

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

STAHL'S INC.,
Petitioner,

v.

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

IPR2020-00644
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)

I. INTRODUCTION

Stahls' Inc. ("Petitioner")¹ filed a Petition (Paper 1, "Pet.") requesting *inter partes* review of claims 1–6, 8–12, 15–17, 19, and 24–26 of U.S. Patent No. 7,749,581 B2 (Ex. 1007, "the '581 patent"). Pet. 1. Jodi A. Schwendimann and NuCoat, Inc. (collectively "Patent Owner") filed a Preliminary Response (Paper 8, "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 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 challenged grounds. *Id.*

Following institution of trial, Patent Owner filed a Patent Owner Response (Paper 14, "PO Resp."), Petitioner filed a Reply (Paper 25, "Pet. Reply"), and Patent Owner filed a Sur-reply (Paper 30, "Sur-reply"). In support of their respective positions, Petitioner relies on the testimony of Dr. Christopher E. Scott (Ex. 1001, "Scott Decl."; Ex. 1039, "Scott Rebuttal 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.").

¹ Petitioner identifies Stahls' Inc. and Siser North America, Inc. as the real parties-in-interest. Pet. 2–3.

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").

We held an oral hearing on July 14, 2021, and a transcript of the hearing is included in the record (Paper 34, “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, 2, 4–6, 8, 11, and 12 of the ’581 patent are unpatentable.

A. Related Proceedings

Petitioner identifies the pending lawsuit between the parties, styled *Jodi A. Schwendimann v. Stahls’ Inc.*, Case No. 2:19-cv-10525-LVP-RSW (E.D. Mich.), as a related proceeding in which Patent Owner asserts the ’581 patent. Pet. 4; *see also* Paper 9, 2 (Patent Owner’s Mandatory Notices). The ’581 patent is the subject of separate IPRs: *Neenah, Inc. v. Jodi A. Schwendimann*, IPR2020-00634 and *Stahls’ Inc. v. Jodi A. Schwendimann*, IPR2020-00645. Paper 9, 2; *see* Paper 9, 2. Petitioner also filed petitions against claims of U.S. Patent No. RE41,623 and claims of U.S. Patent No. 7,754,042, and that it expects to file petitions against claims of the U.S. Patent No. 7,771,554, and U.S. Patent No. 7,766,475. Pet. 4; *see* Paper 9, 2. We instituted *inter partes* review in IPR2020-00634 but declined to institute IPR2020-00645. *See* IPR2020-00634, Paper 13; 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 asserted in the following pending litigations:

Jodi A. Schwendimann v. Neenah, Inc., Case No. 1:19-cv-00361-LPS (D. Del.); and

Jodi A. Schwendimann v. Siser North America, Inc., Case No. 1:19-cv-00362-LPS (D. Del.) (the -00631 and -00632 cases, collectively, “the Delaware Lawsuit”).

Pet. 4; Paper 9, 2. The ’581 patent was also asserted in *Jodi A.*

Schwendimann v. Arkwright Advanced Coating, Inc., Case No. 0:11-cv-00820-JRT-HB (D. Minn.) (“*Arkwright Lawsuit*”). Pet. 4.

B. The ’581 Patent

The ’581 patent, titled “Image Transfer on a Colored Base,” issued on July 6, 2010. Ex. 1007, 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.

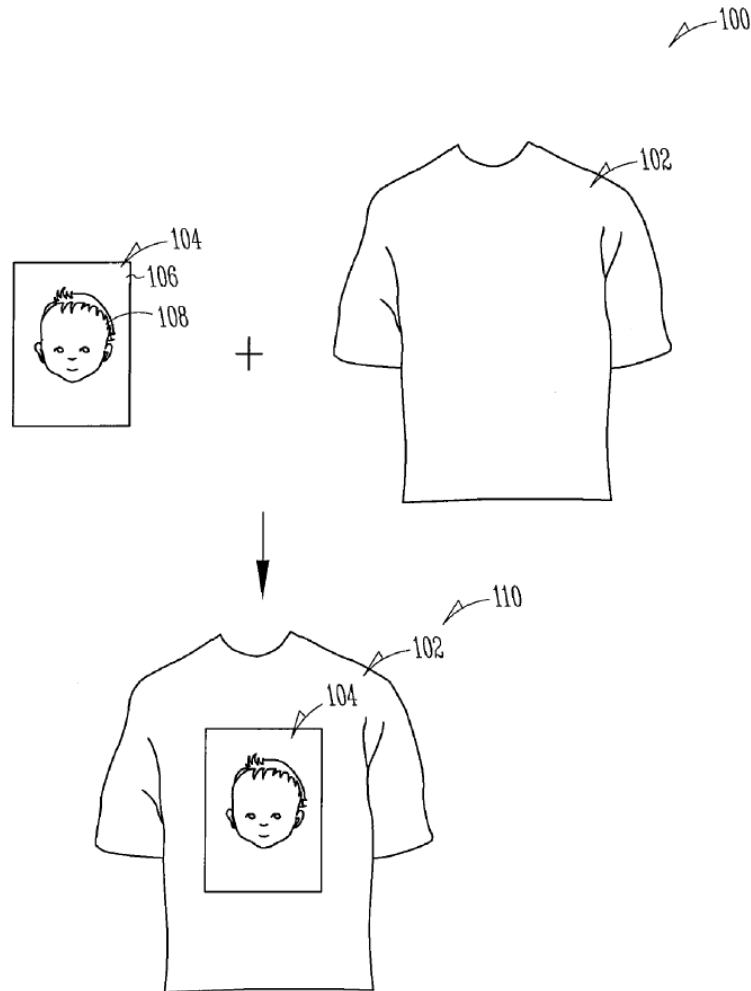


Fig. 1

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 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.

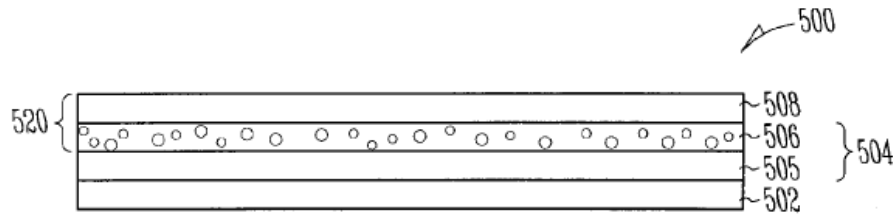


Fig. 5

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

³ “Titanium oxide,” “titanium dioxide,” and “TiO₂” are synonymous, and used interchangeably in the prior art, the parties’ papers, and in this Decision.

