–70.

Patent Owner does not separately address independent claim 10 or dependent claims 11–15 and, therefore, has forfeited any arguments based on these uncontested claims. *See generally* PO Resp. 20–42; *cf. NuVasive*, 842 F.3d at 1381. Instead, Patent Owner relies on the same arguments addressed above in our discussion of claim 1, challenging Petitioner's arguments and evidence regarding whether a person of ordinary skill in the art would have had reason to combine the teachings of Kronzer and Oez-US, and whether a person of ordinary skill in the art would have had a reasonable expectation of success.

We have reviewed the information Petitioner provides, including the relevant portions of the Wanat Declaration, and agree with Petitioner's undisputed arguments and evidence that Kronzer and Oez-US teach or suggest all of the limitations in claims 10–15. Additionally, for the same reasons discussed above, 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 disclosures set forth in Kronzer and Oez-US, and that a person of ordinary skill in the art would have had a reasonable expectation of success in achieving the claimed invention. We, therefore, find Petitioner has established, by a preponderance of the evidence, that claims 10–15 are unpatentable as obvious in view of the combined teachings of Kronzer and Oez-US.

6. Claims 16–22

Petitioner alleges that the combined teachings of Kronzer and Oez-US would have rendered obvious the subject matter of independent claim 16 and claims 17–22, which depend therefrom. Pet. 74–79. Independent claim 16 is similar to claim 1, and additionally requires an "image-imparting member including at least one surface configured to receive and carry indicia to be transferred." Ex. 1004, 12:24–28. Independent claim 16 also requires peeling the removable substrate away from the image-imparting member, contacting the image-imparting member, after being separated from the substrate, to a dark-colored fabric, and heating the image-imparting member. Ex. 1004, 12:52–13:8 (collectively referred to as the "peel first" method).

For the common limitations between claims 1 and 16, Petitioner relies on the same arguments and evidence discussed above with regard to claim 1. Pet. 74–75. Additionally, Petitioner argues that Kronzer's fourth layer, which "is useful for a printable heat transfer material on

which an image is to be placed by an ink jet printer," corresponds to the "image-imparting member" with a surface for receiving/carrying indicia to be transferred, as recited in claim 16. Pet. 69–70, 75. Petitioner also argues that Kronzer teaches the steps of "peeling" off the substrate, "contacting" the image-imparting member to the base/fabric, and "applying heat" to transfer the image and polymer layers onto the base/fabric. Pet. 76. Petitioner acknowledges that Kronzer does not disclose performing these steps in the sequential order recited in claim 16, but argues that Oez-US does, and that a person of ordinary skill in the art would have had reason to modify the order of the steps in Kronzer based on Oez-US and would have had a reasonable expectation of success. Pet 76–77.

In particular, Petitioner argues that "[i]n conjunction with modifying Kronzer's third layer (adjacent to the ink-receiving layer) to include an opaque/white background, as taught by Oez-US," a person of ordinary skill in the art "would have naturally also applied the image transfer steps and image orientation taught by Oez-US." Pet. 76. According to Petitioner,

> the purpose of adding the white pigment to Kronzer's third layer is to provide an opaque/white background for the image being transferred. Oez-US, 1:27–31, 1:47–55. Thus, the first step would be to peel off the substrate so that the image printed on Kronzer's fourth/ink-receiving layer is placed face-up (as a positive image) on top of the third/white layer before applying heat. Wanat Decl., ¶223–231

(otherwise, the white layer would be on top of and blocking the image).

Pet. 76–77. Petitioner also argues that a person of ordinary skill in the art would have understood Kronzer's substrate layer could be peeled off first without the need to apply heat because Kronzer expressly teaches that its substrate layer has "cold release" properties. Pet. 77.

In addition to the arguments and evidence presented with regard to claim 1, Patent Owner argues that Petitioner and Dr. Wanat cite no support for the position that using the method from Oez-US with Kronzer's sheet would have been natural. PO Resp. 40. Patent Owner also argues that Petitioner's proposed modification constitutes a "complete re-engineering of Kronzer" because it not only modifies Kronzer's method of application, but also reverses the order of the layers in Kronzer. PO Resp. 40–41 (citing Ex. 2011 ¶ 151). Patent Owner further asserts that Petitioner's reengineering is based on hindsight. PO Resp. 41. Additionally, Patent Owner contends that this "complete reversal of the order of the layers would not yield predictable results . . . given the numerous failures in Kronzer," and that Petitioner fails to explain why a person of ordinary skill in the art would have expected the modified structure would be successful. PO Resp. 41.

In response to Patent Owner's re-engineering argument, Petitioner contends that Patent Owner and Dr. Ellison overlook Kronzer's disclosure that its third and fourth layers are largely the same, and can include similar thermoplastic polymers/binders having similar

characteristics. Reply 11 (citing Ex. 1018, 5:46–65, 6:1–8, 6:54–56, 7:12–41; Ex. 1062 ¶¶ 42–48). In view of this, Petitioner asserts that a person of ordinary skill in the art would have understood that reversing the order of the layers would result in the same or similar functionality. Reply 11. Petitioner also argues that "Kronzer explicitly makes clear that any minor adjustments that might need to be made to the characteristics of the third and/or fourth layer would have been straightforward and trivial to a" person of ordinary skill in the art. Reply 11 (citing Ex. 1018, 6:57–59, 8:47–51; Ex. 1062 ¶ 47).

Patent Owner challenges Petitioner's characterization of Kronzer's third and fourth layers as largely the same, asserting that Kronzer expressly teaches that its third and fourth layers must have different molecular weights and masses, and that the fourth layer "cannot be modified without creating printability or washability problems." Sur-reply 13–14 (citing Ex. 1018, 16:64–17:6). Patent Owner also contends Petitioner ignores the impact that compositional differences (e.g., Orgasol and pigment) in the layers would have on the proposed modification. Sur-reply 14. Additionally, Patent Owner contends that Petitioner's admission that reversing the order of layers may require adjustments, coupled with its failure to identify any specific adjustments that would or could be made, further supports its arguments regarding unpredictability and the lack of a reasonable expectation of success. Sur-reply 14–15.

We find Petitioner's arguments to be persuasive. As Petitioner and Dr. Wanat indicate, Kronzer teaches

that its third and fourth layers may each comprise similar types of thermoplastic polymers having similar characteristics, including particle size and melting points. Ex. 1018, 5:46– 65, 6:1–8, 6:54–56, 7:12–41; Pet. 71; Reply 11; Ex. 1062 ¶ 45 (including a chart listing similarities between Kronzer's third and fourth layers). Patent Owner does not directly contest this evidence or testimony from Dr. Wanat regarding the similarities between the two layers. Instead, Patent Owner argues that Kronzer's third and fourth layers cannot be "largely the same" because Kronzer expressly states that the layers "must have different molecular weights and masses." Sur-reply 13–14. The language Patent Owner relies upon for this assertion, however, appears in Kronzer's discussion of Table XIII, which lists data for six trial samples in Kronzer aimed towards attempts to soften a transferred image, eliminate cracking, and retain good washability. Ex. 1018, 16:32–54 (Table XIII titled "Trial Samples with Pilot Second Layer-Coated Paper – Attempts to Soften Transferred Image"). We discern no indication in Kronzer that the statements regarding the relative molecular weights and masses of the third and fourth layers in these trial samples apply to all of Kronzer's embodiments, especially considering Kronzer describes its third and fourth layers more generally elsewhere, including in its claims, without requiring a specific relationship between the molecular weights and masses of the third and fourth layers. *E.g.*, Ex. 1018, 5:46–6:31, 18:48–67 (claim 8); *see Wesslau*, 353 F.2d at 241.

Furthermore, we credit Dr. Wanat's testimony that a person of ordinary skill in the art would have known that

adjustments could be made to Kronzer's layers, and that those adjustments would have been straightforward. Ex. 1062 ¶ 47. Dr. Wanat's testimony is supported by Kronzer's statement 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. The use of these and similar materials is well known to those having ordinary skill in the art." Ex. 1018, 8:47–51. In an obviousness analysis, we "must consider what the prior art as a whole would have suggested to one skilled in the art." *Envtl. Designs v. Union Oil Co.*, 713 F.2d 693, 698 (Fed. Cir. 1983) (citing *In re McLaughlin*, 443 F.2d 1392, 1395 (CCPA 1971)). In this regard, Dr. Wanat's testimony and the language in Kronzer regarding what was well-known in the art undermine Patent Owner's arguments that compositional differences in the third and fourth layers, and the failure to identify specific adjustments that could be made, support a finding of unpredictability or a failure to show a reasonable expectation of success.

For all of the foregoing reasons, we find Petitioner has demonstrated sufficiently that Kronzer and Oez-US disclose the limitations in claim 16, and 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. Accordingly, we find Petitioner has established, by a preponderance of evidence, that claim 16 is unpatentable as obvious in view of Kronzer and Oez-US.

Claims 17–22 depend from claim 16. Petitioner alleges that the combined teachings of Kronzer and Oez-US would

have rendered obvious the subject matter of dependent claims 17–22. Pet. 77–79. Petitioner directs us to portions of Kronzer and Oez-US that teach or suggest all of the limitations in claims 17–22, and argues that a person of ordinary skill in the art would have had reason to combine the disclosures in Kronzer and Oez-US and would have had a reasonable expectation of successfully achieving the claimed invention. Pet. 77–79.

Patent Owner does not separately address dependent claims 17–22 and, therefore, has forfeited any arguments based on these uncontested claims. *See generally* PO Resp. 20–42; *cf. NuVasive*, 842 F.3d at 1381. Instead, Patent Owner relies on the same arguments addressed above in our discussion of claims 1 and 16, challenging Petitioner's arguments and evidence regarding whether a person of ordinary skill in the art would have had reason to combine the teachings of Kronzer and Oez-US, and whether a person of ordinary skill in the art would have had a reasonable expectation of success.

We have reviewed the information Petitioner provides, including the relevant portions of the Wanat Declaration, and agree with Petitioner's undisputed arguments and evidence that Kronzer and Oez-US teach or suggest all of the limitations in claims 17–22. Additionally, for the same reasons discussed above, 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 disclosures set forth in Kronzer and Oez-US, and that a person of ordinary skill in the art would have had a reasonable expectation of success in achieving the claimed

invention. We, therefore, find Petitioner has established, by a preponderance of the evidence, that claims 17–22 are unpatentable as obvious in view of the combined teachings of Kronzer and Oez-US.

E. Alleged Obviousness over Kronzer, Oez-US, and Hare (claim 4) or DeVries (claim 9)

Petitioner contends dependent claim 4 is unpatentable as obvious in view of Kronzer, Oez-US, and Hare, and dependent claim 9 is unpatentable as obvious in view of Kronzer, Oez-US, and DeVries. Pet. 79–80.

Claim 4 depends from claim 2, which depends from claim 1, and additionally requires combining the indicia-receptive layer (recited in claim 2) with at least one of a glow-in-the-dark material or a color-changeable material. Ex. 1004, 11:53–57.

Petitioner contends Hare, like Kronzer and Oez-US, is directed to image transfer sheets for heat transferring images to fabric. Pet. 79 (citing Ex. 1037, Abstract, 2:40–43, 3:20–39). Petitioner notes Hare expressly teaches combining an image-receiving layer with "iridescent colors that will glow in the dark," and argues that a person of ordinary skill in the art would have modified the transfer sheets of Kronzer and Oez-US for reasons expressly stated in Hare, and that doing so would involve the combination of well-known elements. Pet. 79 (citing Ex. 1032, 5:27–32; Ex. 1020 ¶¶ 98, 215, 236–37).

Claim 9 depends from claim 1 and additionally requires the step of "combining at least one of the one or more

polymer layers with the pigment" in claim 1 to include mixing the polymer layers with one or more ingredients such as kaolin or calcium carbonate. Ex. 1004, 12:13–20. Petitioner contends DeVries is directed to a sublimation transfer sheet applied under heat and pressure onto a substrate such as cotton, and teaches the use of opacifying agents such as calcium carbonate and kaolin. Pet. 79 (citing Ex. 1036, Abstract, 8:51–57). Petitioner contends a person of ordinary skill in the art would have understood that using calcium carbonate or kaolin in place of the titanium dioxide in Oez-US "merely involved a simple substitution of well-known white pigments." Pet. 79–80 (citing Ex. 1020 ¶¶ 99, 218, 238–239).

Patent Owner does not separately address dependent claims 4 and 9 and, therefore, has forfeited any arguments based on these uncontested claims. *Cf. NuVasive*, 842 F.3d at 1381. Instead, Patent Owner relies on the same arguments addressed above in our discussion of claim 1, and argues that Hare and DeVries fail to cure the deficiencies in Petitioner's arguments and evidence regarding whether a person of ordinary skill in the art would have had reason to combine the teachings of Kronzer and Oez-US, and whether a person of ordinary skill in the art would have had a reasonable expectation of success. PO Resp. 42

As discussed above, however, we disagree that Petitioner's arguments and evidence regarding a reason to combine Kronzer with Oez-US and a reasonable expectation of success suffer from any deficiencies. Moreover, we have reviewed the undisputed arguments and evidence Petitioner provides for claims 4 and 9,

including the relevant portions of the supporting Wanat Declaration, and agree that Kronzer, Oez-US, and Hare teach or suggest all of the limitations of claim 4, and Kronzer, Oez-US, and DeVries teach or suggest all of the limitations of claim 9. We also agree with Petitioner's arguments and evidence that a person of ordinary skill in the art would have had reason to combine the teachings of the references, and would have had a reasonable expectation of successfully doing so.

For example, as Petitioner explains, Hare relates to image transfer sheets, and not only discloses the use of iridescent colors that glow in the dark in a sheet for transferring images to fabric, but also expressly states that the use of such colors will result in a shirt that "provid[es] a safety function for the wearer." Ex. 1037, 5:27–32. Additionally, DeVries describes polymeric coating materials that include opacifying agents, such as titanium dioxide, calcium carbonate, and kaolin, that are "designed to decorate a colored substrate." Ex. 1036, 8:51–57. Furthermore, we credit Dr. Wanat's unchallenged testimony supporting Petitioner's explanation that a person of ordinary skill in the art would have had reason to combine the teachings of Hare and DeVries with Kronzer and Oez-US, and would have had a reasonable expectation of success. Pet. 79–80; Ex. 1020 ¶¶ 98–99, 215, 218, 236–239.

In view of the foregoing, we find Petitioner has established, by a preponderance of evidence, that claim 4 is unpatentable as obvious in view of Kronzer, Oez-US, and Hare, and claim 9 is unpatentable in view of Kronzer, Oez-US, and DeVries.

F. Remaining Unpatentability Challenges

Having determined that Petitioner establishes by a preponderance of the evidence that claims 1–3, 5–8, and 10–22 are unpatentable as obvious over the combined teachings of Kronzer and Oez-US, that claim 4 is unpatentable as obvious in view of the combined teachings of Kronzer, Oez-US, and Hare, and that claim 9 is unpatentable as obvious in view of Kronzer, Oez-US, and DeVries, we do not address Petitioner's additional grounds challenging claims 1–22. *See SAS Inst. Inc. v. Iancu*, 138 S. Ct. 1348, 1359 (2018) (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.").

IV. PATENT OWNER'S MOTION TO STRIKE

On June 1, 2021, with authorization, Patent Owner filed a Motion to Strike. Paper 29 ("Motion" or "Mot."), 1. The Motion seeks to strike "evidence submitted by Petitioner for the first time on Reply," including the Reply Declaration of Dr. Robert Wanat (Ex. 1062), as well as evidence relied on in that Declaration (Exhibits 1054–1060 and 1064–1065). Mot. 1, 4. Petitioner filed its Opposition to the Motion to Strike on June 15, 2021. Paper 30 ("Pet. Response").

Patent Owner argues that the Wanat Reply Declaration includes "new argument and cite[s] new evidence that

could have – and should have – been submitted with the Petition." Mot. 1. Patent Owner also argues that we should strike newly submitted evidence (Exhibits 1054–1060 and 1064–1065) used to support the Wanat Reply Declaration for the same reason. Mot. 1, 4.

Under the Board's rules, a petitioner's reply "may only respond to arguments raised in the corresponding . . . patent owner response" or address the institution decision. 37 C.F.R. § 42.23(b); *see also Ariosa Diagnostics v. Verinata Health, Inc.*, 805 F.3d 1359, 1367 (Fed. Cir. 2015) (discussing how, in *inter partes* review proceedings, a petitioner's reply is "limited to a true rebuttal role" (citing 37 C.F.R. §§ 42.104(b)(5), 42.23(b))). "Petitioner may not submit new evidence or argument in reply that it could have presented earlier, e.g. to make out a prima facie case of unpatentability. A party also may submit rebuttal evidence in support of its reply." *See* Consolidated Trial Practice Guide, 73 (2019)[13] (citing *Belden*, 805 F.3d at 1077–78). We address each of Patent Owner's concerns below.

A. Alleged New Motivation to Combine

Patent Owner argues that the Wanat Reply Declaration, for the first time, "set[s] forth a new motivation to combine." Mot. 1 (citing Ex. 1062 ¶¶ 9–12). Petitioner argues that "[t]ellingly, [Patent Owner] does not even identify any motivation that is supposedly 'new.'"

