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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

RUST-OLEUM CORPORATION and
RPM INTERNATIONAL, INC.,
Petitioners,

v.

ALAN STUART, TRUSTEE FOR THE CECIL G. STUART AND DONNA M. STUART REVOCABLE LIVING TRUST AGREEMENT
and
CDS DEVELOPMENT LLC,
Patent Owners.

Case IPR2017-02158
Patent 6,669,991 B2

Before JO-ANNE M. KOKOSKI, CHRISTOPHER G. PAULRAJ, and DAVID COTTA, *Administrative Patent Judges.*

PAULRAJ, *Administrative Patent Judge.*

FINAL WRITTEN DECISION
35 U.S.C. § 318(a) and 37 C.F.R. § 42.73

I. INTRODUCTION

Rust-Oleum Corporation and RPM International, Inc. (collectively, "Petitioners")[1] filed a Petition (Paper 2, "Pet.") to institute an *inter partes* review of claims 1–11, 13, 14, and 20–24 of U.S. Patent No. 6,669,991 B2 (Ex. 1001, "the '991 patent"). Alan Stuart, Trustee for the Cecil G. Stuart and Donna M. Stuart Revocable Trust Agreement, and CDS Development LLC (collectively, "Patent Owners") timely filed a Preliminary Response (Paper 6, "Prelim. Resp."). We determined, based on the information presented in the Petition and Preliminary Response, that there was a reasonable likelihood that Petitioners would prevail in challenging claims 1–11, 13, 14, and 20–24 as unpatentable under 35 U.S.C. § 102(b) as anticipated by Baumgärtel[2] and under § 103(a) as rendered obvious by Baumgärtel and Billmeyer.[3] Pursuant to 35 U.S.C. § 314, the Board instituted trial on April 9, 2018, as to those claims of the '991 patent. Paper 7 ("Institution Decision" or "Inst. Dec."). Subsequently, in view of *SAS Inst., Inc. v. Iancu*, 138 S. Ct. 1348 (2018), we modified our Institution Decision to include within the scope of this proceeding the anticipation and

[1] The Petition additionally identifies Wipe New LLC and The Avento Corp. as real parties in interest. Pet. 1.
[2] Baumgärtel et al., German Patent Application DE 28 080 005 A1, with certified English Translation (published Aug. 30, 1979) (Ex. 1002, "Baumgärtel").
[3] Fred W. Billmeyer, TEXTBOOK OF POLYMER SCIENCE, 151–153, 396, and 397 (3d. ed. 1984) (Ex. 1003, "Billmeyer").

obviousness grounds based on Gladstone[4] that were also set forth in the Petition. Paper 9.

Patent Owners filed a Response to the Petition (Paper 13, "PO Resp.") and Petitioners filed a Reply to Patent Owners' Response (Paper 16, "Reply"). Patent Owners also filed a Motion for Conditional Amendment under 37 C.F.R. § 42.121 (Paper 14, "Motion to Amend" or "Mot."), Petitioners filed an Opposition (Paper 17, "Opp."), and Patent Owners filed a Reply (Paper 19, "Amend. Reply"). An oral hearing was held on January 9, 2019, and a transcript has been entered into 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. Based on the record before us, we conclude that Petitioners have demonstrated by a preponderance of the evidence that claims 1–11, 13, 14, and 20–24 of the '991 patent are unpatentable. We deny Patent Owners' Motion to Amend.

a. Related Proceedings

Patent Owners have asserted the '991 patent against Petitioners in a copending litigation in the Southern District of Ohio: *Alan Stuart, Trustee for The Cecil G. Stuart and Donna M. Stuart Revocable Living Trust Agreement et al. v. RPM International et al.*, No. Civil Action No: 2:16-cv-00622-EAS-TPK (S.D. Ohio). Paper 5, 2. That litigation has been stayed pending our final written decision in this proceeding.