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. 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 9:21–25. 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 that

[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 9:33–48.

C. Illustrative Claim

In the Petition, Petitioner challenges claims 1–6, 8–12, 15–17, 19, and 24–26 of the '581 patent. Pet. 1. Claim 1 is illustrative and is 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. 1007, 11:35–48.

D. Prior Art and Asserted Grounds of Unpatentability

Petitioner initially alleged that claims 1–6, 8–12, 15–17, 19, and 24–26 of the '581 patent would have been anticipated or rendered obvious in view of the following grounds of unpatentability:

Claims Challenged	35 U.S.C. § ⁴	Reference(s)/Basis
1–5, 8–11, 15, 17, 19, 24–26	102	Asajima ⁵
1, 2, 4–6, 8, 11, 12	102	DeVries ⁶
1–5, 8–11, 15–17, 19, 24–26	103	Asajima

Pet. 5. We instituted trial on all asserted grounds. DI 8; *SAS*, 138 S. Ct. at 1355. Petitioner, however, withdraws its challenges based on Asajima.

Pet. Reply 2. Accordingly, this Final Written Decision focuses on Petitioner’s remaining asserted ground, i.e., that claims 1, 2, 4–6, 8, 11, and 12 are anticipated by DeVries.

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). To anticipate, a reference must “show all of the limitations of the claims arranged or combined in the same way as recited in the claims.” *Net MoneyIN, Inc. v. VeriSign, Inc.*, 545 F.3d 1359, 1370 (Fed. Cir. 2008); *accord In re Bond*, 910 F.2d 831, 832 (Fed. Cir. 1990). Although the elements must be arranged or combined in the same

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

⁵ Asajima et al., US 5,418,207, issued May 23, 1995 (Ex. 1018, “Asajima”).

⁶ DeVries et al., US 4,058,644, issued November 15, 1977 (Ex. 1016, “DeVries”).

way as the claim, “the reference need not satisfy an *ipsissimis verbis* test,” i.e., the identity of terminology is not required. *In re Gleave*, 560 F.3d 1331, 1334 (Fed. Cir. 2009); *accord In re Bond*, 910 F.2d 831, 832 (Fed. Cir. 1990). Further, to be anticipating, a prior art reference must be enabling and must describe the claimed invention sufficiently to have placed it in possession of a person of ordinary skill in the art. *Helifix Ltd. v. Blok-Lok, Ltd.*, 208 F.3d 1339, 1346 (Fed. Cir. 2000); *In re Paulsen*, 30 F.3d 1475, 1479 (Fed. Cir. 1994).

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 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 (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 generally* PO Resp. 14–15; Pet. Reply 2.

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))).

1. “white layer”/“opaque background”⁷

In the Decision on Institution, we construed the term “white layer”/“opaque background” 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 12–13. 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 claim construction the district court in the Arkwright Lawsuit adopted. Ex. 1031, 17 (Arkwright Markman Order”). The district court in the Delaware Litigation also adopted a similar construction of “white layer.” Ex. 1045, 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

⁷ Although the term “white layer” is not expressly recited in claim 1 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. 45–48; PO Resp. 7–16. And Petitioner and Patent Owner treat “white layer” and “opaque background” synonymously. Pet. 12–13; PO Resp. 1.

another layer.” *Id.* (Patent Owner’s modifications indicated with underlining); Prelim. Resp. 14.

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. 16) and Petitioner asks that we “adopt the same constructions” as in the Delaware Litigation (Pet. Reply 1 (citing Ex. 1045, 9)). Accordingly, we maintain our construction of the term “white layer”/“opaque background.”

2. “base” or “substrate”

In the Institution Decision, we determined that the terms “base” and “substrate” require no express construction. DI 14. Although Patent Owner provides a construction and argument for those terms in the Patent Owner Response (PO Resp. 17), Petitioner explains that Patent Owner “does not challenge the disclosure of DeVries (Ground #2) based on ‘base’ or ‘substrate,’ and, in view of the Board’s Institution Decision, Stahls is no longer pursuing Grounds #1 and #3 [based on Asajima].” Pet. Reply 2; *see generally* PO Resp. Accordingly, we need not construe “base” or “substrate” in order to resolve the dispute before us. *See Nidec*, 868 F.3d at 1017.

D. Alleged Anticipation by DeVries (claims 1, 2, 4–6, 8, 11, and 12)

Petitioner contends claims 1, 2, 4–6, 8, 11, and 12 are unpatentable as anticipated by DeVries. Pet. 44. Petitioner directs us to portions of DeVries that purportedly disclose all the limitations in the challenged claims. *Id.* at 44–53. Petitioner also relies on the testimony of Dr. Scott to support its arguments. *See id.*; Pet. Reply 5–17.

1. *DeVries (Ex. 1016)*

DeVries “relates to a dry release sublimation transfer particularly suitable for decorating textile substrates, including cotton and cotton-polyester fabrics, and to a method of decorating substrates employing the dry release sublimation transfer, in a simple and efficient manner.”

Ex. 1016, 1:11–16. DeVries explains that sublimation printing involves “the printing of a design on a paper backing sheet by conventional printing techniques employing sublimation inks, and then transferring such design under heat and pressure to the cloth or fabric.” *Id.* at 1:19–24. DeVries describes “brilliant colors and clear designs” when transferring sublimation inks under heat and pressure to polyester fabrics or garments but that sublimation designs on cotton-polyester combinations “are weak and easily removed by laundering.” *Id.* at 1:27–38.

In view of the above, DeVries discloses

a dry release sublimation transfer which may be simply and efficiently applied to a textile substrate, including cotton fabrics, and cotton-polyester fabrics, in a one-step operation to provide a sublimation design of excellent clarity, the colors of which are brilliant and distinct and remain so even after relatively long periods of time and after being subjected to a substantial number of washings.

Id. at 2:49–57.

DeVries depicts one embodiment of a dry release sublimation transfer in Figure 2, reproduced below.