13. Available at https://www.uspto.gov/TrialPracticeGuideConsolidated.

Pet. Response 2. Petitioner asserts that the testimony in the Wanat Reply Declaration responds to Patent Owner's arguments, including those asserting "that there would be no motivation to combine Kronzer and Oez-US because they solve 'fundamentally different problems using fundamentally different technologies.'" Pet. Response 3–4 (quoting Ex. 1062 ¶ 7).

We agree with Petitioner that Patent Owner does not identify with specificity what purported new motivation to combine Dr. Wanat introduces in the Reply Declaration. Mot. 1. Accordingly, we find Patent Owner has failed to establish that it is entitled to the requested relief. 37 C.F.R. § 42.20(c) ("The moving party has the burden of proof to establish that it is entitled to the requested relief."). Additionally, we are persuaded by Petitioner's arguments that the testimony in Dr. Wanat's Reply Declaration responds to arguments raised in the Patent Owner's Response, as Dr. Wanat's testimony appears to be specifically directed to arguments Patent Owner makes in its Response and toward testimony in Dr. Ellison's supporting declaration. Pet. Response 3–4.

B. Alleged New Arguments Regarding the Use of TiO2

Patent Owner argues that the Petition fails to cite any evidence for its allegation that using TiO2 in Kronzer would have been predictable to the person of ordinary skill in the art, and, as a result, we should now preclude Petitioner from providing new evidentiary support. Mot. 2 (citing Ex. 1062 ¶¶ 17–40). Patent Owner contends that we should also strike Petitioner's argument (and evidence)

"that ready to use formulations exist that include titanium dioxide, which Petitioner asserts somehow supports the predictability of titanium dioxide." Mot. 3 (citing Ex. 1062 ¶ 38; Ex. 1065). Patent Owner further contends that Petitioner's arguments that a person of ordinary skill in the art "would **also** know to include other (unidentified) additives to Kronzer in order to make the composition work" are untimely. Mot. 2 (citing Ex. 1062 ¶¶ 37–38).

Petitioner asserts that "Dr. Wanat's position that using TiO2 in transfer sheets would have led to predictable results is entirely consistent with the arguments and evidence presented in the Petition." Pet. Response 4–5 (citing Pet. 66–67, 70; Ex. 1020 ¶¶ 97, 198–202, 208–210). Petitioner explains that Dr. Wanat provides further positions regarding the use of additives and ready-to-use formulations in the Wanat Reply Declaration in direct response to Patent Owner's arguments that TiO2 could not be used predictably. Pet. Resp. at 7–8.

We are not persuaded that Petitioner's arguments are improper rebuttal arguments. In the Petition, Petitioner explains that it would have been obvious to combine the white layer from Oez-US (containing TiO2) with Kronzer's third layer because Kronzer discloses that any pigment can be placed in any of its layers. Pet. 66–67; Ex. 1020 ¶ 209; Ex. 1018, 8:47–49. Petitioner also suggests that TiO2, along with other white pigments, were well-known. *E.g.*, Pet. 79–80. In its Response, Patent Owner argues that including a pigment would have been unpredictable to one of ordinary skill in the art because the inclusion of pigments "can pose significant technical challenges"

including changing "the viscosity and flow properties of the third layer at transfer temperatures" and changing "solid state characteristics of the third layer, such as modulus, elasticity, and flexibility." PO Resp. 35–37. Patent Owner further argues that finding a "'drop in' replacement" for a pigment would have been "extremely rare." PO Resp. 35–36. Therefore, Dr. Wanat's testimony that TiO2 was well-known, well-studied, and well-understood, that the skilled artisan would have understood how to account for the "technical challenges" Patent Owner identified through use of additives, and that "drop-in replacements" were in fact available, properly supports Petitioner's arguments in response to those Patent Owner raises.

C. Alleged New Arguments Regarding the Similarity of Layers

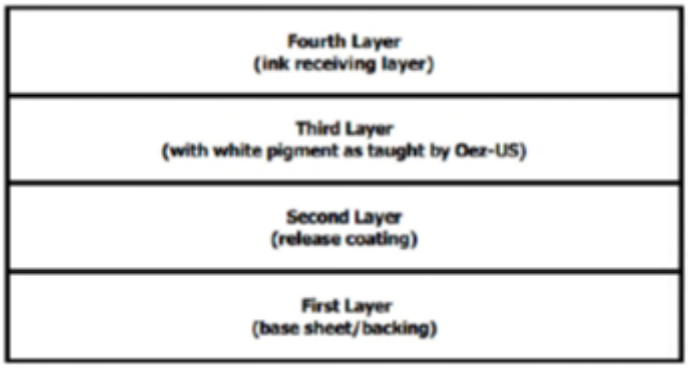
Patent Owner asserts that Petitioner improperly advances an argument where the third and fourth layers of Kronzer are flipped and, because of their similarity, there would be no "impact [on] the composition at all." Mot. 3. Petitioner argues that

> [c]ontrary to PO's assertion, the Petition expressly addresses the similarity of characteristics for Kronzer's third and fourth layers. Pet., p. 71 ("Kronzer teaches that both its third and fourth layer include a thermostatic polymer which melts in a range of from about 65°C. to about 180°C."); Wanat Decl., ¶¶211–213. Thus, paragraphs 44–48 of Dr. Wanat's reply declaration are entirely consistent within the

originally filed Petition. Wanat Reply Decl., ¶¶44–48.

Pet. Response 8–9. Further, Petitioner asserts that "Dr. Wanat's reply declaration [is] clearly directed to [Patent Owner's] own baseless argument that 'flipping' Kronzer's layer would be a 'complete re-engineering' of Kronzer." Pet. Response 9.

We are persuaded by Petitioner's arguments. In the Petition, Petitioner argues that the combination of Kronzer and Oez-US would result in an image transfer sheet having the following structure.



Pet. 66–67 (citing Ex. 1020 ¶ 201), 70–71. Petitioner further explains that "Kronzer teaches that both its third and fourth layers include a 'thermoplastic polymer which melts in a range of from about 65°C. to about 180°C.'" Pet. 71 (quoting Ex. 1018, 2:45–67); *see also* Ex. 1062 ¶ 212 (discussing same). Petitioner also explains that a person of ordinary skill in the art "would have naturally applied the image transfer steps and image orientation taught

by Oez-US," i.e., with the image on top of the white layer. Pet. 76 (discussing claim 16) (citing Ex. 1020 ¶¶ 223–231).

Accordingly, because Petitioner raises arguments regarding the similarity of Kronzer's third and fourth layers, and flipping the layers, in the Petition, we do not consider similar arguments in the Reply to be new. We also find Dr. Wanat's reply testimony specifically responds to arguments Patent Owner makes in its Response and, therefore, is proper rebuttal evidence. *See, e.g.*, Ex. 1062 ¶ 44 (referring to Patent Owner's argument that reorienting the layers in Kronzer requires a "complete re-engineering" of Kronzer).

D. Alleged New Arguments Relating to Cross-linking

Patent Owner argues that the Wanat Reply Declaration, for the first time, makes "new arguments regarding cross-linking, including new arguments regarding melting that pointed to new citations to Oez." Mot. 4 (citing Ex. 1062 ¶¶ 63–66). These purportedly "new arguments" regarding melting relate to a challenge we do not address or rely on in determining claims 1–22 are unpatentable. Accordingly, we dismiss as moot Patent Owner's Motion to Strike with respect to Dr. Wanat's testimony and related exhibits regarding cross-linking.

For all of the foregoing reasons, we deny in part and dismiss in part Patent Owner's Motion to Strike.

V. CONCLUSION

After reviewing the complete record developed during the course of the trial, we conclude that Petitioner has satisfied its burden of demonstrating, by a preponderance of the evidence, that claims 1–22 of the '042 patent are unpatentable.[14] We also deny in part and dismiss in part Patent Owner's Motion to Strike.

VI. ORDER

In consideration of the foregoing, it is hereby:

ORDERED that Petitioner establishes by a preponderance of the evidence that claims 1–22 are unpatentable;

FURTHER ORDERED that Patent Owner's Motion to Strike is denied in part and dismissed in part; and

FURTHER ORDERED that, because this is a Final Written Decision, parties to the proceeding seeking

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14. 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).

judicial review of the decision must comply with the notice and service requirements of 37 C.F.R. § 90.2.

In summary:

Claim(s)	35 U.S.C.	References/ Basis	Claim(s) Shown Unpatent-able	Claim(s) Not Shown Unpatent-able
1–3, 5–8, 10–22	§ 103	Oez-US, Meyer[15]		
4	§ 103	Oez-US, Meyer, Hare		
9	§ 103	Oez-US, Meyer, DeVries		
1–3, 5–8, 10–22	§ 103	Oez-PCT, Oez-US		
4	§ 103	Oez-PCT, Oez-US, Hare		

15. As explained above, we do not reach this ground, or the other grounds for which the last two columns of this table are blank, in view of our determination that claims 1–22 are unpatentable as obvious over Kronzer, and Oez-US, either alone or in combination with Hare or DeVries.

9	§ 103	Oez-PCT, Oez-US, DeVries		
1–3, 5–8, 10–22	§ 103	Kronzer, Oez-US	1–3, 5–8, 10–22	
4	§ 103	Kronzer, Oez-US, Hare	4	
9	§ 103	Kronzer, Oez-US, DeVries	9	
1–3, 5–8, 10–16, 19–22	§ 103	Kronzer, Meyer		
4	§ 103	Kronzer, Meyer, Hare		
9	§ 103	Kronzer, Meyer, DeVries		
17, 18	§ 103	Kronzer, Meyer, Hare-PCT		
Overall Outcome			1–22	

APPENDIX D — JUDGMENT AND FINAL WRITTEN DECISION OF THE UNITED STATES PATENT AND TRADEMARK OFFICE, PATENT TRIAL AND APPEAL BOARD, DATED SEPTEMBER 10, 2021

UNITED STATES PATENT
AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL
AND APPEAL BOARD

NEENAH, INC.,

Petitioner,

v.

JODI A. SCHWENDIMANN,

Patent Owner.

IPR2020-00634
Patent 7,749,581 B2

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)

Appendix D

Denying in Part, Dismissing in Part
Patent Owner's Motion to Strike

I. INTRODUCTION

Neenah, Inc. ("Petitioner")[1] filed a Petition (Paper 2, "Pet.") requesting *inter partes* review of claims 1–6, 8–21, and 24–31 of U.S. Patent No. 7,749,581 B2 (Ex. 1003, "the '581 patent"). Pet. 1. Jodi A. Schwendimann ("Patent Owner") filed a Preliminary Response (Paper 11, "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 '581 patent. Paper 13 ("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 challenged grounds. *Id.*

Following institution of trial, Patent Owner filed a Patent Owner Response (Paper 17, "PO Resp."), Petitioner filed a Reply (Paper 22, "Pet. Reply"), and Patent Owner

1. Petitioner identifies Neenah, Inc., Avery Products Corporation, and Stahls' Inc. as real parties-in-interest. Pet. 1.

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-trialand-appeal-board/trials/guidance-impact-sas-aia-trial) ("USPTO Guidance").

filed a Sur-reply (Paper 27, "Sur-reply"). In support of their respective positions, Petitioner relies on the testimony of Dr. Robert A. Wanat (Ex. 1020, "Wanat Decl."; Ex. 1062, "Wanat Reply Decl."), and Patent Owner relies on the testimony of Dr. Scott Williams (Ex. 2001, "Williams Decl.") and the Declaration of Dr. Christopher Ellison (Ex. 2011, "Ellison Decl.").

We held an oral hearing on July 12, 2021, and a transcript of the hearing is included in the record (Paper 38, "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 1–6, 8–21, and 24–31 of the '581 patent are unpatentable. We also deny in part and dismiss in part Patent Owner's Motion to Strike (Paper 29, "Motion").

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.) (the "Delaware Lawsuit"), as a related proceeding in which Patent Owner asserts the '581 patent. Pet. 1; *see also* Paper 12, 2 (Patent Owner's Mandatory Notices). The '581 patent is the subject of separate IPRs: *Stahls' Inc. v. Jodi A. Schwendimann*, IPR2020-00644 and *Stahls' Inc. v. Jodi A. Schwendimann*, IPR2020-00645. Paper 12, 2; *see* Paper 12, 2.

Petitioner also filed petitions against U.S. Patent No. RE41,623, U.S. Patent No. 7,754,042, U.S. Patent No. 7,771,554, and U.S. Patent No. 7,766,475. Pet. 1–2; Paper 12, 2. We instituted *inter partes* review in IPR2020-00644 but declined to institute IPR2020-00645. *See* IPR2020-00644, Paper 10; IPR2020-00645, Paper 10. We also instituted *inter partes* review of RE41,623, U.S. Patent No. 7,754,042, and U.S. Patent No. 7,766,475 but declined to institute *inter partes* review of U.S. Patent No. 7,771,554. *See* IPR2020-00628, Paper 10; IPR2020-00641, Paper 11; IPR2020-00629, Paper 10; IPR2020-00635, Paper 10; IPR2020-00915, Paper 9; IPR2020-00636, Paper 10; IPR2020-01121, Paper 8.

The '581 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.); and
>
> *Jodi A. Schwendimann v. Siser North America, Inc.*, Case No. 1:19-cv-00362-LPS (D. Del.)

Pet. 2; Paper 12, 2. The '581 patent was asserted in *Jodi A. Schwendimann v. Arkwright Advanced Coating, Inc. et al.*, Case No. 0:11-cv-00820-JRT-HB (D. Minn.) (the "Arkwright Lawsuit"). Pet. 2, 10.

B. The '581 Patent (Ex. 1003)

The '581 patent, titled "Image Transfer on a Colored Base," issued on July 6, 2010. Ex. 1003, codes (45), (54). The '581 patent is directed to "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 1:17–19.

The '581 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 3:37–50. According to the '581 patent, the conventional two-step process required careful alignment of an image with the white background, was "exceedingly time-consuming," and produced significant waste of base and image transfer materials. *Id.* at 3:51–57.

An exemplary image transfer process of the '581 patent is depicted below in Figure 1.

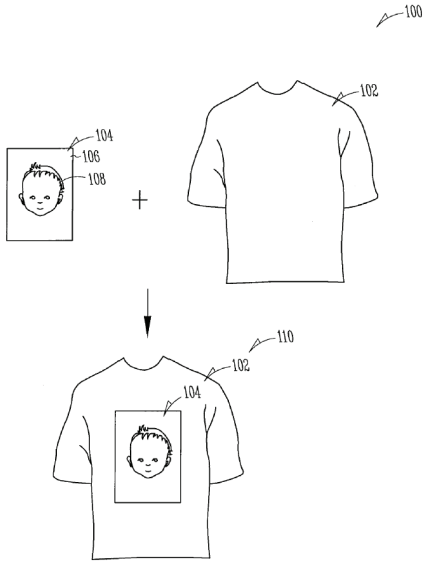

Fig. 1

Appendix D

Figure 1 "illustrates a schematic view of one process of image transfer onto a colored product." *Id.* at 2:31–32. Figure 1 depicts colored base material 102 (e.g., a colored textile), image 104 including substantially white background 106, and indicia 108 disposed on the substantially white background 106. *Id.* at 3:10–21. The '581 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.

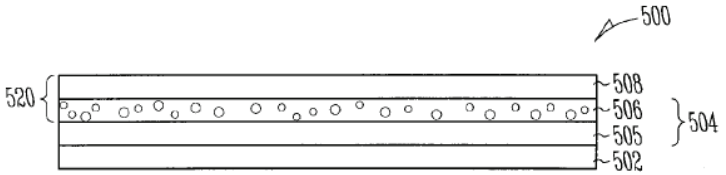

Fig. 5

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. The '581 patent describes "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 8:44–47. Figure 5 also depicts white layer 506 and receiving layer 508 as part of peel layer 520. *See id.* at 8:54–57, 9:1–3.

The '581 patent describes the white layer as imparting "a white background on a dark substrate." *Id.* at 3:35–36. 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."[3] *Id.* at 8:51–54. 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 8:54–57. According to the '581 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 6:6–18.

Referring once again to the embodiment of Figure 5, the '581 patent describes an image transfer process.

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3. "Titanium oxide," "titanium dioxide," and "TiO_2" are synonymous, and used interchangeably in the prior art, the parties' papers, and in this Decision.

Specifically, the '581 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 9:1–3. The '581 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 9:11–19. 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 9:19–25. 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 9:28–32. The '581 patent further explains:

> Because 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 9:33–48.

C. Illustrative Claims

Petitioner challenges claims 1–6, 8–21, and 24–31 of the '581 patent. Of the challenged claims, claims 1, 17, 24, 27, 30, and 31 are independent. Claims 1 and 17 are illustrative and are reproduced below.

> 1. An image transfer article, comprising:
>
> an image-imparting member, including at least one surface configured to receive and carry indicia to be transferred and including at least one portion comprising a concentration or configuration of pigment providing an opaque background for received indicia, the opaque background having a substantially non-transparent effect allowing the received indicia to be visible when transferred to a dark-colored base; and
>
> a removable substrate disposed adjacent, and underlaying, the image-imparting member,

> the removable substrate including a coating comprising at least one of silicone, clay, resin, fluorocarbon, urethane, or an acrylic base polymer.