[4] Bernard Gladstone, *Tarred 'N' Bothered – Kitchen Scouring Pad Can Restore a 'Dull' Finish to Vinyl Siding*, CHICAGO TRIBUNE, Feb. 18, 2000, available at http://www.chicagotribune.com (Ex. 1004) ("Gladstone").

b. The ’991 patent (Ex. 1001)

The ’991 patent issued on December 30, 2003, with Alan Stuart as the named inventor. Ex. 1001 at (45), (76). The ’991 patent issued from an application filed March 22, 2002. *Id.* at (22). The ’991 patent relates generally “to a composition and method for rejuvenating polymeric materials, especially those comprised of vinyl resins such as vinyl siding.” *Id.* at 1:7–9. The Background section of the patent indicates that ultraviolet light can cause vinyl resins, such as poly(vinyl chloride), “to discolor, chalk, loose [sic] gloss, and even to become brittle leading to possible deformation of the product.” *Id.* at 1:18–20. According to the patent, prior attempts at solving this problem, such as using ultraviolet stabilizers or cleaning the surface, have not proven to be satisfactory, and thus “a need remains to rejuvenate the surfaces of these products.” *Id.* at 1:22–54.

The invention described in the patent includes the use of a composition with an organic solvent that has a particular “solubility parameter” (δ), which is matched to the solubility parameter of the vinyl polymer to be rejuvenated. *Id.* at 2:40–45. The patent states that the term “solubility parameter” is known in the art, defined using one of two formulas:

1) $\delta = [(\Delta E_v)/(V)]^{½}$, where ΔE_v is energy of vaporization and V is the molar volume; or
2) $\delta^2 = \delta_D^2 + \delta_E^2 + \delta_H^2$, where δ_D is the dispersion component, δ_E is the polar component, and δ_H is the hydrogen bonding component.

Id. at 2:46–61 (citing and incorporating by reference Kirk-Othmer[5] and Grulke[6]). The organic solvent may have a solubility parameter either within the range of 8.0 to about 10.6 $(cal/cm^3)^{½}$, or within about 1.8 $(cal/cm^3)^{½}$ of the solubility parameter of the target polymeric surface. *Id.* at 1:57–61, 2:13–18. Specific organic solvents that may be used for such a composition are also identified, including methylene chloride and acetone. *Id.* at 3:58–4:35.

The patent teaches that "[t]he composition and method of this invention advantageously removes or transforms the chalky surface that develops on polymeric surfaces that are exposed to sunlight and other environmental conditions," and "[a]dditionally, the color, luster, and gloss of the surface can be restored." *Id.* at 2:20–24. The patent notes that "the fact that the composition of this invention restores the original luster of the surface, especially the surfaces of vinyl siding, was highly unexpected since conventional wisdom suggests that a solvent would remove and thereby deteriorate the luster of the surface." *Id.* at 3:29–33. The patent further notes that "it has been found that the rejuvenation, e.g., restoration of color and luster, does not necessarily result from cleaning the surface." *Id.* at 5:62–65. The only example provided in the patent describes the use of a colorimeter in determining that the original color of the vinyl siding was restored within 1 Delta E, which was tantamount to the color differentiation of a new product and not noticeable to the human eye. *Id.* at 6:20–7:9.

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[5] Kirk-Othmer, ENCYCLOPEDIA OF CHEMICAL TECHNOLOGY, Supplement, 889–910 (2d. ed. 1971) (Ex. 1006, "Kirk-Othmer").
[6] Eric A. Grulke, *Solubility Parameter Values*, POLYMER HANDBOOK, VII/519–VII/559 (3d ed. 1989) (Ex. 1008, "Grulke").

c. Illustrative Claim

Petitioners challenge claims 1–11, 13, 14, and 20–24 of the '991 patent. Among the challenged claims, claims 1, 20, and 22 are each independent and reproduced below:

> 1. A method for rejuvenating the surface of vinyl siding, the method comprising:
>
> applying a composition to the surface of the vinyl siding, where the composition consists essentially of one or more organic solvent compounds that have a solubility parameter (δ) of from about 8.0 to about 10.6 $(cal/cm^3)^{½}$, optionally one or more diluents selected from the group consisting of aliphatic distillates, aromatic distillates, naphtha, pine oil, tricresyl phosphate, and mixtures thereof, and optionally one or more antioxidants, thermal stabilizers, bacteriostats, ultraviolet absorbers, and a mixture thereof.
>
> 20. A method for rejuvenating and cleaning the surface of weathered vinyl siding, the composition comprising:
>
> applying a composition to the surface of the vinyl siding, where the composition comprises from about 50 to about 100 percent by weight of an organic solvent component that is an ether, a heterocyclic ether, an aldehyde, a ketone, an ester, a chlorinated hydrocarbon, an amide, a cyclic amide, a compound that is both an ether and an ester, or a mixture thereof, where the organic solvent component has a solubility parameter (δ) of from about 8.0 to about 10.6 $(cal/cm^3)^{½}$.
>
> 22. A method for rejuvenating the surface of vinyl siding, the method comprising:
>
> applying a composition to the surface of vinyl siding, where the vinyl siding includes poly(vinylchoride) or other vinyl copolymers that are characterized by having a solubility parameter of from about 9.4 to about 9.8 $(cal/cm^3)^{½}$, where the composition includes at least 50 percent by weight of one or more organic solvent compounds that have a solubility parameter of from about 8.0 to about 10.6 $(cal/cm^3)^{½}$.