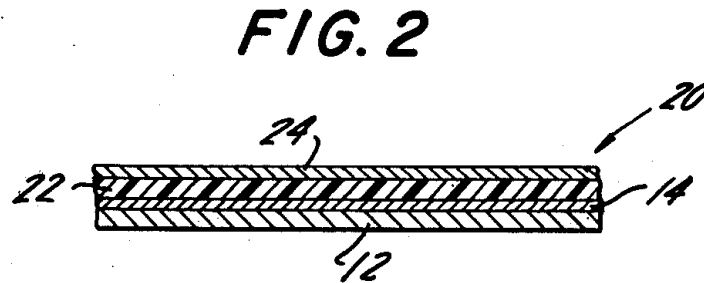


Figure 2 “is a diagrammatic cross-sectional representation of another embodiment of the dry release sublimation transfer of the invention.” *Id.* at 4:39–41. Figure 2 shows dry release sublimation transfer 20 having temporary backing sheet 12, release layer 14, polymeric coating layer 22, and sublimation design layer 24 disposed on polymeric coating layer 22. *Id.* at 10:64–68.

DeVries discloses that “[t]he temporary backing sheet 12 may comprise a suitable sheet material which is relatively non-porous and substantially impervious to the release layer 14 when the latter is in softened or molten condition,” such as “a paper backing sheet, preferable of the parchment type” but “other materials may be employed in place of paper, such as fiberglass cloth, plastic film, for example, polytetrafluoroethylene, cross-linked phenol-formaldehyde resin, and cross-linked urea-formaldehyde resin, or a thin metal foil or a woven or non-woven fabric, as will be apparent to one skilled in the art.” *Id.* at 4:57–68.

DeVries further explains

that the polymeric coating materials employed herein may include from about 2 to about 25% by weight and preferably from about 5 to about 15% by weight of an opacifying agent, such as titanium dioxide, calcium carbonate, calcium fluoride, kaolin, talcum, and the like, where it is designed to decorate a colored substrate.

Id. at 11:47–53.

2. *Analysis of Claim 1*

Petitioner contends that the image transfer article of claim 1 is taught by DeVries. Pet. 44–49. Petitioner argues that DeVries discloses an image transfer article because “DeVries describes ‘a dry release sublimation transfer for the decoration of textile substrates.’” *Id.* at 44 (citing Ex. 1016, 2:63–64).

Petitioner contends that DeVries’ dry release sublimation transfer includes an image-imparting member as claimed. *Id.* 44–45. Specifically, Petitioner asserts that the dry release sublimation transfer is comprised of multiple sublayers including, *inter alia*, polymeric coating 22 and sublimation dye layer 24. *Id.* at 44 (citing Ex. 1016, 10:66–68; Ex. 1001 ¶ 198). “The polymeric coating layer (22) is the claimed ‘image imparting member’ and the sublimation design layer 24 is the claimed ‘indicia.’” *Id.* at 45. According to Petitioner, because “‘sublimation design layer 24 is disposed on the polymeric coating 22,’ . . . the polymeric coating layer (22) (i.e., ‘the image-imparting member’) includes ‘at least one surface configured to receive and carry indicia to be transferred.’” *Id.* (citing Ex. 1016, 10:67–68; Ex. 101 ¶ 198).

Petitioner further asserts that DeVries explains “that the polymeric coating layer (22) may include ‘an opacifying agent, such as titanium dioxide, calcium carbonate, calcium fluoride, kaolin, talcum, and the like, where [the transfer sheet] is designed to decorate a colored substrate.’” *Id.* (citing Ex. 1016, 11:47–53). Petitioner contends that polymeric coating layer 22, including titanium dioxide, provides the requisite background for the received indicia. *Id.* (citing Ex. 1016, Fig. 2; Ex. 1001 ¶ 198).

Petitioner alleges that DeVries teaches “that the release layer 14 can be made from a variety of different materials that melt in the 130°F to 220°F range and that ‘examples of release layers [14] suitable for use herein include low molecular weight polyethylenes, polytetrafluoroethylene as well as stearic acid, and other high molecular weight fatty acids.’” *Id.* at 47 (Ex. 1016, 5:11–33; Ex. 1001 ¶ 205). Petitioner explains that when heat and pressure are applied to the dry release sublimation transfer, polymeric coating layer 22 will soften and penetrate into the substrate. *Id.* (citing Ex. 1016, 4:24–28, 7:39–40). Petitioner reasons that because the layers of DeVries are of the same type of materials (i.e., low molecular weight polyethylene and polyurethane) as the opaque background and adjacent layer in the ’581 patent and are heated to the same temperature range, “the layers described in DeVries will behave in the same manner (i.e., melt and mix).” *Id.* at 48 (citing Ex. 1001 ¶¶ 205, 207).

Lastly, Petitioner alleges that DeVries includes the removable substrate adjacent to and underlying the image-imparting member comprising a silicone, clay, resin, fluorocarbon, urethane, or an acrylic base polymer, as claimed. *Id.* at 48–49. In particular, Petitioner asserts that DeVries includes temporary backing sheet 12 that is adjacent to and underlays the polymeric coating layer 22. *Id.* at 48 (citing Ex. 1016, 4:57–68, Fig. 2; Ex. 1001 ¶ 209). According to DeVries, temporary backing sheet 12 may be “low molecular weight polyethylenes, polytetrafluoroethylene as well as stearic acid, and other high molecular weight fatty acids,” where “[p]olytetrafluoroethylene is a fluorocarbon.” *Id.* at 49 (citing Ex. 1016, 5:1–3, 5:29–33; Ex. 1001 ¶ 210).

Patent Owner does not challenge many of Petitioner’s allegations regarding the teachings of DeVries. *See generally* PO Resp. Instead, Patent

Owner focuses its argument on Petitioner’s purported failure to show (a) an indicia-imparting member configured to receive and carry indicia to be transferred, (b) an “opaque background,” and (c) a “white layer” that melts and mixes with another layer, and. *Id.* at 25–34. We address Patent Owner’s arguments below. We determine Petitioner’s arguments and evidence are sufficient to show, by a preponderance of the evidence, each limitation of claim 1 of the ’581 patent is present in DeVries, except those disputed by Patent Owner. We address Patent Owner’s arguments below.

a) *whether DeVries discloses “at least one surface configured to receive and carry indicia to be transferred”*

Patent Owner argues that DeVries does not disclose “an image imparting member with ‘at least one surface configured to receive and carry an indicia to be transferred.’” PO Resp. 25. Patent Owner explains that “[t]his is because, in DeVries, the image has already been formed within the sheet during the manufacturing process using commercial printing techniques,” therefore, “DeVries is not (and need not be) configured to receive a printed image.” *Id.* Patent Owner agrees that the sublimation design layer in DeVries is “the image to be imparted to the fabric.” *Id.* Patent Owner, however, contends that polymeric layer 22 is not a layer that receives an indicia to be transferred, as Petitioner argues, because “the DeVries product is manufactured with **two separate layers**, one of which contains sublimation dyes that create the design.” Sur-reply 19. Patent Owner argues that the presence of separate layers in DeVries distinguishes it from the ’581 patent, which “by contrast, describes a product with a layer upon which indicia is printed.” *Id.* (citing Ex. 1040, 149:7–10, 152:4–12, 152:21–153:5).