Ex. 1003, 11:35–48.

> 17. An image transfer article, comprising:
>
> an indicia-receptive layer including at least one surface configured to receive and carry transferable indicia;
>
> a removable substrate including a release coating; and
>
> a white layer disposed between the indicia-receptive layer and the release coating, the white layer including a white or luminescent pigment providing a substantially opaque, non-transparent background for received indicia and concurrently transferable with received indicia upon, and following, application of heat.

Id. at 12:41–51.

D. Prior Art and Asserted Grounds of Unpatentability

We instituted trial to determine whether claims 1–6, 8–21, and 24–31 of the '581 patent would have been obvious in view of the following asserted grounds of unpatentability:

Appendix D

Claims Challenged	35 U.S.C. §[4]	References/Basis
1–6, 8–21, 24–26	103	Oez-US,[5] Meyer[6]
18, 27–31	103	Oez-US, Meyer, Kronzer[7]
1–6, 8–21, 24–31	103	Oez-PCT,[8] Oez-US
1–6, 8–21, 24–31	103	Kronzer, Oez-US

DI 8, 39 (instituting review on all asserted grounds).

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4. 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 '581 patent issued was filed before this date, the pre-AIA version of § 103 applies.

5. Oez, US 5,665,476, issued September 9, 1997 (Ex. 1013, "Oez-US").

6. Meyer et al., US 3,359,127, issued December 19, 1967 (Ex. 1019, "Meyer").

7. Kronzer, US 5,798,179, issued August 25, 1998 (Ex. 1018, "Kronzer"). In its Grounds of Unpatentability, Petitioner identifies DeVries, as opposed to Kronzer, as applicable for its challenge to claims 18 and 27–31. *See* Pet. 4. However, in setting forth its arguments regarding claims 18 and 27–31, Petitioner relies on Kronzer. *See id.* at 44–51. Therefore, we understand Petitioner to advance the combination of Oez-US, Meyer, and *Kronzer*.

8. Oez, WO 97/41489, published November 6, 1997 (Ex. 1016, "Oez-PCT"). References to Oez-PCT will be to Exhibit 1016, which is an English-language translation of Oez-PCT with line numbers. Pet. 4.

Appendix D

II. ANALYSIS

A. Legal Standards

To prevail in its challenge, a 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(a) 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. *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.[9] *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966).

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 '581 patent

> would have at least a Bachelor's degree in Chemistry, Chemical Engineering, Imaging

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

> 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 11–12 (adopting Patent Owner's proposed definition); *see* Prelim. Resp. 12.

For purposes of this Final Written Decision, we maintain our determination from the Decision on Institution because neither party disputes that determination and because that level of skill is consistent with the record. *See* PO Resp. 17; *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) (2019); *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))).

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 13–14. Our construction was based on the parties' agreement that the claims of the '581 patent require a white layer that melts and mixes with another layer and the the claim construction the district court in the Arkwright Lawsuit adopted. Ex. 1022, 17 (Arkwright Markman Order"). The district court in the Delaware Lawsuit also adopted a similar construction of "white layer." *See* 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 with underlining); Prelim. Resp. 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).

Petitioner contends we should again reject Patent Owner's attempt to rewrite the construction of "white layer," because it is "completely at odds" with the constructions adopted by the district court in both the Arkwright and the Delaware Lawsuits, which requires actual melting, not just softening, and construes "mix" to have its plain and ordinary meaning. Reply 2 (citing Ex. 1066, 6).

We agree with Petitioner and decline to adopt Patent Owner's newly offered construction for the same reasons expressed in our Decision on Institution and because that construction departs from the construction in the Arkwright Lawsuit and the Delaware Lawsuit. DI 13–14; Ex. 1022, 17; Ex. 1066, 6. 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. 19; Tr. 13:24–14:3, 53:9–54:13. Accordingly, we maintain our construction of the term "white layer."[10]

D. Obviousness over Kronzer and Oez-US (claims 1–6, 8–21, 24–31)

Petitioner contends claims 1–6, 8–21, and 24–31 are unpatentable as obvious over Kronzer and Oez-US. Pet. 66. Petitioner directs us to portions of Kronzer and Oez-

10. Although the term "white layer" is not expressly recited in each claim of the '581 patent, both parties agree that all claims of the '581 patent require a white layer that melts and mixes. *See, e.g.*, Pet. 21–24; Prelim. Resp. 13–14, 20–24, 28–29, 32–36, 37–38 (treating "white layer" and "opaque background" as synonymous).

US that purportedly disclose all the limitations in the challenged claims. *Id.* at 66–81. Petitioner also relies on the declaration testimony of Dr. Wanat to support its arguments. *See id.*; Pet. Reply 2–14.

1. Overview of Asserted Prior Art

a) 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 (TiO_2) 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.

b) 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, Abstract, 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, which overlays the second layer, includes a thermoplastic polymer with a melting point 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. Analysis of Claim 1

Petitioner contends that the combination of Kronzer and Oez-US suggests the image transfer article of claim 1. Pet. 67–72. Petitioner argues that Kronzer describes "'a heat transfer paper' (*i.e.*, image transfer article) 'for transferring designs, messages, and illustrations' (*i.e.*, images) 'on articles of clothing, such as T-shirts.'" *Id.* at 67–68 (citing Ex. 1018, 1:5–11, 9:1–18:6; Ex. 1020 ¶ 222). Petitioner asserts that "Kronzer teaches an image-imparting member/indicia-receptive layer . . . configured to receive and carry indicia to be transferred." *Id.* at 68 (Ex. 1020 ¶ 223). Specifically, Petitioner alleges that Kronzer describes "a fourth layer may overlay the third layer in order to provide an ink jet printable heat transfer material [that] typically includes a film forming binder and a powdered thermoplastic polymer." *Id.* (quoting Ex. 1018, 2:65–67, 7:3–9, 4:15–16).

Petitioner further argues that "[a]lthough Kronzer does not expressly disclose a pigment to provide an opaque background to allow indicia to be viewed when transferred to a dark fabric, this feature was extremely wellknown as shown by Oez-US." *Id.* In particular, Petitioner explains that "Oez-US expressly discloses a white layer to provide an opaque/nontransparent background for better image quality on dark/black fabrics." *Id.* (citing Ex. 1013, 1:26–31). Petitioner contends that a person of ordinary skill in the art would have had reason to combine the teachings of Kronzer and Oez-US "to include the white pigment/layer of Oez-US into at least the third layer of Kronzer for the reasons explicitly stated in Oez-US, *i.e.*, to provide

a contrasting opaque background for image transfers to dark/black fabrics." *Id.* at 69 (citing Ex. 1013, 1:26–55; Ex. 1020 ¶ 224).

Petitioner additionally asserts that both "Kronzer and Oez-US further teach the 'melt and mix' requirement." *Id.* at 71. Petitioner contends that Kronzer includes layers of thermoplastic polymers that melt between 65 °C and 180 °C. *Id.* (citing Ex. 1018, 2:35–67; Ex. 1020 ¶ 257). According to Petitioner, a person skilled in the art would have understood that the Kronzer/Oez-US transfer sheet would have been heated above 180 °C during application and, therefore, that the white layer and image-imparting layers "would necessarily melt and mix." *Id.* at 71–72 (Ex. 1018, 2:35–67; Ex. 1020 ¶¶ 256–258).

Lastly, Petitioner asserts that Kronzer describes the removable substrate adjacent to and underlaying the image-imparting member that includes a coating as claimed by the '581 patent. In particular, Petitioner explains that "Kronzer teaches '[t]he printable heat transfer material includes a flexible first layer [that] serves as a base sheet or backing [and] typically will be a film or a cellulosic nonwoven web.'" *Id.* at 69 (citing Ex. 1018, 4:15–20, 4:27–31). According to Petitioner, Kronzer also explains that the backing sheet, which can be easily removed after the image has been transferred to the fabric, may include an acrylic base polymer or clay. *Id.* at 69–70 (citing Ex. 1018, 4:6–14, 5:23–45, 9:49–50, 12:12–43, Tables VI–XIV).

Patent Owner does not challenge many of Petitioner's allegations regarding the teachings of Kronzer and Oez-

US. *See generally* PO Resp. Patent Owner contends that including the Oez-US white layer for Kronzer's third layer would not result in "mixing and melting" as the claims require. PO Resp. 31. Patent Owner further contends that Petitioner has not demonstrated a reason to combine the Oez-US pigment with Kronzer's structure or that such a combination would yield a reasonable expectation of success. *Id.* at 36. Additionally, Patent Owner affirmatively 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 '581 patent. *Id.* at 39. We have reviewed the information submitted by Petitioner and determine Petitioner's arguments and evidence are sufficient to show, by a preponderance of the evidence, that each limitation of claim 1 is suggested by the combination of Kronzer and Oez-US, except those disputed by Patent Owner. We address Patent Owner's arguments below.

a) Whether the combination of Kronzer and Oez-US discloses a "white layer that melts and mixes"

Patent Owner first contends that it is unclear whether Petitioner alleges that a person of ordinary skill in the art "would borrow (1) the entire, cross-linking, white ***layer*** from Oez; or (2) just the white ***pigment*** from Oez." PO Resp. 31. Patent Owner asserts that "[b]orrowing the entire white ***layer*** from Oez would not render obvious any asserted claim because all of the Challenged Claims require a 'white layer' that contains at least one polymer that 'melts and mixes with another layer or layer[s]'

during application." *Id.* at 32. According to Patent Owner, "[t]his is because Oez uses a particular chemical reaction, which involves cross-linking polyurethanes through the use of a melamine formaldehyde . . . which results in a non-melting layer." *Id.* Patent Owner reasons that "Oez-US thus **teaches away** from a transfer sheet in which the 'white layer' mixes and melts with another layer [as] the purpose of Oez-US is to provide a coating **that does not melt and mix**." *Id.* at 35. Patent Owner further alleges "[e]very expert that has addressed the issue has testified that, because the polyurethane in Oez is cross-linked under heat and pressure . . . the coating with white pigment . . . does not melt and cannot mix with any other components or layers." *Id.* at 33 (citing Ex. 2007, 112 (Dr. Macosko's testimony from the Arkwright Lawsuit); Ex. 1020 ¶¶ 53, 118 (Dr. Wanat's testimony that cross-linking is an "important factor that can prevent mixing" and that certain conditions such as cross-linking can prevent mixing). Patent Owner further contends that Dr. Wanat's testimony that the Oez-US white layer would melt and mix is unsupported and conclusory. *Id.* at 33–35.

Petitioner replies that its allegations are based upon including the white pigment in Kronzer's transfer sheet and not Oez-US's entire white layer. Therefore, Petitioner urges that "[Patent Owner's] assertions about substituting Oez'[s] entire layer into Kronzer's sheet are inapposite." Pet. Reply 4.

As we explained in our Decision on Institution, Petitioner alleges that Kronzer describes a white layer that melts and mixes with other layers, when its polymeric

third layer is modified to include the *white pigment* of Oez-US—not the entire cross-linked white layer of Oez-US. DI 33. Petitioner reaffirms our understanding in its Reply, stating that "the Petition demonstrates a [person of ordinary skill in the art] would have found it obvious, based on Oez-US's teachings, to include a ***white pigment*** in Kronzer's transfer sheet." Pet. Reply 3–4 (emphasis in original) (describing Patent Owner's argument as a red herring). Therefore, Patent Owner's arguments are directed to a position that Petitioner does not advance and are unavailing.

Petitioner, instead, argues that although Kronzer does not expressly teach using a white pigment in its image transfer sheet, Kronzer expressly discloses that pigments may be used in any of its film layers. Pet. Reply 3; Ex. 1018, 8:46–50. Thus, the only teaching Oez-US provides is the specific color of the pigment, that is, a white pigment or TiO_2 to provide a white background for image transfers to dark fabrics and textiles. Pet. 68–69; Pet. Reply 3; Ex. 1013, 1:46–54. Petitioner explains that because contacting layers of Kronzer's polymers will necessarily mix together when heated to a temperature of 180° C, "the application of heat [to] the third/white layer and fourth/image imparting layer of Kronzer/Oez-US's transfer sheet would necessarily melt and mix," the layers. Pet. 71–72 (citing Ex. 1018, 2:35–67; Ex. 1020 ¶¶ 256–258). Dr. Wanat testifies that because of the similarities between the third and fourth layers, the polymers have "some degree of compatibility and will mix together when they are melted." Ex. 1020 ¶ 258 (citing Ex. 1018, 6:52–55, 7:30–32). We credit Dr. Wanat's unrebutted testimony. Accordingly,

the preponderance of the evidence supports Petitioner's assertion that the ordinarily skilled artisan would have understood that the combination of Kronzer and Oez-US would have resulted in a white layer that mixes and melts with another layer.

b) 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 combine Kronzer and Oez-US and that each of Petitioner's three reasons to combine must fail. PO Resp. 36–38. Patent Owner contends that Petitioner's first reason, i.e., that each reference teaches "printable multilayered transfer structures having a removable substrate, release coating, and image-imparting layer," is incorrect. *Id.* at 36. Patent Owner explains that "every example and every claim is Oez teaches a single coating of plastic, not a multi-layered transfer with a distinct 'image-imparting layer.'" *Id.* at 36–37 (citing Ex. 1013 generally). Patent Owner additionally argues that mere identity of subject matter between two references is insufficient to establish that the ordinarily skilled artisan would have had a reason to combine the teachings of those references. *Id.* at 37.

Petitioner asserts that Patent Owner's allegation regarding Oez-US being limited to a single layer of plastic is "demonstrably false." Pet. Reply 4. Petitioner explains that "Oez-US discloses and claims a multilayered transfer sheet" and that "[Patent Owner's] expert admitted as

much during his deposition." *Id.* at 5 (citing Ex. 1013, 2:36–44; 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 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 (Dr. Ellison's testimony describing Oez-US as having a second, optional layer).

Furthermore, although we agree with Patent Owner that identity of subject matter is, 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. Nevertheless, we consider Petitioner's discussion 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 actually solve fundamentally different problems using fundamentally different

technologies." PO Resp. 37. 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.* at 37–38. Therefore, Patent Owner reasons that "the respective goals of the two inventions actually demonstrates why a [person of ordinary skill in the art] would ***not*** be motivated to combine the references." *Id.* at 38. Similarly, Patent Owner 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.* (quoting Pet. 67 and citing Pet. 68–69). According to Patent Owner, "Petitioner does not argue that there is something lacking in Oez-US that would be improved by combining it with Kronzer or even that 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 is improper hindsight. *Id.*

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. 66–67; Ex. 1020 ¶¶ 220–221; Ex. 1062 ¶¶ 11–12). Citing our Decision on Institution, Petitioner explains that "Kronzer does not limit its invention to light or dark textiles . . . 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 to provide

an opaque background for the transferred image." *Id.* (citing DI 34–35; Ex. 1020 ¶¶ 224–225; Ex. 1062 ¶¶ 7–14). 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 6.

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. 66–67. 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." Ex. 1013, 1:29–31. 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." Pet. 69 (citing Ex. 1013, 1:26–31; Ex. 1020 ¶ 224).

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 the common result 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 arguments. 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 had reason to combine Oez-US and Kronzer, and Petitioner's reliance on express teachings from Oez-US and Kronzer undermines Patent Owner's argument that Petitioner improperly relied on hindsight.

c) Whether a person of ordinary skill in the art would have had reason to combine Kronzer and Oez-US to yield the invention described in the '581 patent claims

In addition to arguing Petitioner fails to establish that a person skilled in the art would have been motivated to combine Kronzer and Oez-US, Patent Owner affirmatively argues the evidence of record shows a person of ordinary skill in the art would not have been motivated to combine Kronzer and Oez-US. PO Resp. 39. Specifically, Patent Owner contends that

> [t]his evidence includes: (1) Kronzer does not even address dark t-shirt transfer; (2) Kronzer and Oez rely upon different chemical reactions (heat alone v. heat plus a chemical reaction); (3) Kronzer and Oez employ different structures (multi-layered v. single layered); (4) Kronzer and Oez solve different problems (cold peel v. dark fabric transfer); Kronzer and Oez use different technologies to solve those problems (specific formulations v. a cross-linking white layer and a peel-first method); and (5) Kronzer and Oez use opposite methods of printing (mirror v. positive) and opposite methods of applications (image down/peel later v. image up/peel first).

Id. Patent Owner additionally alleges that because Petitioner incorporates only the white pigment from Oez-US, "while wholly 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 39–40. 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 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 '581 Patent is because Kronzer does not solve – or even acknowledge – the problem of transferring an image onto dark fabric." PO Resp. 40. 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 41 (citing Ex. 1018 generally; Ex. 2011 ¶ 137).

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 '581 patent purports to solve. Pet. Reply 6–7. Petitioner further explains that Kronzer is not limited to any fabric color and a person skilled in the art "would have been motivated to improve Kronzer by including a white pigment as taught by Oez-US." *Id.* at 7.