Ex. 1001, 7:16–27, 8:49–59, 8:64–9:6.

d. The Asserted Grounds of Unpatentability

Petitioners challenge the patentability of the claims of the '991 patent based on the following grounds:

References	Basis	Claims challenged
Baumgärtel	§ 102(b)	1–11, 13, 14, and 20–24
Baumgärtel and Billmeyer	§ 103(a)	1–11, 13, 14, and 20–24
Gladstone	§ 102(b)	1–10, 13, and 20
Gladstone	§ 103(a)	11

Petitioners further rely upon the declarations of Robson F. Storey, Ph. D. (Ex. 1005 and Ex. 1022). In their Response, Patent Owners rely upon the declaration of Eric Grulke, Ph.D. (Ex. 2003).

II. ANALYSIS

a. Claim Construction

For petitions filed before November 13, 2018,[7] we interpret claims using the "broadest reasonable construction in light of the specification of the patent in which [they] appear[]." 37 C.F.R. § 42.100(b) (2017); *see also Cuozzo Speed Techs., LLC v. Lee*, 136 S. Ct. 2131, 2144–46 (2016). Under the broadest reasonable construction standard, claim terms are generally given their ordinary and customary meaning, as would be understood by one of ordinary skill in the art at the time of the invention. *In re Translogic Tech., Inc.*, 504 F.3d 1249, 1257 (Fed. Cir. 2007). "Absent claim language

[7] A recent amendment to 37 C.F.R. § 42.100(b) does not apply here because the Petition was filed before November 13, 2018. *See* Changes to the Claim Construction Standard for Interpreting Claims in Trial Proceedings Before the Patent Trial and Appeal Board, 83 Fed. Reg. 51,340 (Oct. 11, 2018).

carrying a narrow meaning, the PTO should only limit the claim based on the specification . . . when [it] expressly disclaim[s] the broader definition." *In re Bigio*, 381 F.3d 1320, 1325 (Fed. Cir. 2004). "Although an inventor is indeed free to define the specific terms used to describe his or her invention, this must be done with reasonable clarity, deliberateness, and precision." *In re Paulsen*, 30 F.3d 1475, 1480 (Fed. Cir. 1994).

1. "solubility parameter"

Each of the challenged claims require the use of a solvent having a "solubility parameter" within a specified range. Petitioners note that the '991 patent describes two alternative measures for the solubility parameter, known in the industry as the Hildebrand solubility parameter ($\delta = [(\Delta E_v)/(V)]^{½}$) and the Hansen solubility parameter ($\delta^2 = \delta_D^2 + \delta_E^2 + \delta_H^2$). Pet. 6–7. Petitioners contend that the claims are indefinite because the specification teaches at least two different methods of measuring a parameter in the claims without specifying which method should be used. *Id.* at 8–9.

Although the Hildebrand and Hansen solubility parameters can diverge for a given solvent, Petitioners acknowledge that the prior art relied upon in the Petition teaches solvents that fall within the claimed ranges regardless of which of these two measures of solubility parameter is used. *Id.* at 10–11. Thus, as we noted in our Institution Decision, we can determine the scope and meaning of the claims sufficiently for purposes of addressing the anticipation and obviousness challenges set forth in the

Petition. Inst. Dec. 7.[8] As an alternative to their indefiniteness argument, Petitioners propose a construction of "solubility parameter as measured by any of the measures of solubility parameters disclosed in the '991 patent or in the publications incorporated by reference in the specification, including but not limited to Hildebrand and Hansen solubility parameters." Pet. 15.

In our Institution Decision, we preliminarily construed "solubility parameter" to encompass either the Hildebrand solubility parameter or the Hansen solubility parameter as taught in the '991 patent. Inst. Dec. 7. Patent Owners do not dispute this construction. PO Resp. 11. Accordingly, we do not modify our construction of "solubility parameter."