We are persuaded by Petitioner’s argument and evidence that polymeric layer 22 in DeVries includes “at least one surface configured to receive and carry an indicia to be transferred.” It is undisputed that the sublimation design layer in DeVries comprises an image to be imparted onto a fabric. PO Resp. 25; Ex. 1016, 2:56–68. In reference to Figure 2, DeVries teaches that “design layer 24 is disposed on the polymeric coating 22” (Ex. 1016, 10:67–68), and that polymeric coating layer 22 “functions as a base for sublimation design layer 24” (Ex. 1016, 11:34-36). Additionally, Dr. Ellison agreed during his deposition that polymeric coating layer 22 “receives” and “carries” sublimation design layer 24. Ex. 1040, 159:20–160:3.

Patent Owner’s arguments based on polymer layer 22 and sublimation design layer 24 being two separate layers are unavailing considering claim 1 requires nothing more than “at least one surface configured to receive and carry an indicia to be transferred.” Patent Owner expressly acknowledges that sublimation design layer 24 is the image (PO Resp. 25), and does not contest that DeVries Figure 2 shows layer 24 on polymer layer 22 (PO Resp. 25–26; *see generally* Sur-reply). Furthermore, DeVries discloses the use of “any conventional printing techniques” to apply the sublimation design layer (Ex. 1016, 6:6–9), which undermines Patent Owner and Dr. Ellison’s attempts to distinguish the ’581 patent from DeVries because the ’581 patent “describes a product with a layer upon which indicia is printed.” Sur-reply 19; Ex. 1040, 149:7–10; 152:4–12.

Accordingly, we determine that the preponderance of the evidence supports Petitioner’s position that DeVries teaches an image imparting member with at least one surface configured to receive and carry an indicia to be transferred, as claim 1 requires.

b) whether DeVries discloses an opaque background

Patent Owner contends that Petitioner fails to show that DeVries teaches an opaque background as claimed. PO Resp. 26. The relevant portion of DeVries, and the portion Petitioner relies upon, states that

[i]t will also be appreciated that the polymeric coating materials employed herein may include from about 2 to about 25% by weight and preferably from about 5 to about 15% by weight of an opacifying agent, such as titanium dioxide, calcium carbonate, calcium fluoride, kaolin, talcum, and the like, where *it* is designed to decorate a colored substrate.

Ex. 1016, 11:47–53 (emphasis added). According to Patent Owner, “the ‘it’ that is referenced in the final portion of the last sentence[,] must refer to either the ‘polymeric coating materials,’ or ‘an opacifying agent,’ in either case it **does not refer to the layer itself.**” PO Resp. 26. Patent Owner contends that as “[c]orrectly read, the ‘it’ in this passage of DeVries refers to the opacifying agent.” PO Resp. 28; Sur-reply 15. Patent Owner reasons that “[b]ecause there is no white sublimation dye, DeVries discloses that an ‘opacifying agent’ can be used ‘to decorate a colored substrate,’ *i.e.*, to provide a white design on a dark substrate.” PO Resp. 28 (citing Ex. 2011 ¶¶ 129, 180). Patent Owner argues that Petitioner does not provide evidence or argument to support how one of ordinary skill in the art would have understood this passage in DeVries to mean using an opacifying agent to lay down an entire opaque layer. *Id.* at 28–29; Sur-reply 17 (arguing that Dr. Scott’s opinions are conclusory and find no support in DeVries).

Petitioner replies that the amount of opacifying agent used in DeVries, *i.e.*, from about 2–25%, suggests to a person of ordinary skill in the art that the opacifying agent is “dispersed *throughout* layer 22 to provide an opaque background.” Pet. Reply 5 (citing Ex. 1039 ¶¶ 7–9). Petitioner argues that

nothing in DeVries describes the opacifying agent as dispersed selectively “to ‘create a design’ instead of an opaque background.” *Id.* Rather, Petitioner explains that DeVries consistently describes design layer 24 as accomplishing decorating a substrate and not polymeric layer 22, which contains the opacifying agent. *Id.* at 5–6 (citing Ex. 1016, 11:64–66, 12:21–22). Petitioner further contends that DeVries’ “deliberate use of the phrase ‘opacifying agent’ – as opposed to a ‘white pigment’ or the like – states clearly that the purpose of this component is to provide *opacity*.” *Id.* Petitioner reasons that because the amount of opacifying agent in DeVries overlaps with the amount of opaque pigment in the ’581 patent, DeVries would also provide an opaque background. *Id.* at 6 (citing Ex. 1007,⁸ 4:14–16 (5–35%), 4:29–31 (10–40%), 6:53–55, 10:54–55; Ex. 1016, 11:47–50 (including about 2–25% of an opacifying agent). Furthermore, Petitioner asserts that Dr. Ellison, Patent Owner’s expert, testified that the opacifying agent of DeVries would provide an opaque background. *Id.* at 6–7 (citing Ex. 1040, 153:14–18, 154:10–155:1).

On this record, we are persuaded that DeVries describes an opaque background as claimed. DeVries specifies the polymer layer may include “an opacifying agent, such as titanium dioxide, calcium carbonate, calcium fluoride, kaolin, talcum, and the like.” Ex. 1016, 11:50–52. Notably, DeVries uses the term “opacifying agent” and not “dye” or “pigment,” which would have indicated to a person of ordinary skill in the art that

⁸ Petitioner here (and in other portions of its Reply) identifies “the ‘042 patent.” *See e.g.*, Pet. Reply 6. The ’581 patent and the ’042 patent share a substantially similar specification. *Compare* Ex. 1007, *with* IPR2020-00635, Ex. 1009. We understand this to be a typographical error and that Petitioner intends to describe the ’581 patent that is the subject of the instant *inter partes* review.

DeVries “provide[s] an opaque background for the image when transferred to a fabric.” Ex. 1039 ¶ 7; Ex. 1001 ¶¶ 198–200, 311. The amount of opacifying agent DeVries teaches, between 2 to 25% by weight, overlaps with the amount utilized in the ’581 patent to provide an opaque background, i.e., about 5 to 40% by weight. Ex. 1016, 11:47–50; Ex. 1007, 4:10–30, 5:26–27 (describing 50% titanium oxide), 10:54–55.