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 any one or all of the references expressly suggests the claimed invention, 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 article. *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 '581 patent—including a pigment in any one of its polymer layers. Pet. 66–72; Ex. 1018, 8:46–51. Kronzer, however, is silent as to the color of the pigment and the color of the substrate used. Oez-US teaches 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. The record evidence discussed above supports a finding that a person of ordinary skill in the art would have recognized that the Oez-US white pigment would improve the transfer sheet disclosed in Kronzer, and would have had a reason to combine the teachings of Kronzer and Oez-US. *KSR*, 550 U.S. at 417.

(2) whether a person of ordinary skill in the art would not have had reason to combine Oez-US's white pigment alone 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. 42. According to Patent Owner, "[t]he cross-linking reaction in Oez is ***required*** for the white layer of Oez to function, but Petitioner simply ignores it." *Id.* Patent Owner explains that "transferring a pigment from a reactive system to a non-reactive system raises significant technical challenges from a chemistry and materials science perspective." *Id.* at 43 (citing Ex. 2011 ¶ 141). 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.* (citing Ex. 2012, 3). Patent Owner states "that, in the reactive system of Oez, the titanium dioxide performs multiple functions beyond providing whiteness." *Id.* at 44 (citing Ex. 2011 ¶ 144). Patent Owner further argues that titanium dioxide is a particulate that "would change the viscosity and flow properties of the third layer at transfer temperatures." *Id.* at 44–45 (citing Ex. 2011 ¶ 145). 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 45. And Patent Owner contends that the numerous failures of Kronzer's system support its argument. *Id.*

Petitioner asserts that nothing in Oez-US teaches away from using only the white pigment and "Oez-US does ***not*** suggest that using TiO_2 with thermopolymers, such as those disclosed in Kronzer, would not achieve the same improvement to an image transfer sheet." Pet. Reply 7–8

(citing Ex. 1062 ¶¶ 13–20). Instead, Petitioner explains that Oez-US describes using TiO_2 to improve image quality on dark substrates and "Kronzer ***encourages*** the use of pigments in any of its polymer layers." *Id.* at 8 (citing Ex. 1013, 1:46–55; Ex. 1062 ¶¶ 16–20; Ex. 2011 ¶¶ 87–91; Ex. 1018, 8:46–51).

Petitioner asserts that a person of skill in the art would have understood "that TiO_2 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. 1063 ¶¶ 17–20; Ex. 1063, 304:8–22). Petitioner further states that neither Patent Owner nor Dr. Ellison cite to record evidence "to support their assertion that TiO_2 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 arguments that Oez-US teaches away from using white pigment alone or that Oez-US requires a crosslinking polymer for the white pigment to function. *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)). 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 TiO_2 to function as a pigment nor does it teach away from pursuing the path taken in the '581 patent.

Patent Owner's arguments that transferring a white pigment from a reactive to non-reactive system would have been unpredictable because the titanium dioxide performs functions beyond whiteness and because the properties and characteristics of the layer would be altered is similarly unavailing. *See* PO Resp. 42–46. Neither Patent Owner nor its expert, Dr. Ellison, identify anything in Oez-US that suggests the titanium dioxide functions other than to provide a contrasting background. *See generally id.*; *see generally* 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 proposed by Petitioner. Ex. 2011 ¶ 144 (emphasis added).

In addition, record evidence supports Petitioner's position that a person of ordinary skill in the art would have understood incorporating 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 ¶¶ 145–148.

Similarly, Patent Owner's argument that "it is 'extremely rare' to find a 'drop in' replacement" for titanium dioxide (PO Resp. 44) is based on an incomplete understanding of the referenced articles and is conclusory. Patent Owner relies on the testimony of Dr. Ellison and Exhibits 2012 and 2013, and identifies the problem as a possible color shift or variance in lightness of up to 10% (Ex. 2012)—not unpredictability. Dr. Ellison also testified that he had not studied the details of Exhibit 2012 and conceded that Exhibit 2013 is not relevant to inorganic

pigments, like titanium dioxide. Ex. 1063 343:11–347:7, 350:5–355:2.

On the other hand, Petitioner identifies evidence that suggests titanium dioxide is the most widely-used and well-known white pigment. Pet. Reply 8–10 (citing Ex. 1062 ¶¶ 19–39; Ex. 1054; Ex. 1056); *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 TiO_2 pigment produced is consumed by the coatings industry and a quarter by the paper industry."); Ex. 1057; Ex. 1058.

We also disagree with Patent Owner's assertion that the alleged "numerous failures" in Kronzer demonstrate why adding a new component to the third layer would be unpredictable. PO Resp. 43; Sur-reply 5. Even if we were to accept Patent Owner's characterization of Kronzer as including some failures as true, none of Kronzer's trials include a pigment. Ex. 1018, Tables VI–XIV; Ex. 2011 ¶ 149. Thus, we fail to see the particular significance of those specific trials to the question of unpredictability based on the addition of a pigment to Kronzer. Moreover, a reference should be considered in its entirety for what it fairly teaches one skilled in the art, which would include the multiple successful trials in Kronzer and an express statement that each of the film layers may include a pigment. Ex. 1018, Tables VI–XIV (showing transfer sheet trials with characteristics, including image transfer, that are "good" and/or "excellent"), 8:46–48; *see In re Wesslau*, 353 F.2d 238, 241 (CCPA 1965).

(3) whether a person of ordinary skill in the art would not have had reason to combine where Kronzer and Oez-US involve the 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. 46. 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.* at 47.

Petitioner argues that Oez-US is not a "single homogenized coating" as Patent Owner suggests. Pet. Reply 11. 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.2.b, we do not agree with Patent Owner's arguments, in this regard. As we explained above, Oez-US and Kronzer each describe a 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 (Dr. Ellison's testimony 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 is 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. 47–48.

Petitioner replies that "Oez-US and Kronzer are both generally directed to, *inter alia*, compositions and methods, including multi-layered polymer sheets for transferring images to fabric . . . and share the common goal of improving the quality of the transferred image when applied to fabric." Pet. Reply 11–12. Petitioner further argues that "both Oez-US and Kronzer teach the use of overlapping classes of polymers, *e.g.*, polyurethane and acrylic acid and acrylic acid ester polymers" and therefore, "the technologies employed by Kronzer and Oez-US are fundamentally the same; *i.e.*, multi-layer sheets comprising similar polymer layers for heat transfer to fabrics." *Id.* at 12 (citing Ex. 1020 ¶¶ 88, 220–221; 1063 ¶¶ 8–10).

For the same reasons discussed above, in Section II.D.2.b, Patent Owner's arguments, in this regard are unavailing. 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 undermines 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 a person or ordinary skill in the art would not have had a reasonable expectation of success. PO Resp. 48. According to Patent Owner, a person of ordinary skill in the art would have been dissuaded from adding a white pigment to Kronzer's third layer because the pigment would "obscure the decorative graphic." *Id.* at 48–49.

Petitioner asserts that "far from being 'counterintuitive' (PO [Resp.], 48-49), 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 necessitate the image to be positioned positively on top of (not underneath) the opaque/white layer, as expressly taught by Oez-US." Pet. Reply 12.

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—i.e., 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 have resulted in the white layer covering the image, and therefore the image would be obscured. PO Resp. 48 (citing Ex. 2011 ¶ 150) ("a [person having ordinary skill in the art] would expect that white pigment in the third layer would obscure the decorative graphic."); Pet. Reply 12; Ex. 1062 ¶¶ 42–43. 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 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.").

For all of 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 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 the evidence that claim 1 is unpatentable as obvious in view of Kronzer and Oez-US.

3. Claims 2 and 3

Claim 2 requires the article of claim 1 "wherein the indicia and the opaque background are arranged to concurrently transfer to the dark-colored base in contact with the image-imparting member upon application of heat." Ex. 1003, 11:49–52. Claim 3 requires the article of claim 2, "wherein the portion of the image-imparting member comprising the pigment and providing the opaque background is configured to be contactable to the darkcolored base, during a transfer process, such that received indicia face upwards." *Id.* at 11:53–57.

Petitioner explains that "Kronzer teaches first placing its image transfer sheet on a fabric, applying heat to effect a[n] image transfer, and (after cooling) peeling off the first/base layer." Pet. 76. Petitioner asserts that a person of ordinary skill in the art "would have naturally [] applied the image transfer steps and image orientation

taught by Oez-US" because "the purpose of adding the white pigment to Kronzer's third layer is to provide a white background for the image being transferred." *Id.* at 77 (citing Ex. 1020 ¶¶ 261 (explaining that if applied otherwise, the white layer would be on top of the image); Ex. 1013, 1:26–55, 2:50–51, 3:30–59; Ex. 1018, 4:15–16).

Patent Owner argues that Petitioner "cite[s] no support or evidence for the proposition" that it would have been "natural" to apply the "image transfer steps and image orientation taught by Oez-US." PO Resp. 49 (citing Pet. 77). 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 expect such re-engineering to be successful. *Id.* at 49–50. Patent Owner reasons that "[t]his re-engineering is based on hindsight." *Id.* at 50.

Petitioner replies that modifying Kronzer to include a "peel first" image orientation would not require a "complete reengineering" as Patent Owner alleges. Pet. Reply 13. 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, with no support for these assertions." *Id.* Petitioner contends its 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, 6:1–8, 6:54–56, 7:12–41; Ex. 1020 ¶¶ 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 the same (or materially similar) functionality as the original orientation." *Id.* (citing Ex. 1036 ¶ 46; Ex. 1018, 6:17–19).

In weighing the evidence before us, we disagree with Patent Owner's argument 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. 77 (citing Ex. 1020 ¶ 261). 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.* (citing Ex. 1018, 4:15–16; Ex. 1020 ¶ 261). 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 71 (quoting Ex. 1018, 2:35–67). 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 had reason modified the teachings of Kronzer and Oez-US. *See KSR*, 550 U.S. at 418.

Furthermore, critically lacking from Patent Owner's argument is any explanation why "a complete reversal of the order of the layers would not yield predictable results" (PO Resp. 50), what "complete re-engineering" other than a reordering the layers would have been required, 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.

For the foregoing reasons, Petitioner has established by a preponderance of the evidence that claims 2 and 3 are unpatentable as obvious in view of Kronzer and Oez-US.

4. Remaining Claims (claims 4–6, 8–21, and 24–31)

Petitioner also alleges that the combined teachings of Kronzer and Oez-US would have rendered obvious the subject matter of independent claims 17, 24, 27, 30, and 31 and dependent claims 4–6, 8–16, 18–21, 25–26, and 28–29. Pet. 66–81. Independent claims 17, 24, 27, 30, and 31 are similar to claim 1 except that claims 27, 30, and 31 additionally require (1) the polymer layer underlying the white layer (claims 27 and 31) or underlying the ink-receptive layer (claim 30) to include ethylene acrylic acid

and (2) a silicone-coated removable substrate underlaying the polymer layer (claims 27 and 31) or underlaying the white layer (claim 29). *See generally* Ex. 1003, claims. Petitioner argues that Kronzer describes a fifth layer comprising ethylene acrylic acid that may be located be between the second layer and third layers (i.e., the white layer as modified), thereby meeting claims 27 and 31. Pet. 73 (citing Ex. 1018, 11:55–65; Ex. 1020 ¶ 238). Alternatively and relevant to claim 30, Petitioner argues that Kronzer discloses that any of the third, fourth, or fifth layers may include ethylene acrylic acid, and that in "Kronzer's five layer variant, a POSITA would have been motivated to place Oez-US's white pigment in the fifth layer to provide the most spatial separation of the indicia and white pigment." *Id.* at 74 (citing Ex. 1020 ¶¶ 243–244). Additionally, Petitioner argues that although Kronzer does not disclose that the release layer may include silicone, but rather clay, Oez-US "expressly teaches a silicone release layer" for easy removal. *Id.* (citing Ex. 1013, 3:14–16). Petitioner contends that a person of ordinary skill in the art would have reason to replace the clay (in Kronzer), a known release coating, for another known alternative, i.e., silicone (in Oez-US), as it involves a matter of simple substitution to achieve the invention of claims 27, 30, and 31. *Id.* at 74–75 (citing Ex. 1020 ¶¶ 241, 246–247, 255).

Patent Owner does not address independent claims 17, 24, 27, 30, and 31 or dependent claims 4–6, 8–16, 18–21, 25–26, and 28–29 beyond what Patent Owner argues for claims 1–3, and therefore has forfeited any arguments based on these uncontested claims. *Cf. In re NuVasive*, 842 F.3d 1376, 1381 (Fed. Cir. 2016) (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). For the reasons we discuss above, we are persuaded by Petitioner's arguments and evidence. We have reviewed the information Petitioner provides, including the relevant portions of both Wanat Declarations 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 that a person of ordinary skill in the art 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 4–6, 8–21, and 24–31, we adopt Petitioner's analysis as our own. Accordingly, Petitioner establishes that the subject matter of claims 4–6, 8–21, and 24–31 would have been obvious over Kronzer in view of 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 1–6, 8–21, and 24–31 obvious, we need not address Petitioner's additional grounds challenging claims 1–6, 8–21, and 24–31. *See SAS Inst. Inc. v. Iancu*, 138 S. Ct. 1348, 1359 (2018) (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. PATENT OWNER'S MOTION TO STRIKE

On June 1, 2021, with authorization, Patent Owner filed a Motion to Strike. Paper 29 ("Motion"). The Motion seeks to strike "evidence submitted by Petitioner for the first time on Reply," including the Reply Declaration of Dr. Robert Wanat (Ex. 1062, "Reply Declaration"), as well as evidence relied on in that Declaration (Exhibits 1054–1060 and 1064–1065). *Id.* at 1, 4. Petitioner filed its Opposition to the Motion to Strike on June 15, 2021. Paper 30 ("Response").

Patent Owner argues that the Reply Declaration includes "new argument and cite[s] new evidence that could have – and should have – been submitted with the Petition." *Id.* at 1. Patent Owner also argues that we should strike newly-submitted evidence (Exhibits 1054–1060 and 1064–1065) used to support the Reply Declaration. *Id.*

Under the Board's rules, a petitioner's reply "may only respond to arguments raised in the corresponding . . . patent owner response" or address the institution decision. 37 C.F.R. § 42.23(b) (2019); *see also Ariosa Diagnostics v. Verinata Health, Inc.*, 805 F.3d 1359, 1367 (Fed. Cir. 2015) (discussing how, in an *inter partes* review proceeding, a petitioner's reply is "limited to a true rebuttal role" (citing 37 C.F.R. §§ 42.104(b)(5), 42.23(b))). "Petitioner may not submit new evidence or argument in reply that it could have presented earlier, e.g. to make out a prima facie

case of unpatentability. A party also may submit rebuttal evidence in support of its reply." *See* Consolidated Trial Practice Guide, 73 (2019)[11] (citing *Belden Inc. v. Berk-Tek LLC*, 805 F.3d 1064, 1077–78 (Fed. Cir. 2015)). We address each of Patent Owner's concerns below.

A. Alleged New Motivation to Combine

Patent Owner argues that the Reply Declaration, for the first time, "set[s] forth a new motivation to combine" Motion 1 (citing Ex. 1062 ¶¶ 9–12). Petitioner argues that "[t]ellingly, [Patent Owner] does not even identify any motivation that is supposedly 'new.'" Response 2. Petitioner asserts that the Reply Declaration is in response to Patent Owner's arguments and specifically those asserting "that there would be no motivation to combine Kronzer and Oez-US because they solve 'fundamentally different problems using fundamentally different technologies.'" *Id.* at 3 (quoting Ex. 1062 ¶ 7).

Patent Owner does not identify what purported new motivation to combine Petitioner introduces. *See generally* Motion. Indeed, Patent Owner does not specifically identify which new theories Dr. Wanat proffers and cites only generally to paragraphs 9–12 of the Reply Declaration. Motion 1. Accordingly, we find Patent Owner has failed to establish that it is entitled to the requested relief. 37 C.F.R. § 42.20(c) ("The moving party has the burden of proof to establish that it is entitled to the requested

11. Available at https://www.uspto.gov/TrialPracticeGuideConsolidated.

relief."). In any event, we do not rely upon Dr. Wanat's additional testimony in determining whether Petitioner has shown an adequate reason to combine Kronzer and Oez-US. Accordingly, we dismiss this aspect of Patent Owner's Motion as moot.

B. Alleged New Arguments Regarding Use of TiO_2

Patent Owner argues that the Petition fails to cite any evidence for its allegation that using TiO_2 in Kronzer would have been predictable to the person of ordinary skill in the art and that we should now preclude Petitioner from providing new evidentiary support. Motion 2 (citing Ex. 1062 ¶¶ 17–40). Patent Owner contends that we should also strike Petitioner's argument (and evidence) "that ready to use formulations exist that include titanium dioxide, which Petitioner asserts somehow supports the predictability of titanium dioxide." *Id.* at 3 (citing Ex. 1062 ¶ 38). Patent Owner further contends that Petitioner's arguments that a person of ordinary skill in the art "would ***also*** know to include other (unidentified) additives to Kronzer in order to make the composition work" are untimely. *Id.* at 2 (citing Ex. 1062 ¶¶ 17–40).