2. "rejuvenating"

The challenged claims are each directed to "rejuvenating" the surface of vinyl siding. In particular, independent claims 1 and 22 recite "[a] method for rejuvenating the surface of vinyl siding," while independent claim 20 recites "[a] method for rejuvenating and cleaning the surface of weathered vinyl siding." Ex. 1001, cls. 1, 20, 22.

Although the "rejuvenating" term appears in the preamble, Petitioners assert that it is nonetheless limiting because the applicant argued during prosecution that rejuvenation of vinyl siding is a feature that distinguishes the amended claims from the prior art, and further because the preamble provides antecedent basis for the "applying a composition to the surface of the vinyl siding" limitations in the body of the independent claims. Pet. 14. Based on the specification's teaching that "the color, luster, and gloss of the

[8] Although Petitioners make the same indefiniteness argument for the proposed substitute claims included with Patent Owners' Motion to Amend, we can also decide that Motion without reaching this issue.

surface can be restored" (Ex. 1001, 2:20–27), Petitioners propose a construction of "rejuvenating the surface of vinyl siding" as "to remove or transform the chalky surface that develops on vinyl siding that is exposed to sunlight and other environmental conditions, and restore the color, luster, and/or gloss of the vinyl siding." Pet. 15 (citing Ex. 1005 ¶¶ 33–38).

We preliminarily adopted Petitioners' proposed construction for "rejuvenating" in our Institution Decision. Inst. Dec. 8–10.[9] In their Response, Patent Owners do not dispute that the preamble language is limiting, but contend that "'rejuvenating [and cleaning] the surface of vinyl siding' should be construed as 'restoring the color and luster of the surface of vinyl siding [and removing or transforming the chalky surface that develops on the surface of vinyl siding from exposure to sunlight and other environmental conditions].'" PO Resp. 4 (alterations in original). Thus, Patent Owners argue that both color and luster must be restored in order to satisfy the "rejuvenating" term, and further seek to distinguish "rejuvenating" from the term "cleaning."

In that regard, Patent Owners contend that "the rejuvenation of the surface of vinyl siding (as claimed) requires restoration of color" because Webster's American Dictionary College Edition (1997) (Ex. 2005, 865), the Fourth Edition of the American Heritage Dictionary (Ex. 2006, 705), and Merriam-Webster (Ex. 2007) each equate "rejuvenate" with "restore," and also because color is an essential aspect of the appearance of vinyl siding.

[9] For purposes of our Institution Decision, we treated luster and gloss as both referring to the shininess of the surface. *See* Inst. Dec. 8, n.7 (citing Ex. 2001, 53:9–20). As there is no dispute on this point, we continue to treat luster and gloss in the same manner for this decision.

PO Resp. 5–6 (citing Ex. 2003 ¶¶ 15–24). Noting that the '991 patent contemplates the rejuvenation of "numerous products made from polymeric materials, including vinyl resins, plastics and rubbers" (Ex. 1001, 1:49–54), Patent Owners contend "it is unsurprising that the specification describes the restoration of color as an example of rejuvenation in the context of describing an invention for rejuvenating weathered polymeric materials in general, as opposed to rejuvenation of vinyl siding specifically." PO Resp. 6 (citing Ex. 2003 ¶ 15, 17–18).

Based on our consideration of the full record of this proceeding, we are unpersuaded by Patent Owners' argument that the proper construction of "rejuvenating" requires restoration of both color and luster. As acknowledged by Patent Owners, the plain and ordinary meaning of "rejuvenating" does not require color to be restored. PO Resp. 5 ("It is true that rejuvenation **in general** does not require the restoration of color."). The claims do not otherwise mention color, luster, or gloss as a characteristic of the vinyl siding.

Moreover, contrary to Patent Owners' arguments, neither the claims nor the specification indicate that color is such an essential aspect of vinyl siding that "rejuvenating the surface of vinyl siding" would have been understood to necessarily require the restoration of color. While the specification teaches that "color, luster, and gloss *can* be restored," we do not interpret that statement to require that all three characteristics *must* be restored according to the claimed methods. Ex. 1001, 2:23–24 (emphasis added). Rather, the specification indicates that restoration of both color and luster is only an example of "rejuvenation" of vinyl siding:

> During this method of application, some of the chalky surface of the vinyl siding may be removed on the cloth, but it should be appreciated that this removal is not required to achieve the benefits of rejuvenation. In other words, it has been found that the rejuvenation, *e.g.*, *restoration of color and luster*, does not necessarily result from cleaning the surface. Instead, the restoration or rejuvenation is believed to result from a replasticizing of the vinyl surface. A residual benefit of the invention is the fact that debris other than the chalky surface can be removed, i.e., cleaned.