Furthermore, even if the “it” in column eleven of DeVries refers to the opacifying agent and not the polymeric coating, as Patent Owner asserts (PO Resp. 28), the opacifying agent remains part of the polymeric coating—not the indicia layer—and provides an opaque background. Dr. Ellison’s testimony supports this understanding.

Q. And the polymeric coating of DeVries, layer 22, that would be considered the white layer because that has the opacifying agent like TiO₂ in it, correct?

A. Would be the opaque layer, yes.

* * *

Q. So my question is, the titanium dioxide in the polymeric coating layer 22 in the amount of 2 to 25 percent in DeVries, that is what provides the opaque background for the image in the DeVries product when it’s applied to a garment?

Mr. Robbennolt: Same objection.

THE WITNESS: I would like to see what I’ve written about this in my declaration.

MR. FORBIS: Okay.

THE WITNESS: Can you point me to it if you know where it’s at? Otherwise, I will find it.

MR. FORBIS: Yeah. We’ve got opinions about DeVries starting at page 65.

THE WITNESS: Yep. DeVries says that this is for capacity [sic] and so I have to leave it -- it creates some kind of an opaque background, if that was your question.

Ex. 1040, 153:14–155:1. We acknowledge Patent Owner’s argument that Dr. Ellison misunderstood the questions during his deposition and subsequently clarified his testimony that in a “peel last” scenario, DeVries would not provide an opaque background because the polymeric coating with the opacifying agent would be on top of the indicia (Sur-reply 17–18; Ex. 1040, 171:13–24). But Dr. Ellison’s revised testimony is unavailing, as the ’581 patent claims are directed to a particular structure, not a method of application.

Accordingly, we determine that the preponderance of the evidence supports Petitioner’s position that DeVries teaches a polymeric coating that includes an opacifying agent, such as titanium dioxide, that provides an opaque background as the ’581 patent requires.

c) whether DeVries discloses a “white layer that mixes and melts”

Patent Owner provides two separate arguments for this claim limitation, which we address in turn below.

(1) whether “melting” occurs in DeVries

Patent Owner first argues that even if DeVries suggests an opaque background, Petitioner has failed to establish that the opaque background melts with other layers. PO Resp. 29–42. Patent Owner alleges that “Devries teaches the use of **cross-linking** polyurethanes in the polymer layer . . . [and] [c]rosslinking polyurethanes will not soften/melt and mix with other layer(s) because cross-linking creates a stiff layer.” *Id.* at 30 (citing Ex. 2011 ¶¶ 113, 181). Patent Owner argues that although DeVries describes its polymeric layer as preferably including functional groups that

cross-link upon heating, “crosslinking is critical because otherwise the transferred design would not adhere to the fabric.” *Id.* at 30–31 (citing Ex. 2011 ¶ 116); Sur-reply 8. Patent Owner also asserts that “[m]ultiple passages in DeVries confirm that crosslinking is a critical feature of the polymer coating layer. PO Resp. 31–32 (citing Ex. 1016, 4:14–33, 6:50–53). Patent Owner explains that a person of ordinary skill in the art would have understood from these passages the DeVries requires cross-linking. *Id.* at 32 (citing Ex. 2011 ¶ 121).

Petitioner argues that “DeVries explicitly states multiple times that the polymeric layer 22 merely ‘preferably includes functional groups which will set or cross-link during transfer” and therefore, DeVries does not require cross-linking. Pet. Reply 8 (citing Ex. 1016, 6:31–32, 3:26–30). Petitioner explains that DeVries describes the cross-linking as one improvement over conventional non-cross-linking polymer transfer sheets because cross-linking polymers improve stability of the transfer when applied to cotton fabrics. *Id.* at 8–9 (citing Ex. 1016, 1:19–43, 2:25–30, 2:49–3:16; Ex. 1039 ¶ 10). Petitioner reasons that although a cross-linking polymer may be *preferable*, it is not required. *Id.* at 9. Petitioner further contends that even when cross-linking polymers are utilized, DeVries describes that its polymeric layer must soften and penetrate the fabric before the polymer is cross-linked. *Id.* at 9–10 (citing Ex. 1016, 3:8–14, 3:24–26, 4:24–30, 6:25–32). Petitioner states that DeVries warns that problems occur when cross-linking occurs too rapidly and before the polymer can soften and penetrate the substrate. *Id.* at 10 (citing Ex. 1016, 7:9–23, 14:56–60). Petitioner further cites to Dr. Ellison’s testimony in which he agreed that the polymer must melt first for it to “meld” into the fabric. *Id.* (Ex. 1040, 178:10–179:3).

Patent Owner, in its Sur-reply, argues that “DeVries clearly and unequivocally teaches a polymeric layer that softens—not melts—during the application of the transfer sheet to a fabric substrate.” Sur-reply 2–3 (citing Ex. 1016, Abstract, 3:8–14, 3:23–26, 4:14–30, 6:25–32). According to Patent Owner, the polymeric layer “**softens** and then immediately cross-links, or **hardens**, in order to adhere to the transfer sheet to the fabric.” *Id.* at 3 (citing Ex. 1016, 7:9–23). Patent Owner explains that DeVries does not use the word “melt” or teach that its polymeric layer “melts.” *Id.* at 4. Patent Owner argues that DeVries’ disclosure that its polymeric layer softens is insufficient to prove the layer melts in view of Petitioner’s argument, consistent with the Delaware Markman Order and our Institution Decision, that the plain and ordinary meaning of melt requires actual melting, not just softening. *Id.* (citing Ex. 1045, 8 (stating that “‘softening’ is not the same as ‘melting’”)).

Patent Owner states that “the Board should reject Dr. Scott’s opinion that ‘[a] PHOSITA would have clearly understood that DeVries polymeric layer 22 would have ‘melted’ upon application of heat, whether the polymeric layer used cross-linking or non-cross-linking polymers,” as such testimony is conclusory. *Id.* at 6 (quoting Ex. 1039 ¶ 10(f)). Patent Owner also claims that Petitioner’s assertion that Dr. Ellison conceded that DeVries’ transfer sheet would adhere to fabric without use of cross-linking polymers “is simply wrong.” *Id.* at 9. Instead, according to Patent Owner, Dr. Ellison testified that the transfer sheet *may* adhere to “some degree,” but that experimentation would need to be performed to know for certain. *Id.* (citing Ex. 1040, 186:3–10); *see also* Ex. 1040, 183:25–184:13, 185:4–8 (explaining that a transfer sheet would not work effectively without a cross-linker).