Petitioner asserts that "Dr. Wanat's position that using TiO_2 in transfer sheets would have led to predictable results is entirely consistent with the arguments and evidence presented in the Petition." Response 4 (citing Pet. 66–69; Ex. 1020 ¶¶ 85, 220–224). Petitioner explains that Dr. Wanat's further positions regarding the use of additives and ready-to-use formulations were in direct response to Patent Owner's arguments that TiO_2 could not be used predictably. *Id.* at 7–8.

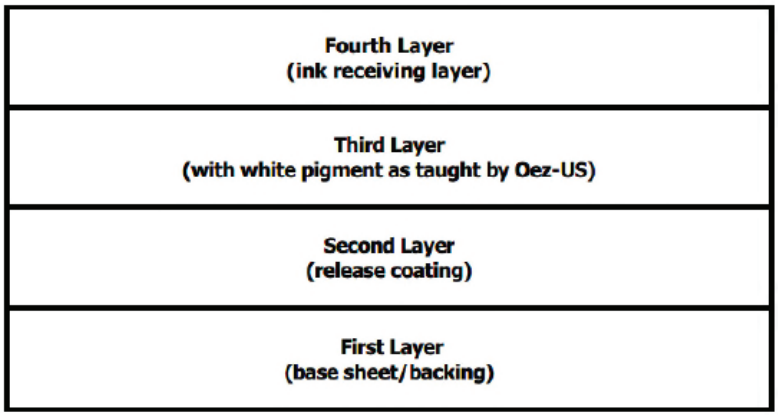
We are not persuaded that Petitioner's arguments are improper rebuttal arguments. In the Petition, Petitioner explains that because the combination "merely involved combining well-known elements (*i.e.*, polymers and pigments) using well-known polymer science/manufacturing techniques" the results would have been predictable to the person of ordinary skill in the art. Pet. 69 (citing Ex. 1020 ¶ 224). In its Response, Patent Owner argued that including a pigment would, in fact, have been unpredictable to one of ordinary skill in the art because the inclusion of pigments "can pose significant technical challenges" including changing "the viscosity and flow properties of the third layer at transfer temperatures" and changing "solid state characteristics of the third layer, such as modulus, elasticity, and flexibility." PO Resp. 44–45. Patent Owner further argues that finding a "'drop in' replacement" replacement for a pigment is "extremely rare." *Id.* at 44. Therefore, Dr. Wanat's testimony that the skilled artisan would have understood how to account for the "technical challenges" Patent Owner identified through use of additives and testimony that "drop-in replacements" were in fact available, properly responds to arguments raised by Patent Owner.

C. Alleged New Arguments Regarding the Similarity of Layers

Patent Owner asserts that Petitioner improperly advances an argument where the third and fourth layers of Kronzer are flipped and, because of their similarity, there would be no "impact on the composition at all." Motion 3. Petitioner argues that "the Petition expressly

addresses the similarity of characteristics for Kronzer's third and fourth layers . . . [t]hus paragraphs 44–48 of Dr. Wanat's Reply declaration are entirely consistent within the originally filed Petition." Response 8–9. Further, Petitioner asserts that "Dr. Wanat's reply declaration [is] clearly directed to [Patent Owner's] own baseless argument that 'flipping' Kronzer's layer would be a 'complete reengineering' of Kronzer." *Id.* at 9.

We are persuaded that the Reply Declaration is proper rebuttal evidence. In the Petition, Petitioner argues that the combination of Kronzer and Oez-US would result in an image transfer sheet having the following structure.



Pet. 66–67 (citing Ex. 1020 ¶ 221). Petitioner further explains that "Kronzer teaches that its third and fourth layers' include[] a thermoplastic polymer which melts in a range of from about 65°C. to about 180°C.'" *Id.* at 71 (quoting Ex. 1018, 2:35–67); *see also* Ex. 1020 ¶¶ 256–258 (same). Petitioner also explains that a person of ordinary

skill in the art "would have naturally applied the image transfer steps and image orientation taught by Oez-US," i.e., image on top of the white layer. *Id.* at 77 (discussing claims 2 and 3) (citing Ex. 1020 ¶ 261).

In its Response, Patent Owner argues that Petitioner, other than for claims 2 and 3, has not addressed which application method or combination thereof is used or how they would be applied. PO Resp. 48. Patent Owner contends that a person of ordinary skill in the art would not have applied Kronzer's "peel later" method as there would be no reasonable expectation of success because the decorative graphic would be obscured by the white pigment. *Id.* With respect to claims 2 and 3, Patent Owner asserts that a person of ordinary skill in the art would not have followed the transfer steps and image orientation of Oez-US because "it is a complete re-engineering of Kronzer." *Id.* at 49.

Petitioner did not need to initially address whether the ordinarily skilled artisan would have peeled first or last because the challenged claims of the '581 patent recite an article of manufacture, not a method. It was not until the Patent Owner Response raised the issue of a lack of a reasonable expectation of success that the need for Petitioner's argument arose. Accordingly, Dr. Wanat's reply testimony responds to Patent Owner's arguments and is proper rebuttal evidence. We therefore deny Patent Owner's Motion relating to this testimony.

Appendix D

D. Alleged New Arguments Relating to Cross-linking

Patent Owner argues that the Reply Declaration, for the first time in, makes "new arguments about cross-linking, including new arguments regarding melting that pointed to new citations to Oez." Motion 4 (citing Ex. 1062 ¶¶ 49–54). According to Petitioner, the Petition and original Wanat declaration explained that

> crosslinking will require a period of time at the high temperature to complete the crosslinking process and, as a result, upon initial heating of such melamine formaldehyde polymers, . . . the polymers will be in a state with very little to no crosslinking, and so there will be mobility . . . which can allow for mixing of polymers between layers to occur.

Response 10–11 (citing Pet. 24–36; Ex. 1020 ¶¶ 49–54. Furthermore, Petitioner contends that the Reply Declaration is in direct response to Patent Owner's arguments. *Id.* at 11.

Dr. Wanat's "new arguments" regarding melting (Ex. 1062 ¶¶ 49–54) relate to a ground we do not rely on in determining claims 1–6, 8–21, and 24–31 unpatentable. Accordingly, Patent Owner's Motion to strike Dr. Wanat's testimony in this regard, is dismissed as moot.

IV. CONCLUSION[12]

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 1–6, 8–21, and 24–31 of the '581 patent is unpatentable. We also deny in part and dismiss in part Patent Owner's Motion to Strike.

V. ORDER

In consideration of the foregoing, it is hereby:

ORDERED that, Petitioner establishes by a preponderance of the evidence that claims 1–6, 8–21, and 24–31 are unpatentable; and

FURTHER ORDERED that Patent Owner's Motion to Strike is denied in part and dismissed in part; 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.

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12. 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).

Appendix D

In summary:

Claims	35 U.S.C. §	References/ Basis	Claims Shown Unpatentable	Claims Not Shown Unpatentable
1–6, 8–21, 24–26	§ 103	Oez-US, Meyer[13]		
18, 27–31	§ 103	Oez-US, Meyer, Kronzer		
1–6, 8–21, 24–31	§ 103	Oez-PCT, Oez-US		
1–6, 8–21, 24–31	§ 103	Kronzer, Oez-US	1–6, 8–21, 24–31	
Overall Outcome			1–6, 8–21, 24–31	

13. As explained above, we do not reach Petitioner's alternative grounds based on Oez-US and Oez-PCT. *See supra* Section II.E.

APPENDIX E — JUDGMENT AND FINAL WRITTEN DECISION OF THE UNITED STATES PATENT AND TRADEMARK OFFICE, PATENT TRIAL AND APPEAL BOARD, FILED NOVEMBER 21, 2021

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

NEENAH, INC.,

Petitioner,

v.

JODI A. SCHWENDIMANN,

Patent Owner.

IPR2020-00915
Patent 7,766,475 B2

Before JEFFREY W. ABRAHAM, MICHELLE N. ANKENBRAND, and AVELYN M. ROSS, *Administrative Patent Judges.*

ANKENBRAND, *Administrative Patent Judge.*

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

Appendix E

I. INTRODUCTION

This is a Final Written Decision in an *inter partes* review challenging the patentability of claims 1–21 (collectively, "the challenged claims") of U.S. Patent No. 7,766,475 B2 ("the '475 patent," Ex. 1005). We have jurisdiction under 35 U.S.C. § 6. We issue this Final Written Decision under 35 U.S.C. § 318(a) and 37 C.F.R. § 42.73. For the reasons that follow, we determine that Petitioner demonstrates, by a preponderance of the evidence, that the challenged claims are unpatentable.

A. Procedural History

Neenah, Inc. ("Petitioner") filed a Petition (Paper 1, "Pet.") requesting an *inter partes* review under 35 U.S.C. § 311. Jodi A. Schwendimann ("Patent Owner") filed a Preliminary Response. Paper 8. On November 5, 2020, we instituted an *inter partes* review of the challenged claims. Paper 9 ("Institution Decision" or "DI").

Following institution, Patent Owner filed a Response (Paper 13, "Resp."), Petitioner filed a Reply (Paper 16, "Reply"), and Patent Owner filed a Sur-reply (Paper 23, "Sur-reply").

Petitioner relies on the Declaration of Dr. Robert A. Wanat (Ex. 1020), and submitted a supplemental Declaration of Dr. Wanat (Ex. 1062) with the Reply. Patent Owner relies on the Declaration of Dr. Christopher Ellison (Ex. 2011). Petitioner took cross-examination testimony of Dr. Ellison via deposition and filed the transcript (Ex. 1063).

We heard oral argument on July 12, 2021, and the record includes a transcript of the argument. Paper 28 ("Tr.").

B. Related Matters

The parties identify the following lawsuits involving the '475 patent: *Jodi A. Schwendimann v. Neenah, Inc.*, Case No. 1:19-cv-00361-LPS (D. Del.) ("Delaware Lawsuit"); *Jodi A. Schwendimann v. Arkwright Advanced Coating, Inc.*, Case No. 0:11-cv-00820-JRT-HB (D. Minn.) ("Arkwright Lawsuit"); *Jodi A. Schwendimann v. Stahls' Inc.*, Case No. 2:19-cv-10525-LVP-MKM (E.D. Mich.); and *Jodi A. Schwendimann et al. v. Siser North America, Inc.*, Case No. 1:19-cv-00362-LPS (D. Del.). Pet. 1–2; Paper 4, 2.

The parties also identify the following proceedings challenging the '475 patent and related patents: IPR2020-00628, IPR2020-00633, and IPR2020-00641, challenging U.S. Patent No. RE 41,623 ("the RE '623 patent"); IPR2020-00629 and IPR2020-00635, challenging U.S. Patent No. 7,754,042 ("the '042 patent"); IPR2020-00634, IPR2020-00644, and IPR2020-00645, challenging U.S. Patent No. 7,749,581 ("the '581 patent"); IPR2020-00636 and IPR2020-001121, challenging U.S. Patent No. 7,771,554 ("the '554 patent"); and IPR2020-01122, challenging the '475 patent. Pet. 2; Paper 4, 2. We instituted review in all of the proceedings except IPR2020-00636, IPR2020-00645, and IPR2020-01121.

On September 10, 2021, we entered final written decisions in IPR2020-00629, IPR2020-00634, IPR2020-00635, and IPR2020-00644 determining all challenged

claims of the '042 patent and the '581 patent unpatentable. IPR2020-00629, Paper 39; IPR2020-00634, Paper 39; IPR2020-00635, Paper 46; IPR2020-00644, Paper 35; IPR2020-00644, Paper 36. On October 1, 2021, we entered final written decisions in IPR2020-00628 determining all challenged claims of the RE '623 patent unpatentable, and in IPR2020-00633 and IPR2020-00641 determining some challenged claims of the RE '623 patent unpatentable. IPR2020-00628, Paper 29; IPR2020-00633, Paper 40; IPR2020-00641, Paper 42.

In addition, Petitioner identifies several interference proceedings involving the '475 patent that have concluded—Interference Nos. 105,961, 105,964, and 105,966. Pet. 9–10.

A. The '475 Patent (Ex. 1005)

The '475 patent, titled "Image Transfer on a Colored Base," issued on August 3, 2010. Ex. 1005, [45], [54]. The '475 patent relates to an image transfer sheet comprising a release layer and a polymer layer where one or more of the release and polymer layers comprise titanium oxide or other white pigments. *Id.* at Abstract.

The written description explains that conventional image transfer processes used 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 3:37–50. According to the '475 patent, the conventional two-step process required careful alignment of an image with the white background, was "exceedingly time-

consuming," and produced significant waste of base and image transfer materials. *Id.* at 3:51–57. To address that issue, the '475 patent discloses a method that applies the white background, i.e., a "white layer," and image in a single step. *Id.* at 3:10–21.

The '475 patent describes several embodiments of, and methods for making, an image transfer sheet. One embodiment of the transfer sheet is depicted below in Figure 5.

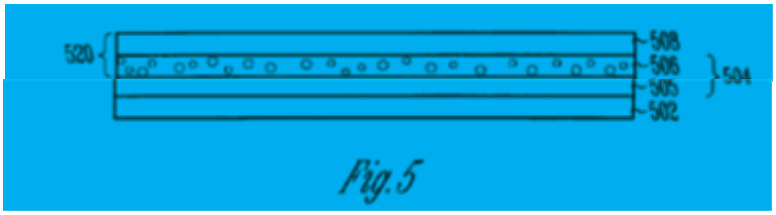

Fig. 5

Figure 5 illustrates "a cross-sectional view of one . . . embodiment of the image transfer device of the present invention." *Id.* at 2:41–42. "[I]mage transfer sheet 500 . . . is comprised of a substrate layer 502 [and] a release layer 504, comprising a silicone coating 505 and a white layer 506." *Id.* at 8:45–47. Figure 5 also depicts white layer 506 and receiving layer 508 as part of peel layer 520. *See id.* at 8:53–56, 9:1–3.

The '475 patent describes the white layer as imparting "a white background on a dark substrate." *Id.* at 3:35–36. 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 8:51–54. 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 8:54–57.

Referring again to the Figure 5 embodiment, the '475 patent also describes an image transfer process. Specifically, the '475 patent discloses "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 9:1–3. "[I]mage 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 9:11–19. 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 9:19–25. 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 9:28–32. The '475 patent further explains:

> Because 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 9:33–48.

B. Illustrative Claims

Petitioner challenges claims 1–21 of the '475 patent. Of the challenged claims, claims 1, 13, and 19 are independent. Claims 1 and 19 are illustrative and are reproduced below.

> 1. An ink-jet transfer article, comprising:
>
> a substrate member including a substrate surface;
>
> an opaque first layer overlaying the substrate surface, the opaque first layer including polyurethane and a white or luminescent pigment; and
>
> a second layer overlaying the opaque first layer and configured to receive indicia, the second layer including polyurethane and a polymeric material.

Appendix E

Ex. 1005, 11:34–41.

19. A method of transferring an image to a dark-colored or black receiving member, comprising:

providing an ink-jet transfer article, comprising

a substrate member including a substrate surface;

an opaque first layer overlaying the substrate surface, the opaque first layer including polyurethane and a white or luminescent pigment; and

a second layer overlaying the opaque first layer and configured to receive indicia printed using an ink-jet printer, the second layer including polyurethane and a polymeric material;

wherein the substrate member is peeled away from the opaque first layer and the second layer;

wherein the opaque first layer and the second layer are applied to the dark-colored or black receiving member such that received indicia face upwards;

wherein the substrate layer, when peeled, or an overlay release paper is positioned over the second layer and the opaque first layer; and

wherein heat is applied to one of the substrate layer or the overlay release paper, the second layer, and the opaque first layer so that received

> indicia and a substantially white background for received indicia, provided by the opaque first layer, are transferred to the colored or black receiving member at substantially the same time.

Id. at 12:42–67.

C. Asserted Unpatentability Challenges

We instituted an *inter partes* review of the challenged claims on the following grounds of unpatentability:

Claims Challenged	35 U.S.C. §[1]	References/ Basis
1–21	103	Oez-US,[2] Meyer[3]
1–21	103	Oez-PCT,[4] Oez-US
1–21	103	Kronzer,[5] Oez-US

1. Because the claims at issue have an effective filing date before March 16, 2013, the effective date of the applicable provisions of the Leahy Smith America Invents Act, Pub. L. No. 112–29, 125 Stat. 284 (2011) ("AIA"), we apply the pre-AIA version of 35 U.S.C. § 103 in this decision.

2. US 5,665,476, issued Sep. 9, 1997 (Ex. 1013).

3. US 3,359,127, issued May 9, 1966 (Ex. 1019).

4. WO 97/41489, published Nov. 6, 1997 (Ex. 1014). References to Oez-PCT will be to Exhibit 1016, which is an English-language translation of Oez-PCT with line numbers. Pet. 4.

5. US 5,798,179, issued Aug. 25, 1998 (Ex. 1018).

Appendix E

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(a) 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 skill in the art; and (4) objective evidence of nonobviousness, i.e., secondary considerations.[6] *See Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966). Subsumed within the *Graham* factors is the requirement 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. . . . [A]ll that is required is a reasonable expectation of success." *In re O'Farrell*, 853 F.2d 894, 903–04 (Fed. Cir. 1988).

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6. The record does not contain evidence or argument regarding objective evidence of nonobviousness.

Moreover, "[t]he combination of familiar elements according to known methods is likely to be obvious when it does no more than yield predictable results." *KSR*, 550 U.S. at 416. "If a person of ordinary skill can implement a predictable variation, § 103 likely bars its patentability." *Id.* at 417.

B. Level of Ordinary Skill in the Art

In the Institution Decision, we determined that a person of ordinary skill in the art at the time of the invention of the '475 patent would have had "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" because that description was consistent with the level of skill reflected in the prior art. DI 8 (adopting Dr. Ellison's description of the level of ordinary skill in the art). For purposes of this Final Written Decision, we maintain our determination from the Institution Decision because neither party disputes that determination and that level of ordinary skill is consistent with the record. *See* Resp. 15; *see generally* Reply.

C. Claim Construction

In an *inter partes* review, 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). Under that standard, we construe

claims "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). Furthermore, we expressly construe the claims only to the extent necessary to determine whether to institute *inter partes* review. *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))). For purposes of this decision, the claim term "white layer" and the order of method steps merit discussion.

1. White layer

In the Institution Decision, we determined that each of the claims in the '475 patent requires a "white layer" that melts and mixes with another layer or layers during application. DI 10–11. Our construction was based the parties' agreement that the claims of the '475 patent require a white layer that melts and mixes with another layer, and on the claim construction of "white layer" that the district court in the Arkwright Lawsuit adopted. Ex. 1022, 17 (Arkwright Lawsuit Markman Order). In the Institution Decision, we rejected Patent Owner's attempt to modify the interpretation adopted in the Arkwright Lawsuit to include "a polymer that softens or melts and mixes to some degree with another layer." DI 10 (Patent Owner's modifications underlined).

In its Response, Patent Owner again requests that we adopt a construction of "white layer" that differs from the construction adopted in the Arkwright Lawsuit and in our Institution Decision. Specifically, Patent Owner's proposed construction 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." Resp. 16–17. (Patent Owner's modifications underlined).

Petitioner contends that we should again reject Patent Owner's attempt to rewrite the construction of "white layer" because it is "completely at odds" with the construction in both the Arkwright Lawsuit and the Delaware Lawsuit, which requires actual melting, not just softening, and construes "mix" to have its plain and ordinary meaning. Reply 2 (citing Ex. 1022, 8–18; Ex. 1066, 6, 8–9).

We agree, and decline to adopt Patent Owner's construction that departs from the construction in the Arkwright Lawsuit and the Delaware Lawsuit. Ex. 1022, 17; Ex. 1066, 6. Accordingly, for purposes of this Final Written Decision, we maintain our construction of the term "white layer" from the Institution Decision. We note, however, 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." Resp. 17; Tr. 13:21–14:3; 53:19–21.

2. Order of steps

Claim 19 of the '475 patent recites a method that includes several steps. Ex. 1005, 12:42–67. In the Institution Decision, we found that it was not necessary to determine the order of steps in claim 19 to resolve the parties' dispute. DI 11. Patent Owner argues that the order of the method steps, i.e., "providing an ink-jet transfer article," "wherein the substrate member is peeled away," "wherein the opaque first layer and the second layer are applied to the dark-colored or black receiving member," and "wherein heat is applied," is sequential. Resp. 18 (citing Pet. 74). Patent Owner further asserts that "Petitioner acknowledges there is a 'sequential order recited in claim 19.'" *Id.* (quoting Pet. 74). Petitioner does not provide any express argument about the order of steps. Although we agree with Patent Owner that Petitioner's arguments at least imply that claim 19 requires a sequential order, as in the DI, we conclude that it is not necessary to determine whether the order of steps must be sequential to resolve the parties' dispute because Petitioner shows that the art teaches the steps in the order claim 19 recites. *Nidec*, 868 F.3d at 1017; *see infra* § II.D.4.

D. Obviousness over Kronzer and Oez-US

Petitioner contends that the subject matter of claims 1–21 would have been obvious over Kronzer and Oez-US. Pet. 60. Petitioner directs us to portions of Kronzer and Oez-US that purportedly disclose all the limitations in the challenged claims. *Id.* at 62–76. Petitioner also relies on Dr. Wanat's testimony to support its arguments. *See*

id. We provide a brief summary of Kronzer and Oez-US before discussing the parties' arguments.

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 it has cooled. Ex. 1018, Abstract, 2:25–30. According to Kronzer, the heat transfer paper includes a flexible first layer, or base sheet, that "ha[s] sufficient strength for handling, coating, sheeting, 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 that melts in a range of 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 ink jet printer places an image. *Id.* at 7:3–6.

2. Oez-US

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 "[i]t is furthermore of essential importance that a white pigment (TiO_2) 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. Claims 1 and 13

Petitioner contends that the combination of Kronzer and Oez-US discloses the ink-jet transfer article of claims 1 and 13. Pet. 62–66. Petitioner argues that Kronzer describes "'a heat transfer paper' (*i.e.*, image transfer sheet) 'for transferring designs, messages, and illustrations' (*i.e.*, images/indicia) 'on articles of clothing, such as T-shirts.'" *Id.* at 62 (quoting Ex. 1018, 1:5–11, 9:1–18:6). Petitioner also argues Kronzer "teaches that layers are 'useful for a printable heat transfer material on which an image is to be placed by an ink jet printer.'" *Id.* (quoting Ex. 1018, 7:3–8:31; citing Ex. 1020 ¶ 249).

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Claim 1 requires a substrate member that includes a substrate surface, and claim 13 requires a removable substrate member. Ex. 1005, 11:35, 12:15. Petitioner explains that "Kronzer teaches '[t]he printable heat transfer material includes a flexible first layer having first and second surfaces [that] serves as a base sheet or backing [and] typically will be a film or a cellulosic nonwoven web.'" Pet. 62 (quoting Ex. 1018, 4:15–20; citing *id.* at 4:27–30; Ex. 1020 ¶ 251) (emphasis omitted, alterations in original). According to Petitioner, Kronzer also explains that the backing sheet, i.e., substrate, is removable. *Id.* (citing Ex. 1018, 4:6–14, 5:23–44, 12:12–43, Tables VI–XIV; Ex. 1020 ¶ 251).

Claim 1 next requires "an opaque first layer overlaying the substrate surface, the opaque first layer including polyurethane and a white or luminescent pigment." Ex. 1005, 11:36–38. Claim 13 similarly requires an opaque white layer "overlaying a portion of the substrate member" that includes "a binder and a white or luminescent pigment." *Id.* at 12:16–18. Petitioner alleges that Kronzer discloses a second, release layer that overlays the first surface of the first layer and "is 'composed of a thermoplastic polymer having essentially no tack at transfer temperatures'" and that Kronzer discloses a third polymer layer that overlays the second layer. Pet. 63 (quoting Ex. 1018, 5:23–48; citing Ex. 1020 ¶ 253). Petitioner argues that "[a]lthough Kronzer does not expressly disclose that its second/third layers include a white or luminescent pigment, this feature was extremely well-known before the '475 patent, as shown by Oez-US." *Id.* In particular, Petitioner explains that Oez-US "expressly discloses" including a white pigment

"to form a white layer in the transfer sheet that provides an opaque/non-transparent background and improves image quality on dark/black fabrics." *Id.* (citing Ex. 1013, 1:26–31, 1:47–55, 3:32–54, claim 6; Ex. 1020 ¶ 253). Petitioner further asserts that Oez-US teaches that the white pigment and the polymers in the layer "are 'mixed and homogenized'" and that a person of ordinary skill in the art "would have understood that such polymers . . . were commonly used as 'binders.'" *Id.* (citing Ex. 1013, 3:22–58; Ex. 1020 ¶ 253).

Petitioner contends that a person of ordinary skill in the art would have had reason to combine the teachings of Kronzer and Oez-US because Kronzer teaches that any of its layers may contain materials such as pigments, and Oez-US teaches that "including a white layer 'advantageously provides a contrasting white background for application of images onto dark [(black)] fabrics.'" Pet. 64 (quoting Ex. 1013, 1:27–31, 2:50–51; citing Ex. 1018, 8:47–49).

Petitioner additionally asserts that a person of ordinary skill in the art "would have understood that Kronzer's white layer (e.g., its third layer with . . . white pigment as taught by Oez-US) would melt and mix with other adjacent layers of the image transfer sheet, such as the fourth/ink-receptive layer." *Id.* at 64–65. Petitioner contends that Kronzer includes third and fourth layers of thermoplastic polymers that melt between 65 °C and 180 °C. *Id.* at 65 (citing Ex. 1018, 2:35–67). According to Petitioner, an ordinarily skilled artisan would have understood that the Kronzer/Oez-US transfer sheet would have been heated above 180 °C during application and,

therefore, that the third/white layer and fourth/image-imparting layers would melt and mix. *Id.* (citing Ex. 1020 ¶ 259).

Claims 1 and 13 also require a layer overlaying the opaque layer. Ex. 1005, 11:39, 12:19. In claim 1, the layer overlaying the opaque layer is "configured to receive indicia" and includes "polyurethane and a polymeric material." *Id.* at 11:39–41. In claim 13, the layer overlying the opaque white layer is an "ink-receptive layer" and includes "a binder and a polymeric material." *Id.* at 12:19–21. Petitioner argues that Kronzer teaches "'a fourth layer may overlay the third layer in order to provide an ink jet printable heat transfer material [that] typically includes a film-forming binder and a powdered thermoplastic polymer.'" Pet. 65 (quoting Ex. 1018, 2:65–67, 7:3–9; citing *id.* at 4:15–16) (emphasis omitted, alteration in original). Petitioner further explains that Oez-US "teaches a polymer layer with a surface on which an image (*i.e.*, indicia) is printed that comprises polyurethane [commonly used as a binder] and polymeric components." *Id.* (citing Ex. 1013, Abstract, 1:6–8, 1:26–31, 3:24–30, 3:56–58; Ex. 1020 ¶ 261). Thus, Petitioner argues that Kronzer and Oez-US teach "a second layer for receiving ink/ink-receptive layer that includes a binder (film-forming binder, polyurethane) and a polymeric material overlaying the opaque first/white layer." *Id.* at 66 (citing Ex. 1020 ¶ 262).

Patent Owner does not dispute that Kronzer and Oez-US together teach or suggest all of the limitations recited

in claims 1 and 13. *See generally* Resp. 20–42;[7] Reply 1. After considering the full record developed during trial, we agree with Petitioner's undisputed arguments and evidence that Kronzer and Oez-US teach or suggest all of the limitations recited in claims 1 and 13.

Patent Owner, however, does contend that Petitioner fails to demonstrate that one of ordinary skill in the art would have had reason to combine just the white pigment from Oez-US (and not the entire crosslinking white layer) with Kronzer's structure, or that such a combination would have yielded a reasonable expectation of success. Resp. 30–31. Similarly, Patent Owner argues that Petitioner fails

7. In its Sur-reply, Patent Owner states that "Petitioner's main obviousness challenge presents a combination of two references (Kronzer-Oez . . .), **neither of which discloses this key feature**: a white layer that melts and mixes with another layer." Sur-reply 1. Patent Owner also states, "**[n]o prior art of record** teaches the key feature of the '475 Patent: a white layer that melts and mixes with another layer." *Id.* at 2. We understand Patent Owner's assertions here to mean that neither reference, individually, discloses a white layer that melts and mixes, not that the combined teachings of the references fail to disclose a white layer that melts and mixes. Our understanding is based on Patent Owner's arguments that Kronzer "has no need for a white layer at all," and that Oez-US discloses a white layer that does not melt and mix. *Id.* at 1. Patent Owner's statements in the Sur-reply do not address Petitioner's actual argument, namely that Kronzer discloses a layer that melts and mixes, and Oez-US discloses the use of a white pigment, such that the references collectively teach or suggest a white layer that melts and mixes. *See In re Merck*, 800 F.2d 1091, 1097 (Fed. Cir. 1986) ("Non-obviousness cannot be established by attacking references individually where the rejection is based upon the teachings of a combination of references.").

to demonstrate a reason the skilled artisan would have included a polyurethane (as recited in claim 1) or a binder (as recited in claim 13) in both the white layer and the layer configured to receive indicia/indicia receptive layer of Kronzer. *Id.* at 44– 45, 48. Additionally, Patent Owner affirmatively asserts that a person of ordinary skill in the art would *not* have had a reason to combine the teachings of Kronzer and Oez-US to achieve the invention claimed in the '475 patent. *Id.* at 31. We address Patent Owner's arguments below.

a) Whether Petitioner establishes a reason one of ordinary skill in the art would have combined Kronzer and Oez-US

Patent Owner acknowledges that Petitioner offers three reasons why a person of ordinary skill in the art would have combined the teachings of Kronzer and Oez-US, and challenges each reason. Resp. 31–34.

Patent Owner contends that Petitioner's first reason—that both Kronzer and Oez-US teach "printable multi-layered transfer structures having a removable substrate, release coating, and image-imparting layer"—is incorrect. *Id.* at 31. Patent Owner asserts 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.* at 31–32. Patent Owner additionally argues that mere identity of subject matter between two references is insufficient to establish that the ordinarily skilled artisan would have had a reason to combine the teachings of those references. *Id.* at 32.

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Petitioner asserts that Patent Owner's allegation regarding Oez-US being limited to a single layer of plastic is "demonstrably false." Reply 4. 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.* (citing Ex. 1013, 2:36–44; 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. Petitioner directs us to specific portions of Oez-US that, like Kronzer, describe multi-layered transfer structures. *See* Ex. 1013, 2:36–44 (describing a polymer layer *between* the paper and the polyurethane layer), claim 12 (same). Testimony from Dr. Ellison likewise indicates Oez-US discloses a multi-layered structure. Ex. 1063, 295:8–296:18 (Dr. Ellison's testimony 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. Nevertheless, we consider Petitioner's discussion of the identity of subject matter to be 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 actually solve fundamentally different problems using fundamentally different technologies." Resp. 32 (quoting Pet. 61). Patent Owner explains that Kronzer "solves the problem of creating an image transfer that has 'cold release properties;'" 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.* at 32–33. According to Patent Owner, Kronzer's solution involved experimenting with transparent transfer materials (i.e., lacking pigment) that can be printed in mirror image and applied image-side down, whereas Oez-US's solution involves incorporating white pigment into its coating and using an image-side up, peel first method. *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 the references." *Id.* at 33.

Petitioner maintains that "Kronzer and Oez-US are both directed to improving the image transfer quality of multi-layer transfer sheets." Reply 4 (citing Pet. 60–61; Ex. 1020 ¶¶ 245–248; Ex. 1062 ¶¶ 7–12). Citing our Institution Decision, Petitioner explains that "Kronzer's teachings are applicable to image transfers on any color fabric" and argues 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 19–20; Ex. 1020 ¶¶ 245–263; Ex. 1062 ¶¶ 7–12).

We find Petitioner's arguments persuasive. Contrary to Patent Owner's argument that the references have divergent goals, the evidence of record supports Petitioner's assertion that both Kronzer and Oez-US share the common goal of improving the quality of image transfers. *E.g.*, Ex. 1013, 1:25–31 (referring to a transfer paper that "ensures a greater brilliance of the image"); Ex. 1018, 2:17–48 (referring to "an improved heat transfer paper"); Ex. 1020 ¶¶ 245–248. Additionally, we credit Dr. Wanat's testimony that Kronzer and Oez-US are "complementary and compatible" with one another "because Kronzer's image transfer sheet can be used on any color fabric." Ex. 1062 ¶ 11. As noted in our Institution Decision, we do not discern any specific discussion in Kronzer that its teachings are limited to any color fabric. DI 20. Nor has Patent Owner directed us to any. Instead, Patent Owner acknowledges that Kronzer does not discuss problems with transferring an image to a dark fabric, or the use of dark or black fabric/T-shirts. Resp. 24. In view of Kronzer's silence about the color of its T-shirt base, a person of ordinary skill in the art would have understood that Kronzer's teachings are applicable to any color fabric.

Moreover, even if we were to agree with Patent Owner's argument regarding Kronzer and Oez-US solving fundamentally different problems, it would be error to "assum[e] that a person of ordinary skill in the art attempting to solve a problem will be led only to those prior art elements designed to solve the same problem." *KSR*, 550 U.S. at 402. Further, "[c]ommon sense teaches . . . that familiar items may have obvious uses beyond their primary purposes, and in many cases a person of ordinary

skill will be able to fit the teachings of multiple patents together like pieces of a puzzle." *Id.* at 420.

Patent Owner also challenges Petitioner's argument that a person of ordinary skill in the art would have combined the teachings in Kronzer and Oez-US because Kronzer discloses its film layer may contain pigments and "Oez-US teaches that its transfer sheets 'can be used particularly advantageously on dark (black) fabrics.'" Resp. 33 (quoting Pet. 61). According to Patent Owner, "nothing in this argument indicates ***why*** a [person of ordinary skill in the art] would be motivated to combine Oez-US ***with Kronzer***." *Id.* at 33. Patent Owner faults Petitioner for failing to argue, for example, "that there is something lacking in Oez-US that would be improved by combining it with Kronzer" or "that the combination of the two references as Petitioners propose would result in some new desirable feature." *Id.*; Sur-reply 12. As a result, Patent Owner argues that Petitioner's combination of Kronzer and only the pigment from Oez-US uses the claims as a roadmap. Resp. 33.