As we discussed in our Decision on Institution, we are not persuaded that DeVries requires cross-linking. DI 29–30. In the Summary of the Invention, DeVries describes four separate embodiments, only one of which uses isocyanate functional groups to promote cross-linking. Ex. 1016, 3:17–60. In fact, the entirety of DeVries’ discussion of Figures 2 and 3 excludes any reference to the use of cross-linking polymers despite describing the application of heat and pressure to “embed” the polymeric coating and design layer into the substrate. *Id.* at 10:61–12:33. Though Patent Owner contends DeVries describes cross-linking as “critical” (PO Resp. 31–32 citing Ex. 1016, 4:14–33, 6:50–53; Sur-reply 8)), we disagree. DeVries uses “critical” only once to describe certain characteristics of polymeric coating layer 18—namely, that the polymer will soften and penetrate the fibers of the substrate when heated. Ex. 1016, 6:26–32. For example, DeVries states

The polymeric coating layer 18 of this invention has certain critical characteristics. Specifically, it is formed of a polymeric material which upon being subjected to heat and pressure as described below will not only soften and penetrate into the interstices between the individual fibers forming the textile substrate to be decorated, but which also preferably includes functional groups which will set or cross-link during transfer.

Id. This portion of DeVries expressly describes the polymer as “*also preferably* include[ing] functional groups” to facilitate cross-linking. *Id.* (emphasis added). Further suggesting that the cross-linking function is *preferable*, DeVries continues to explain that it is “highly preferred that these functional groups be blocked.” *Id.* at 6:33–35. Therefore, although DeVries suggests cross-linking may be advantageous, in particular for textiles made from cotton or cotton-polyester (*id.* at 1:19–43, 2:25–61), DeVries does not mandate cross-linking.

Furthermore, even where cross-linking occurs in DeVries, the polymer does not “soften[] and then *immediately* crosslink[], or harden[]” as Patent Owner suggests. Sur-reply 2 (emphasis added). Instead, DeVries suggests that rapid cross-linking should be avoided. In particular, DeVries explains that

[p]referably, the polymeric coating layer *will not immediately become unblocked*, but will do so in a manner such that cross-linking does not occur with the temporary backing sheet, particularly when cellulosic materials such as paper are employed for these purposes.

Ex. 1016, 6:35–40 (emphasis added). Rather, crosslinking should be delayed to allow the polymer to soften and penetrate into the fabric and for the backing sheet to be removed. *See id.* at 7:9–15 (describing problems where the “polymer material begins cross-linking too rapidly, that is before the polymer layer softens and penetrates into the textile substrate”); Ex. 1039 ¶ 10(e); *see also* Ex. 1040, 177:25–178:17 (Dr. Ellison’s testimony that cross-linking does not preclude melting and that “cross-linking should not occur before it imbibes [sic] into the fabric.”).

We further agree with Petitioner that a person of ordinary skill in the art would have understood DeVries’ polymer layer would have melted when heat and pressure are applied regardless of whether a cross-linking or non-cross-linking polymer were employed. *See* Pet. Reply 9–10; Ex. 1039 ¶¶ 10(e)–(f). That DeVries does not specifically use the term “melt” is of little consequence as DeVries describes that melting occurs. DeVries states that when heat and pressure are applied, its polymer coating “softens *and penetrates*” into the textile substrate and into the interstices between the individual fibers forming the substrate. Ex. 1016, 3:8–11 (emphasis added), 6:28–30. Indeed, each instance where DeVries describes its polymer as

softening, DeVries also describes its polymer as penetrating into the textile. *Id.* at Abstract, 3:8–13, 3:25, 4:23–26, 6:24–30, 7:12–16, claims 1, 14, and 17. As a result, Dr. Scott testifies that a person of ordinary skill in the art would have understood the polymers of DeVries to melt with or without cross-linking. Ex. 1039 ¶¶ 10(e)–(f). In fact, record evidence suggests that polymeric layer 22 in DeVries must melt, i.e., penetrate into the fibers of the textile fabric, to function properly. *Id.* ¶ 10(e).

The description in DeVries that the polymer softens and penetrates undermines Patent Owner’s argument that DeVries’ disclosure is insufficient to prove melting because it only uses the word softens, and does not expressly teach that the polymer “melts,” as the proper construction of the term “white layer” requires. Contrary to Patent Owner’s argument, however, the language in DeVries that the polymer softens and penetrates suggests that the polymers do more than “only soften[.]” Sur-Reply 4. Patent Owner’s own declarant, Dr. Ellison, agreed that for the polymers in DeVries to “go into the fabric,” i.e., penetrate into the substrate, it must first melt:

Q. Correct. And for it to go into the fabric, for it to meld into the fabric, doesn’t the polymeric layer 22 have to melt first?

A. Yes.

Q. So polymeric -- in application of the image to the garment, the polymeric -- the heat is applied, the polymeric layer melts, moves into the fabric, and then if cross-link is used, cross-linking occurred at that point after the melting process, correct?

A. Yes.

Ex. 1040, 178:18–179:3; *see* Ex. 1040 186:3–10. Patent Owner’s only response to this testimony⁹ is that expert testimony cannot supply a limitation that is missing from a reference. Sur-reply 7. Here, however, Dr. Ellison’s testimony is not supplying a limitation missing from the reference, but rather providing evidence as to what a person of ordinary skill in the art would have understood from the disclosures in DeVries.

Therefore, we find the preponderance of the evidence supports Petitioner’s contention that DeVries teaches a polymer layer, i.e., white layer, that melts as the claims of the ’581 patent require.

(2) *whether “mixing” occurs in DeVries*

Patent Owner further argues that even if melting occurs, there is no suggestion in DeVries that the polymer *mixes* with another layer.¹⁰ PO Resp. 33 (citing Ex. 2011 ¶ 181). Patent Owner states that no mixing occurs because “mixing of a reacting system with a nonreactive layer (or a layer that reacts by a different reaction mechanism) could detrimentally affect the crosslinking itself . . . because mixing can dilute and distribute or disperse the reactive functional groups required for the crosslinking reaction.” *Id.*

⁹ During the oral hearing, counsel for Patent Owner argued that at the time Dr. Ellison provided this testimony, he was using a definition of melt that included softening. Tr. 48:20–23. Dr. Ellison, however, testified that “in determining whether the prior art references had a white layer that mixes and melts,” his definition of melt did not include softening. Ex. 1041, 369:19–370:14; Tr. 91:24–92:15.