We disagree. Petitioner's arguments are based on Oez-US supplying something beneficial that is missing from Kronzer and, therefore, improving Kronzer's system.[8] Thus, contrary to Patent Owner's assertions otherwise, Petitioner has indicated why a person of ordinary skill

8. In view of this, we agree with Petitioner that Patent Owner's assertion regarding Petitioner's failure to argue Kronzer provides something beneficial that is lacking in Oez-US is a red herring, as Petitioner does not propose to modify or improve anything in Oez-US based on Kronzer. Reply 5.

in the art would have been motivated to combine Oez-US and Kronzer. Furthermore, Petitioner's reliance on express teachings from Oez-US and Kronzer in support of its arguments undermines Patent Owner's assertion that Petitioner improperly relies on hindsight.

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. Petitioner relies on Kronzer's express teaching that any of its layers may contain pigments and Oez-US's express teaching that its layered sheet including a white pigment "advantageously provides a contrasting white background for application of images onto dark fabrics." Pet. 64 (citing Ex. 1018, 8:47–49; Ex. 1013, 1:27–31 (stating the use of white pigment "ensures a greater brilliance of the image . . . especially for printing black textiles"), 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 achieve the shared goal in Kronzer and Oez-US of improving image transfer. *Id.* at 60–61; Reply 5; Ex. 1062 ¶¶ 11–12.

b) Whether Petitioner establishes that a person of ordinary skill in the art would have included polyurethane or a binder in both the white layer and indicia receptive layer

Patent Owner argues that Petitioner fails to establish that a person of ordinary skill in the art would have had a reason to include a polyurethane (claim 1) or a binder

(claim 13) in both the layer containing the pigment and the layer configured to receive the indicia. Resp. 44–48. As to the polyurethane that claim 1 requires, Patent Owner contends that Petitioner "borrow[s]" from Oez-US the polyurethane in the white layer and "relies upon Kronzer to supply the polyurethane in the indicia-receiving layer," but fails to "cite to any disclosure in either Kronzer or Oez that includes polyurethane in ***both*** a white layer ***and*** an indicia-receiving layer, and there are none." *Id.* at 45–46. Patent Owner further contends that Petitioner "seems to argue that [a person of ordinary skill in the art] would make a combination that included (1) Oez's polyurethane in the white layer; and (2) Kronzer's binder in the fourth [indicia-receiving] layer," but Petitioner provides no evidence why an ordinarily skilled artisan would have made that combination. *Id.* According to Patent Owner, an ordinarily skilled artisan would not have had a reason "to borrow both the polyurethane and the white pigment from Oez without also borrowing the cross-linking melamine formaldehyde in Oez's white layer" because the polyurethane is included "for the purpose of cross-linking." *Id.* at 46 (citing Ex. 2011 ¶ 317); Surreply 14 (citing Ex. 1013, 1:39–41). Patent Owner makes the same argument with respect to the binder claim 13 requires in both layers. *See* Resp. 48.

Petitioner replies that Patent Owner's arguments are "entirely at odds with Kronzer, which discloses the use of 'binders' [e.g., polyurethane] in both its third and fourth layers without the use of cross-linking." Reply 11– 12 (citing Ex. 1018, 5:46–67, 7:22–35). Petitioner also notes that Dr. Wanat explains that "'polyurethane' was a well-known binder at the time of the '475 patent." *Id.* at

12 (citing Ex. 1020 ¶¶ 253, 261, 262, 298; Ex. 1062 ¶ 47). And Petitioner asserts that a person of ordinary skill in the art would have had reason to use polyurethane "for reasons completely unrelated to cross-linking," including "to hold polymer layers together." *Id.* (citing Pet. 63–66; Ex. 1020 ¶¶ 253, 254, 298–300; Ex. 1062 ¶ 48); *see id.* at 13 (providing the same reply arguments for the "binder" limitation in claim 13).

Petitioner's arguments are persuasive. Initially, we note that Patent Owner's argument that neither Oez-US nor Kronzer discloses a polyurethane or binder in both layers is unavailing because obviousness does not require a single reference to disclose all claim elements. *See Banner Eng'g Corp. v. Tri-Tronics Co.*, Nos 93-1115, 93-1116, 93-1158, 1993 WL 432383, at *3 (Fed. Cir. Oct. 27, 1993) (unpublished). This is because "references are read not in isolation but for what they fairly teach in combination with the prior art as a whole." *Id.* (citing *Merck*, 800 F.2d at 1097).

As for whether one of ordinary skill in the art would have added polyurethane or a binder to both the pigment and indicia-receiving layers, we agree with Petitioner that Kronzer expressly discloses using a binder (e.g., polyurethane) in two layers—its third and fourth layers. Ex. 1018, 5:46–67, 7:22–35; *see id.* at 6:55–57 (disclosing polyurethane as an exemplary polymer that can be used as a binder), 11:44–45 (Table IV chart of fourth layers noting that "Sancor 12676 is a heat sealable polyurethane"). Further, as Petitioner argues, polyurethane was a known binder that was used to "hold polymer layers together."

Reply 12. In that regard, we credit Dr. Wanat's unrebutted testimony that "polyurethane had the known use as a 'binder' to hold polymer layers together, such as layers with pigment particles." Ex. 1062 ¶ 48; *see also, e.g.*, Ex. 1020 ¶ 253 (citing Ex. 1051 generally). Kronzer also supports Dr. Wanat's testimony, disclosing, for example, that the third layer "may be formed by applying a coating of a film-forming binder" and that the 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," Ex. 1018, 5:46–52 (emphasis added).[9] Thus, contrary to Patent Owner's arguments, we determine that Petitioner provides adequate reasons why one of ordinary skill in the art would have used polyurethane or a binder both in the layer containing pigment and in the indicia-receiving layer.

c) Patent Owner's affirmative arguments that a person of ordinary skill in the art would not have combined Kronzer and Oez-US to yield the inventions described in the '475 patent claims

In addition to arguing Petitioner fails to establish that a person skilled in the art would have been motivated to combine Kronzer and Oez-US, Patent Owner affirmatively

9. We acknowledge that Oez-US discloses polyurethane "can be cross-linked under the action of heat by melamine-formaldehyde resin." Ex. 1013, 1:39–40. That disclosure, however, does not negate the fact that polyurethane can be used as a binder without cross-linking to hold polymer layers together in more than one layer of an image transfer sheet. Reply 11–12; Ex. 1018, 5:46–67, 6:55–57, 7:22–35, 11:44–45.

argues the evidence of record shows a person of ordinary skill in the art would not have been motivated to combine Kronzer and Oez-US. Resp. 34. Specifically, Patent Owner contends that

> [t]his evidence includes: (1) Kronzer does not even address dark t-shirt transfer; (2) Kronzer and Oez rely upon different chemical reactions (heat alone v. heat plus a chemical reaction); (3) Kronzer and Oez employ different structures (multi-layered v. single layered); (4) Kronzer and Oez solve different problems (cold peel v. dark fabric transfer); Kronzer and Oez use different technologies to solve those problems (specific formulations v. a cross-linking white layer and a peel-first method); and (5) Kronzer and Oez use opposite methods of applications (image down/peel later v. image up/peel first).

Id. Patent Owner additionally alleges adding the white pigment from Oez-US to Kronzer would not yield predictable results and a person of ordinary skill in the art would not "expect the combination to succeed" because Petitioner "incorrectly borrows a single function of the white pigment in Oez (allowing transfer to dark fabrics) while ignoring the impact of the other functions of the white pigment." *Id.* at 34–35. 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 and Oez-US because Kronzer's sheets are transparent and Kronzer fails to acknowledge problems associated with transferring an image to 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 '475 Patent . . . because Kronzer does not solve – or even acknowledge – the problem of transferring an image onto dark fabric." Resp. 35. 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 36 (citing Ex. 2011 ¶¶ 173, 308).

Petitioner replies that "***Oez-US***—not Kronzer—discloses the solution to the problems with transferring images onto dark fabrics; *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 '475 patent purports to solve. Reply 6. Petitioner further explains Patent Owner ignores that Kronzer is not limited to a light fabric color and a person skilled in the art "would have been motivated to improve Kronzer by including a white pigment, as taught by Oez-US." *Id.* at 5–6.

Petitioner's arguments are persuasive. Contrary to Patent Owner's assertions, Kronzer need not solve, much less acknowledge, the specific problem of dark image transfer. The test for obviousness is not whether any one or all of the references expressly suggests the claimed invention, 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). Moreover, 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 method. *See KSR*, 550 U.S. at 418 (holding "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 discloses an image transfer sheet, and does not expressly limit its teachings to any color fabric. Oez-US teaches an improvement—the use of a white, opaque pigment that "ensures a greater brilliance of the image . . . especially for printing on black textiles." Ex. 1013, 1:28–31. The evidence of record discussed above, including the fact that Kronzer teaches including a pigment in any one of its polymer layers (Ex. 1018, 8:46–50), the shared goal of improving image transfer sheets (Ex. 1013, 1:25–31; Ex. 1018, 2:17–48), and the "complementary and compatible" nature of the transfer

sheets in Kronzer and Oez-US (Ex. 1062 ¶ 11), supports a finding that a person of ordinary skill in the art would have recognized that the Oez-US technique would improve the similar transfer sheet disclosed in Kronzer, and would have had a reason to combine the teachings of Kronzer and Oez-US. *See KSR*, 550 U.S. at 417.

(2) whether a person of ordinary skill in the art would not have had reason to combine Kronzer with Oez-US's white pigment alone and whether a reasonable expectation of success exists

Patent Owner next 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, i.e., that melts and mixes. Resp. 37; Sur-reply 12–13. According to Patent Owner, "[t]he cross-linking reaction in Oez is ***required*** for the white layer in Oez to function, but Petitioner simply ignores it." Resp. 37. Patent Owner also argues that "transferring a pigment from a reactive system [Oez] to a non-reactive system [Kronzer] raises significant technical challenges from a chemistry and materials science perspective," such that a person of ordinary skill in the art would not have had a reasonable expectation of success in taking only the pigment from Oez-US, and not the entire crosslinking white layer. *Id.* at 38 (citing Ex. 2011 ¶ 177–183, 312).

Patent Owner contends that the "numerous failures in the numerous trials in Kronzer" support its argument

and further "demonstrate why one cannot simply add a completely different composition (a composition or concentration of white pigment sufficient to create an opaque, nontransparent background) without making other adjustments or accommodating for all of the various effects caused by the pigments." *Id.* (citing Ex. 2011 ¶¶ 185, 313). Patent Owner argues that "it is 'extremely rare' to find a 'drop in' replacement for an existing ingredient that will result in the identical finished [] color." *Id.* at 39 (citing Ex. 2011 ¶ 176; Ex. 2012, 3). Additionally, Patent Owner states Petitioner "ignores that, in the reactive system of Oez[-US], the titanium dioxide performs multiple functions beyond providing whiteness," and can also chemically react with the components of a polymer layer. *Id.* (citing Ex. 2011 ¶ 180). Patent Owner further argues that titanium dioxide is a particulate, which "would completely change the characteristics" of Kronzer's third layer, including the viscosity and flow properties of the third layer at transfer temperatures and solid state characteristics of the third layer, such as modulus, elasticity, and flexibility. *Id.* at 39–40. As a result, according to Patent Owner, transferring the pigment from Oez-US to Kronzer is not a "like-for-like transfer," the results of the transfer would be unpredictable, and a person would not have had a reasonable expectation that adding pigment to the third layer of Kronzer would be successful. *Id.* at 40–41.

Petitioner replies that Oez-US does not teach away from using only the white pigment because "Oez-US does **not** make **any** statement that criticizes, discredits or would discourage a [person of ordinary skill in the art] from the

use of a white pigment such as TiO_2 in non-cross-linking polymers." Reply 6. Petitioner also argues that "Oez-US does **not** suggest that using TiO_2 with thermopolymers, such as those disclosed in Kronzer, would not achieve the same improvement to an image transfer sheet." *Id.* (citing Ex. 1062 ¶¶ 16–20). Instead, Petitioner explains that it is undisputed that Oez-US describes the use of titanium oxide to improve image quality on dark substrates and asserts that "Kronzer also ***encourages*** using of pigments in its polymer layers." *Id.* at 6–7 (citing Ex. 1013, 1:46–55; Ex. 1018, 8:46– 51; Ex. 1062 ¶¶ 16–20; Ex. 2011 ¶¶ 87–91). Petitioner further asserts that a person of ordinary skill in the art would have understood "that TiO_2 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***," and points to testimony from Patent Owner's declarant, Dr. Ellison, in support. *Id.* at 7 (citing Ex. 1062 ¶¶ 17–20; Ex. 1063, 304:8–22). And Petitioner states that neither Patent Owner nor Dr. Ellison cites to record evidence "to support [the assertion] that TiO_2 somehow participates in the cross-linking reaction in Oez-US." *Id.* (citing Resp. 37–41; Ex. 2011 ¶¶ 141–148; Ex. 1063, 302:4–303:21).

We do not agree with Patent Owner's arguments that Oez-US teaches away from using white pigment alone or that Oez-US requires a crosslinking polymer for the white pigment to function. *See* Resp. 37–41. 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 using a white pigment without a cross-linking polymer. Our independent review of Oez-US does not reveal any such teaching. The fact that Oez-US uses a white pigment in addition to a cross-linked polymer does not mean that cross-linking is required; nor does it teach away from pursuing the path taken in the '475 patent.

Patent Owner's arguments that transferring a white pigment from a reactive to a non-reactive system would have been unpredictable because the titanium dioxide performs functions beyond providing whiteness and the properties and characteristics of the layer would be altered are similarly unavailing. *See* Resp. 38–41; Sur-reply 5–6. Neither Patent Owner nor Dr. Ellison identifies anything in Oez-US that suggests the titanium dioxide performs any function other than providing a contrasting background. *See generally* Resp. 38–41; Ex. 2011. Rather, Oez-US consistently refers to the white pigment or titanium dioxide as the material responsible for providing contrast for images transferred to dark-colored textiles.

Ex. 1013, 1:25–30, 1:50–54, 2:50–51. In fact, Oez-US states that "[i]f white textiles are to be printed on, the titanium oxide pigment can also 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 a non-reactive system as Petitioner proposes. Ex. 2011 ¶ 180 (emphasis added).

Furthermore, record evidence supports Petitioner's position that a person of ordinary skill in the art would have understood that incorporating titanium dioxide within a polymer layer provides 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 Dr. Ellison's conclusory declaration testimony, which is entitled to little or no weight. *See* Ex. 2011 ¶¶ 181–184; 37 C.F.R. § 42.65(a).

Similarly, Patent Owner's argument that "it is 'extremely rare' to find a 'drop in' replacement" for titanium dioxide (Resp. 39) appears to be based on an incomplete understanding of the referenced articles and

is otherwise conclusory. For example, 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 such as titanium oxide, and that he had not "studied" the details of the paper in Exhibit 2012, which identifies the problem with titanium oxide only as a possible color shift or variance in lightness of up to 10%. Reply 8–9; Ex. 1063, 343:11–347:7, 350:5–355:2.

On the other hand, Petitioner identifies evidence that suggests titanium dioxide is well-studied, well-understood, and the most widely-used white pigment in response to Patent Owner's unpredictability arguments and arguments that a person of ordinary skill in the art would not have had a reasonable expectation of success. Reply 8–9; Ex. 1062 ¶¶ 23–39 (citing Exs. 1054–1058); *see also* Ex. 2012, 1 ("Titanium dioxide is the most widely used white pigment because of its unique ability to provide exceptional opacity and lend whiteness and brightness."); Ex. 1055, 129 ("Half of all TiO_2 pigment produced is consumed by the coatings industry and a quarter by the paper industry.").

We also disagree with Patent Owner's assertion that the alleged "numerous failures" in Kronzer demonstrate why adding a new component to the third layer would be unpredictable. Resp. 38; Sur-reply 5. Even if we were to accept Patent Owner's characterization of Kronzer as including some failures as true, Patent Owner itself acknowledges that none of those trials included a pigment. Resp. 36 ("In each of the 68 trials in Kronzer, there is no

pigment in any of the layers that are transferred . . . ."); *see also* Reply 8 ("Kronzer does not disclose any 'failure' regarding the use of TiO_2 or any pigment.") Thus, we fail to see the particular significance of those specific trials to the question of unpredictability based on adding a pigment to Kronzer. Moreover, a reference should be considered in its entirety for what it fairly teaches one skilled in the art, which here would include the multiple successful trials in Kronzer. Ex. 1018, Tables VI–XIV (showing transfer sheet trials with characteristics, including image transfer, that are "good" and/or "excellent"); *see In re Wesslau*, 353 F.2d 238, 241 (CCPA 1965).

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

Patent Owner contends Kronzer and Oez-US have "fundamental differences in their structures and manufacturing" such that the ordinarily skilled artisan would not have combined their teachings. Resp. 42. In particular, Patent Owner asserts 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 claim and every example in Oez teaches a single homogenized coating, which is pre-mixed during manufacture." *Id.*

Petitioner replies that Oez-US is not a "single homogenized coating" as Patent Owner suggests. Reply

9. Petitioner asserts that both Oez-US itself and Patent Owner's own declarant describe Oez-US as having a multilayered 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 explain above, Oez-US and Kronzer each describe a multi-layered image transfer structure. *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 Kronzer and Oez-US because the problems being solved, and technology employed to solve them 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." Resp. 43 (referring back to the arguments made at Resp. 37–38).