¹⁰ Petitioner argues that polymeric layer 22 mixes with one of release layer 14 or design layer 24 when heat is applied during transfer. Pet. Reply 11. Because we determine that the polymeric layer and the release layer mix and melt, we do not reach Petitioner’s separate argument that the polymer layer and the indicia layer also mix and melt.

According to Patent Owner, this mixing “could prevent the product from performing reactions efficiently and in reasonable time frames.” *Id.*

Petitioner argues that “DeVries polymeric layer 22 mixes with the adjacent release layer 14, at least to the same extent Schwendimann’s adjacent layers mix.” Pet. Reply 12 (citing Ex. 1001 ¶¶ 170–175).

According to Petitioner, release layer 14 and polymeric layer 22 of DeVries comprise polyethylene and polyurethanes like the release layer and the image-receiving layers of the ’581 patent. *Id.* (citing Ex. 1016, 5:29–33, 7:38–45; Ex. 1007,¹¹ 3:44–46, 4:3–5, 5:12–22, 6:10–11, 6:31–34, 6:55–59, 7:43–45, 9:25–26). Petitioner further directs our attention to the disclosure of DeVries which states that upon the application of heat and pressure release layer 14 “is in softened or molten condition” and the polymeric coating “soften[s] and penetrate[s] into the interstices.” *Id.* at 14 (citing Ex. 1016, 4:57–61, 6:25–31). Therefore, Petitioner continues, to the extent the layers of the ’581 patent melt and mix, the layers of DeVries similarly melt and mix because the same materials and same temperatures are utilized in each of DeVries and the ’581 patent. *Id.* (citing Ex. 1001 ¶¶ 167–175; Ex. 2011 ¶ 48); *see also id.* at 15–16 (arguing that “[t]he sufficiency of DeVries’ disclosure of ‘melt’ and ‘mix’ should not be held to a higher standard than Schwendimann’s disclosure under 35 U.S.C. §112”).

Petitioner also relies on Ms. Schwedimann’s testimony that “she *just knew* they [the layers] ‘mixed’ because she could see that the layers had

¹¹ Petitioner cites to the ’042 patent (Ex. 1009) instead of the ’581 patent (Ex. 1007) which is the subject of this *inter partes* review. The ’581 patent and the ’042 patent share a substantially similar specification. *Compare* Ex. 1007, *with* IPR2020-00635, Ex. 1009. We cite to the relevant portions of the ’581 patent in this Final Written Decision.

‘melted’ and the resulting image on the fabric was ‘soft’ and had good ‘wash durability.’” *Id.* at 15–16 (citing Ex. 1042, 100:6–14, 108:19–109:6, 110:1–111:3, 112:8–22, 113:6–114:1). According to Petitioner, “DeVries even satisfies that minimalistic standard.” *Id.* at 16 (citing Ex. 1016, 13:6–7, 13:49–52, 13:68–14:2, 14:27–29). Petitioner states that Dr. Ellison’s testimony is *merely* that mixing cross-linking polymers with unreactive polymers “could detrimentally affect the crosslinking itself” and further that “‘mixing’ of the polymeric layer 22 with an adjacent layer is possible.” *Id.* at 17 (citing Ex. 2011 ¶¶ 133, 181; Ex. 1040, 177:25–178:5, 174:12–23, 182:24–183:3). And Dr. Scott testifies that “a [person having ordinary skill in the art] would have known . . . how to formulate DeVries’ layers so that the mixing of those layers would *not* [have] adversely affect[ed] the cross-linking.” *Id.* (citing Ex. 1039 ¶ 13).

In its Sur-reply, Patent Owner further argues that the polymer layer does not mix with the release layer because the materials in DeVries are *not* the same as the materials in the ’581 patent, as Petitioner suggests. Sur-reply 13. According to Patent Owner, the polyurethane in DeVries is a blocked polyurethane which is different from the polyurethane used in the ’581 patent and “the inclusion of the specific cross-linking agents in DeVries[,] directly affects the layers’ ability to mix.” *Id.* at 13–14 (citing Ex. 2011 ¶ 133). Patent Owner also asserts that Petitioner’s argument regarding being “held to the same ‘standard’” fails because “[t]o anticipate, DeVries must disclose the ‘mix’ limitation expressly” and that the ’581 patent does, in fact, disclose mixing. *Id.* at 14–15.

We recognize that DeVries does not expressly state that the polymeric layer and the release layer mix. Nevertheless, there is sufficient evidence in the record supporting Petitioner’s assertion that a person of ordinary skill in

the art would have understood the adjacent layers in DeVries will mix because they melt. This evidence includes Dr. Ellison’s testimony that “[b]ecause the white layer of the [challenged patent] melts or softens at ironing temperatures, the white layer intermingles with one or more of the polymer layers”¹² and Ms. Schwendimann’s testimony that she did not test her samples to determine if mixing occurred, but instead relied on the fact that they melted, as well as the resulting image on the fabric being soft and having good washability. Ex. 2011 ¶ 48; Ex. 1042, 110:1–111:3.

Patent Owner does not directly address or dispute this testimony or Petitioner’s arguments based on it. Instead, Patent Owner argues that Petitioner’s attempts to show mixing based on the layers in DeVries melting fails because the polymeric layer only softens, not melts. Sur-reply 11–12. For the reasons discussed above, however, there is sufficient evidence demonstrating that the polymeric layer and the release layer each melt. This evidence includes express language in DeVries itself (Ex. 1016, 4:57–61 (“release layer 14 . . . is in softened or molten condition”); 6:25–31 (“The polymeric coating layer . . . soften[s] and penetrate[s] into the interstices.”), and the testimony from Dr. Ellison (Ex. 1040, 178:10–179:3) and Dr. Scott. (Ex. 1001 ¶¶ 201–208; Ex. 1039 ¶ 10). It is also undisputed that DeVries describes its products as being soft and having good washability. Ex. 1016, 13:6–7, 13:49–52, 13:68–14:2, 14:27–29. According to Ms. Schwendimann,

¹² The image transfer sheets of both DeVries and the ’581 patent are applied to a fabric substrate with heat source—such as a conventional iron—at ironing temperatures. Ex. 1016, 2:59–61, 12:2–7 (applying heat from about 200 °F to about 450 °F), 12:39–42; Ex. 1007, 9:16–19, 9:61–63 (applying heat from 250 °F to about 350 °F), 11:2–5 (applying heat ranging from 200 °F to 400 °F); Ex. 2011 ¶¶ 48; Ex. 1001 ¶ 84.

these properties are suggestive of melting and mixing. Ex. 1042, 110:1–111:3.