Petitioner replies that "Kronzer and Oez-US are both directed to improving the image transfer quality of multi-layer transfer sheets." Reply 4, 9–10; *see also* Pet. 60–61 (referring to the "common goal" of improving image

transfer sheets). Dr. Wanat testifies that the teachings of Kronzer and Oez-US are "clearly complementary and compatible with one another" because "Kronzer's image transfer sheet can be used on ***any*** color fabric," "Kronzer teaches that 'pigments' can be used in any of its layers," and "[t]here is no structural or chemical characteristic of Kronzer's image transfer sheet that would prevent it from being applied to dark or black fabric, or prevent it from being used with a white pigment as taught by Oez-US." Ex. 1062 ¶¶ 11–12.

For the same reasons discussed above in Section II.D.3.a, Patent Owner's arguments in this regard are unavailing. As we explained above, we consider Kronzer and Oez-US to be aligned with a common goal of improving the quality of transferred images. Additionally, Dr. Wanat's testimony regarding Oez-US and Kronzer being complementary and compatible, which Kronzer supports because it teaches the use of pigments and is not limited to fabric color, undermines Patent Owner's bare assertion 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 Kronzer and Oez-US where the printing and applying method of Kronzer and Oez-US are opposite to one another

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 a person of ordinary skill in the art would not have had a reasonable expectation of successfully adding white pigment to Kronzer's third layer using Kronzer's method of application. Resp. 43–44. Patent Owner contends that, with the exception of claim 19, Petitioner does not address how one would have combined the peel later method of Kronzer (where the backing is peeled away from the image transfer sheet after heating) with the peel first method of Oez-US (where the backing is peeled away from the image transfer sheet before heating), or which method an ordinarily skilled artisan would have used. *Id.* at 44. According to Patent Owner, a person of ordinary skill in the art using Kronzer's peel later method would not have had a reasonable expectation of successfully adding a white pigment to the third layer of Kronzer because, in Kronzer, the third layer is between the viewer and the graphic and, therefore, adding white pigment would have "obscure[d] the decorative graphic" and been counterintuitive. *Id.* at 44.

Petitioner asserts that "far from being 'counterintuitive' (PO[Resp.] 40), 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 necessitate the image to be positioned positively on top of (not underneath) the opaque/white layer, as expressly taught by Oez-US." Reply 10 (citing Ex. 1062 ¶¶ 43–44).

Petitioner's arguments are persuasive. Oez-US teaches that the printed image should be oriented on top of the white/opaque background. Ex. 1013, 1:25–31, 1:46–55,

3:1–4. Thus, we agree with Petitioner that a person of ordinary skill in the art would have understood from the references themselves that the image in Kronzer should be positioned such that it does not end up underneath the white/opaque layer when printed. Reply 10. Further, as Patent Owner acknowledges, using a white pigment without modifying Kronzer's peel later method would have resulted in the white layer covering the image, and therefore, the image would have been obscured. Resp. 44; Ex. 2011 ¶ 186 (A person having ordinary skill in the art "would expect that white pigment in the third layer would ***obscure*** the decorative graphic"). We disagree, however, that this would have dissuaded a person of ordinary skill in the art from making Petitioner's proposed modification because 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).

For all of 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 claims 1 and 13. As noted above, we also agree with Petitioner's arguments and evidence that Kronzer and Oez-US teach or suggest all of the limitations recited in claims 1 and 13. As a result,

we find Petitioner establishes, by a preponderance of evidence, that claims 1 and 13 are unpatentable as obvious in view of Kronzer and Oez-US.

4. Claim 19

Petitioner further asserts that the combined teachings of Kronzer and Oez-US would have rendered obvious the subject matter of independent claim 19. Pet. 72–75. Independent claim 19 recites "[a] method of transferring an image to a dark-colored or black receiving member," comprising, among other things, "providing an ink-jet transfer article comprising" a substrate and two layers. Ex. 1005, 12:42–52. The ink-jet transfer article recited in claim 19 is substantively similar to the ink-jet transfer article recited in claim 1. Claim 19 further requires peeling the removable substrate away from the opaque first layer and the second layer; applying the opaque first layer and second layer to the dark-colored or black receiving member such that the indicia face upwards; positioning the substrate layer, when peeled, or an overlay release paper over the second layer and opaque first layer; and applying heat to the substrate layer or overlay release paper, the second layer, and the opaque first layer so that the indicia and the opaque first layer's substantially white background are transferred to the receiving member at the same time. *Id.* at 12:53–67.

For the common limitations between claims 1 and 19, Petitioner relies on the same arguments and evidence discussed above with regard to claim 1. Pet. 73. Additionally, Petitioner argues that Kronzer in view of Oez-US teaches "[a] method of transferring an image to a

dark-colored or black receiving member," as recited in the preamble of claim 19. *Id.* at 72. Petitioner also argues that Kronzer teaches the steps of peeling off or removing the substrate, applying the ink-jet transfer article to a fabric, and "applying heat" to transfer the indicia and polymer layers onto the fabric. *Id.* at 74. Petitioner acknowledges that Kronzer does not disclose performing these steps in the sequential order recited in claim 19, but argues that Oez-US does, and that a person of ordinary skill in the art would have had reason to modify the order of the steps in Kronzer based on Oez-US and would have had a reasonable expectation of success. *Id.* (citing Ex. 1013, 1:47–50, 3:10–12; Ex. 1020 ¶ 303).

In particular, Petitioner argues that "[i]n conjunction with modifying Kronzer's third layer to include an opaque/white background, as taught by Oez-US," a person of ordinary skill in the art "would have also naturally applied the image transfer steps and image orientation taught by Oez-US." *Id.* at 75. According to Petitioner,

> the purpose of adding the white pigment to Kronzer's third layer is to provide an opaque/white background for the image being transferred. Oez-US, 1:27–31, 1:47–55. Thus, the first step would be to peel off the [substrate[10]]. Wanat Decl., ¶ 304 (explaining

10. The Petition includes the word "heat" instead of the word "substrate." Pet. 75. We understand this to be a typographical error, as Dr. Wanat's testimony at paragraph 304 states "the first step would be to peel off the substrate so that the image printed on Kronzer's fourth/ink-receiving layer is placed face-up (as a positive image) on top of the third/white layer before applying heat."

> that, otherwise, the white layer would be on top of and blocking the image).

Id. Petitioner also argues that a person of ordinary skill in the art would have understood Kronzer's substrate layer could be peeled off first without the need to apply heat because Kronzer expressly teaches that its substrate layer has "cold release" properties. *Id.*

In addition to the arguments and evidence presented with regard to claim 1, Patent Owner argues that Petitioner and Dr. Wanat cite no support for the position that using the method from Oez-US with Kronzer's sheet would have been natural. Resp. 48. Patent Owner also argues that Petitioner's proposed modification constitutes a "complete re-engineering of Kronzer" because it not only modifies Kronzer's method of application, but also reverses the order of the layers in Kronzer. *Id.* at 48–49 (citing Ex. 2011 ¶ 318). Patent Owner further asserts that Petitioner's reengineering is based on hindsight. *Id.* at 50. Additionally, Patent Owner contends that this "complete reversal of the order of the layers would not yield predictable results . . . given the numerous failures in Kronzer," and that Petitioner fails to explain why a person of ordinary skill in the art would have expected the modified structure would be successful. *Id.*

In response to Patent Owner's re-engineering argument, Petitioner contends that Patent Owner and Dr. Ellison overlook Kronzer's disclosure that its third and fourth layers are largely the same, and can include similar thermoplastic polymers/binders having similar characteristics. Reply 14 (citing Ex. 1018, 5:46–65, 6:1–8,

6:54–56, 7:12–41; Ex. 1062 ¶¶ 51–55). In view of this, Petitioner asserts that a person of ordinary skill in the art would have understood that reversing the order of the layers would result in the same or similar functionality. *Id.* Petitioner also argues that "Kronzer explicitly makes clear that any minor adjustments that might need to be made to the characteristics of the third and/or fourth layer would have been straightforward and trivial to a" person of ordinary skill in the art. *Id.* (citing Ex. 1018, 6:57–59, 8:47–51; Ex. 1062 ¶ 54).

Patent Owner challenges Petitioner's characterization of Kronzer's third and fourth layers as largely the same, asserting that Kronzer expressly teaches that its third and fourth layers must have different molecular weights and masses, and that the fourth layer "cannot be modified without creating printability or washability problems." Sur-reply 16 (citing Ex. 1018, 16:64– 17:6). Patent Owner also contends Petitioner ignores the impact that compositional differences (e.g., Orgasol and pigment) in the layers would have on the proposed modification. *Id.* at 17. Additionally, Patent Owner contends that Petitioner's admission that reversing the order of layers may require adjustments, coupled with its failure to identify any specific adjustments that would or could be made, further supports its arguments regarding unpredictability and the lack of a reasonable expectation of success. *Id.* at 17–18.

Petitioner's arguments are persuasive. As Petitioner and Dr. Wanat indicate, Kronzer teaches that its third and fourth layers may each comprise similar types of thermoplastic polymers having similar characteristics, including particle size and melting points. Ex. 1018, 5:46–

65, 6:1–8, 6:54– 56, 7:12–41; Pet. 72; Reply 14; Ex. 1020 ¶ 258; Ex. 1062 ¶ 52 (including a chart listing similarities between Kronzer's third and fourth layers). Patent Owner does not directly contest this evidence or testimony from Dr. Wanat regarding the similarities between the two layers. Instead, Patent Owner argues that Kronzer's third and fourth layers cannot be "largely the same" because Kronzer expressly states that the layers must have different molecular weights and masses. Sur-reply 16. The language Patent Owner relies upon for this assertion, however, appears in Kronzer's discussion of Table XIII, which lists data for six trial samples in Kronzer aimed towards attempts to soften a transferred image, eliminate cracking, and retain good washability. Ex. 1018, 16:32–54 (Table XIII titled "Trial Samples with Pilot Second Layer-Coated Paper – Attempts to Soften Transferred Image"). We discern no indication in Kronzer that the statements regarding the relative molecular weights and masses of the third and fourth layers in these trial samples apply to all of Kronzer's embodiments, especially considering Kronzer describes its third and fourth layers more generally elsewhere, including in its claims, without requiring a specific relationship between the molecular weights and masses of the third and fourth layers. *E.g.*, *id.* at 5:46–6:31, 18:48–67 (claim 8); *see Wesslau*, 353 F.2d at 241.

Furthermore, we credit Dr. Wanat's testimony that a person of ordinary skill in the art would have known that adjustments could be made to Kronzer's layers, and that those adjustments would have been straightforward. Ex. 1062 ¶ 54. Dr. Wanat's testimony is supported by Kronzer's statement 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. The use of these and similar materials is well known to those having ordinary skill in the art." Ex. 1018, 8:47–51. In an obviousness analysis, we "must consider what the prior art as a whole would have suggested to one skilled in the art." *Envtl. Designs v. Union Oil Co.*, 713 F.2d 693, 698 (Fed. Cir. 1983) (citing *In re McLaughlin*, 443 F.2d 1392, 1395 (CCPA 1971)). In this regard, Dr. Wanat's testimony and the language in Kronzer regarding what was well-known in the art undermine Patent Owner's arguments that compositional differences in the third and fourth layers, and the failure to identify specific adjustments that could be made, support a finding of unpredictability or a failure to show a reasonable expectation of success.

For all of the foregoing reasons, we find Petitioner has demonstrated sufficiently that Kronzer and Oez-US disclose the limitations in claim 19, and 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. Accordingly, we find Petitioner has established, by a preponderance of evidence, that claim 19 is unpatentable as obvious in view of Kronzer and Oez-US.

5. Claims 2–12 and 14–18

Petitioner also alleges that the combined teachings of Kronzer and Oez-US would have rendered obvious the subject matter of dependent claims 2–12, 14–18, 20, and 21. Pet. 66–72, 75–76. Patent Owner does not separately address these dependent claims and, therefore, has

forfeited any arguments based on these uncontested claims. *See generally* Resp. 21–42; *cf. NuVasive*, 842 F.3d 1376, 1381 (Fed. Cir. 2016). Instead, Patent Owner relies on the same arguments addressed above in our discussion of claims 1 and 13, challenging Petitioner's arguments and evidence regarding whether a person of ordinary skill in the art would have had reason to combine the teachings of Kronzer and Oez-US, and whether a person of ordinary skill in the art would have had a reasonable expectation of success.

We have reviewed the information Petitioner provides, including the relevant portions of Dr. Wanat's declarations, and agree with Petitioner's undisputed arguments and evidence that Kronzer and Oez-US teach or suggest all of the limitations in claims 2–12, 14–18, 20, and 21. Additionally, for the same reasons discussed above, Petitioner's arguments and evidence persuade us that a person of ordinary skill in the art would have had reason to combine the disclosures set forth in Kronzer and Oez-US, and that a person of ordinary skill in the art would have had a reasonable expectation of success in achieving the claimed invention. We, therefore, find Petitioner establishes, by a preponderance of the evidence, that claims 2–12, 14–18, 20, and 21 are unpatentable as obvious in view of the combined teachings of Kronzer and Oez-US.

E. Remaining Unpatentability Challenges

Having determined that Petitioner establishes by a preponderance of the evidence that claims 1–21 are unpatentable as obvious over the combined teachings

of Kronzer and Oez-US, we do not address Petitioner's additional grounds challenging claims 1–21. *See SAS Inst. Inc. v. Iancu*, 138 S. Ct. 1348, 1359 (2018) (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. CONCLUSION

After reviewing the complete record developed during the course of the trial, we conclude that Petitioner satisfies its burden of demonstrating, by a preponderance of the evidence, that claims 1–21 of the '475 patent are unpatentable.[11]

11. 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).

Appendix E

IV. ORDER

In consideration of the foregoing, it is hereby:

ORDERED that Petitioner establishes by a preponderance of the evidence that claims 1–21 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:[12]

Claims	**35 U.S.C. §**	**References/ Basis**	**Claim(s) Shown Unpatent-able**	**Claim(s) Not Shown Unpatent-able**
1–21	103	Kronzer, Oez-US	1–21	
1–21	103	Oez-US, Meyer[12]		
1–21	103	Oez-PCT, Oez-US		
Overall Outcome			1–21	

12. As explained above, we do not reach this ground, or the ground challenging claims 1–21 as obvious over Oez-PCT and Oez-US, in view of our determination that claims 1–21 are unpatentable as obvious over Kronzer and Oez-US.

APPENDIX F — RELEVANT STATUTORY PROVISION, IN EFFECT FEBRUARY 2010

35 U.S.C. 103
In effect February 1, 2010

§103. Conditions for patentability; non-obvious subject matter

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, 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. Patentability shall not be negatived by the manner in which the invention was made.

(b)(1) Notwithstanding subsection (a), and upon timely election by the applicant for patent to proceed under this subsection, a biotechnological process using or resulting in a composition of matter that is novel under section 102 and nonobvious under subsection (a) of this section shall be considered nonobvious if-

> (A) claims to the process and the composition of matter are contained in either the same application for patent or in separate applications having the same effective filing date; and
>
> (B) the composition of matter, and the process at the time it was invented, were owned by the same person or subject to an obligation of assignment to the same person.

(2) A patent issued on a process under paragraph (1)-

(A) shall also contain the claims to the composition of matter used in or made by that process, or

(B) shall, if such composition of matter is claimed in another patent, be set to expire on the same date as such other patent, notwithstanding section 154.

(3) For purposes of paragraph (1), the term "biotechnological process" means-

(A) a process of genetically altering or otherwise inducing a single- or multi-celled organism to-

(i) express an exogenous nucleotide sequence,

(ii) inhibit, eliminate, augment, or alter expression of an endogenous nucleotide sequence, or

(iii) express a specific physiological characteristic not naturally associated with said organism;

(B) cell fusion procedures yielding a cell line that expresses a specific protein, such as a monoclonal antibody; and

(C) a method of using a product produced by a process defined by subparagraph (A) or (B), or a combination of subparagraphs (A) and (B).

(c)(1) Subject matter developed by another person, which qualifies as prior art only under one or more of subsections (e), (f), and (g) of section 102 of this title, shall not preclude patentability under this section where the subject matter and the claimed invention were, at the time the claimed invention was made, owned by the same person or subject to an obligation of assignment to the same person.

(2) For purposes of this subsection, subject matter developed by another person and a claimed invention shall be deemed to have been owned by the same person or subject to an obligation of assignment to the same person if-

(A) the claimed invention was made by or on behalf of parties to a joint research agreement that was in effect on or before the date the claimed invention was made;

(B) the claimed invention was made as a result of activities undertaken within the scope of the joint research agreement; and

(C) the application for patent for the claimed invention discloses or is amended to disclose the names of the parties to the joint research agreement.

(3) For purposes of paragraph (2), the term "joint research agreement" means a written contract, grant, or cooperative agreement entered into by two or more persons or entities for the performance of experimental, developmental, or research work in the field of the claimed invention.