All of the foregoing evidence supports Petitioner’s contention that DeVries discloses materials within its polymeric layer and adjacent layers that, “when applied under similar conditions [to those in the ’581 patent], whatever ‘melting and mixing’ that may occur in the ‘581 Patent . . . will also occur in DeVries.” Pet. 46.

Patent Owner’s argument that DeVries discloses unique polyurethanes that are distinct is unavailing. Sur-reply 13. First, Petitioner argues only that both DeVries and the ’581 patent disclose “the same *types of materials*,” not the exact same materials, as Patent Owner appears to assert. *see* Pet. 46 (emphasis added)(“adjacent layers . . . are of the same type”). It is undisputed that both DeVries and the ’581 patent disclose using types of polyurethanes. Second, even assuming Patent Owner is correct that DeVries requires the use of cross-linking polymers in general, and more specifically the use of polyurethane chains with blocked isocyanate functional groups that cross-link, the evidence of record shows these polymers still melt before cross-linking. Ex. 1016, Abstract, 3:8–13, 3:25, 4:23–26, 6:35–40, 6:24–30, 7:12–16, claims 1, 14, and 17; Ex. 1039 ¶ 10(e)–(f); Ex. 1040, 177:25–178:17, 178:18–179:3, 186:3–10. This is particularly important considering that Dr. Ellison, when discussing the “blocked polyurethane” in the polymer layer of DeVries, (1) testified that “[t]he *blocked isocyanate part* is unique and very different from the polyurethanes used in Schwendimann,” (2) agreed that the difference has to do with cross-linking, and (3) stated that “[d]uring heating, the blocking agents come off . . . and then they participate in a cross-linking.” Ex. 1040, 162:11–163:14 (emphasis added); *see also id.* at 177:25–178:5 (Dr. Ellison stating that the presence of a cross-

linking does not preclude the polymer layer from mixing and melting). Thus, the evidence of record demonstrates that the main difference between the polyurethanes disclosed in the '581 patent and those in DeVries relates to cross-linking, not melting.

Patent Owner's additional argument that that the inclusion of specific cross-linking agents in DeVries "directly affects the layers' ability to mix" is equally ineffective. Sur-reply 13–14 (citing Ex. 2011 ¶ 133); PO Resp. 33 (citing Ex. 2011 ¶ 181). Patent Owner's arguments appear to be based on Dr. Ellison's statements in his declaration regarding problems that "could" result from the "mixing of a reacting system (the polymer layer with crosslinking agents) with a nonreactive layer (or a layer that reacts by a different reaction mechanism)." Ex. 2011 ¶¶ 133, 181; PO Resp. 33. Even giving Dr. Ellison the full credit of his statements, they, at best, suggest that such mixing may *potentially* cause problems with cross-linking, not that they "directly affect[] the layers' ability to mix" prior to cross-linking. Sur-reply 13. The possibility that mixing a polymer layer having cross-linking agents with a nonreactive layer (or layer that reacts by a different mechanism) "*could* detrimentally affect the crosslinking itself," or that it "*could* prevent the product from performing reactions efficiently and in reasonable time frames" (Ex. 2011 ¶¶ 133, 181 (emphasis added)), does not outweigh the entirety of the evidence discussed above demonstrating a person of ordinary skill in the art would have understood DeVries discloses or suggests adjacent layers that mix after melting.

For all of the foregoing reasons, we find Petitioner has demonstrated by a preponderance of the evidence that DeVries teaches a polymer layer, including an opaque background that melts and mixes with another layer. After considering the parties' arguments and the evidence of record, we

determine Petitioner has established, by a preponderance of the evidence, that claim 1 is unpatentable as anticipated by DeVries.

3. *Analysis of Claims 2, 4–6, 8, 11, 12*

Petitioner also alleges that the subject matter of dependent claims 2, 4–6, 8, 11, and 12 is anticipated by DeVries. Pet. 49–53. Each of claims 2, 4–6, 8, 11, and 12 depend, directly or indirectly, from claim 1. Patent Owner does not separately address the additional limitations of claims 2, 4–6, 8, 11, and 12, and, therefore, has forfeited any arguments based on these uncontested claims. *Cf. In re NuVasive, Inc.*, 842 F.3d at 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). We have reviewed the information Petitioner provides, including the relevant portions of the Scott Declaration and Petitioner’s arguments and agree with Petitioner’s undisputed arguments and evidence that DeVries teaches all of the limitations of claims 2, 4–6, 8, 11, and 12. Accordingly, we find that Petitioner has established, by a preponderance of the evidence, that DeVries anticipates claims 2, 4–6, 8, 11, and 12 of the ’581 patent.

III. CONCLUSION¹³

For the foregoing reasons, we conclude that Petitioner has satisfied its burden of demonstrating, by a preponderance of the evidence, that the

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

subject matter of claims 1, 2, 4–6, 8, 11, and 12 of the '581 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, 2, 4–6, 8, 11, 12 are unpatentable; and

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

In summary:

Claims	35 U.S.C. §	Reference(s)/ Basis	Claim(s) Shown Unpatentable	Claim(s) Not Shown Unpatentable
1–5, 8–11, 15–17, 19, 24–26	102	Asajima ¹⁴		
1, 2, 4–6, 8, 11, 12	102	DeVries	1, 2, 4–6, 8, 11, 12	
1–5, 8–11, 15–17, 19, 24–26	103	Asajima		
Overall Outcome			1, 2, 4–6, 8, 11, 12	

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).

¹⁴ As explained above, because Petitioner withdrew its challenges based on Asajima, we do not reach Petitioner's grounds based on Asajima.

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Patent 7,749,581 B2

FOR PETITIONER:

Glenn E. Forbis (Reg. No. 40,610)
Matthew Cutler (Reg. No. 43,574)
James B. Luchsinger (Reg. No. 73,705)
Jewell Briggs (Reg. No. 77,298)
HARNESS, DICKY & PIERCE PLC
gforbis@hdp.com
mcutler@hdp.com
bluchsinger@hdp.com
jbriggs@hdp.com

FOR PATENT OWNER:

Devan V. Padmanabhan (Reg. No. 38,262)
Michelle E. Dawson (Reg. No. 62,319)
PADMANABHAN & DAWSON, PLLC
devan@paddalawgroup.com
michelle@paddalawgroup.com