Id. at 5:59–6:1 (emphasis added); *see Interval Licensing LLC v. AOL, Inc.*, 766 F.3d 1364, 1374 (Fed. Cir. 2014) (determining that "person of ordinary skill in the art would not understand the 'e.g.' phrase to constitute an exclusive definition"). Patent Owners' argument that this exemplary statement was only made in the context of discussing weathered polymeric materials in general is not convincing in view of the fact that the immediately both the preceding and subsequent sentences specifically discuss vinyl siding. We also note that other portions of the specification only focus on the restoration of luster, rather than color, of vinyl siding surfaces. *See* Ex. 1001, 3:29–33 (indicating that restoration of "the original luster of the surface, especially the surfaces of vinyl siding, was highly unexpected since conventional wisdom suggests that a solvent would remove and thereby deteriorate the luster of the surface").

Furthermore, while we recognize that the only example included in the specification describes the use of a colorimeter test (Ex. 1001, 6:20–7:9), we do not find that the claims are limited by that example's teachings to require the restoration of color. *See Liebel–Flarsheim Co. v. Medrad, Inc.*, 358 F.3d 898, 906 (Fed. Cir. 2004) ("[T]his court has expressly rejected the

contention that if a patent describes only a single embodiment, the claims of the patent must be construed as being limited to that embodiment.").

Additionally, Patent Owners contend that Petitioners' proposed construction for "rejuvenating" improperly reads in "remove or transform the chalky surface that develops on vinyl siding that is exposed to sunlight and other environmental conditions" because "[t]he specification clearly considers rejuvenating and cleaning to be two related, but distinct actions." PO Resp. 10. Patent Owners assert that this requirement should only be included for those claims in which "cleaning" also appears. *Id.* at 11. Upon consideration of Patent Owners' arguments in the Response and Petitioners' arguments in the Reply, we are still persuaded that this aspect of our preliminary construction is correct.

The specification recites that "[t]he composition and method of this invention advantageously removes or transforms the chalky surface that develops on polymeric surfaces that are exposed to sunlight and other environmental conditions." Ex. 1001, 2:20–24. According to the specification, "rejuvenation . . . does not necessarily result from cleaning the surface," but instead "is believed to result from a replasticizing of the vinyl surface." *Id.* at 5:63–66. Furthermore, the specification defines "cleaned" as when debris *other* than the chalky surface is removed. Ex. 1001, 5:66–6:5 ("A residual benefit of the invention is the fact that debris other than the chalky surface can be removed, i.e., cleaned."); *see Edwards Lifesciences LLC v. Cook Inc.*, 582 F.3d 1322, 1334 (Fed. Cir. 2009) ("[T]he specification's use of 'i.e.' signals an intent to define the word to which it refers.").

At the same time, however, the specification states that removal of the chalky surface is *not* required to achieve rejuvenation. *See id.* at 5:59–62 ("During this method of application, some of the chalky surface of the vinyl siding may be removed on the cloth, but it should be appreciated that this removal is not required to achieve the benefits of rejuvenation."); *id.* at 6:1–5 ("In other embodiments, the composition can be sprayed or rolled onto the surface to be treated. Again, these techniques are useful because the chalky surface does not need to [be] removed from the surface."). The specification also teaches that rejuvenation is specifically attributable to the use of an organic solvent with a solubility parameter that matches the solubility parameter of the vinyl surface, and that this was unexpected because "conventional wisdom suggests that the use of a matched solvent would lead to the destruction, via solubilization, of the surface." *See id.* at 2:40–45 (stating that "[v]inyl siding and other weathered polymeric materials can be rejuvenated by applying *a particular composition* of matter to the surface of the siding or material," wherein "[t]he composition includes at least one organic solvent compound that has a solubility parameter (δ) that is matched to the solubility parameter of the polymeric surface to be rejuvenated") (emphasis added); *id.* at 3:23–28 ("The use of a solvent that is matched to the solubility parameter of the target polymer within the article to be rejuvenated or cleaned has led to unexpected advantages . . . ").

Based on the foregoing, we determine that the specification draws a distinction between "rejuvenating" the chalky surface that develops on polymeric surfaces exposed to sunlight and other environmental conditions, and simply "cleaning" the surface. *See also* Ex. 1001, 1:43–48 (discussing drawbacks to "[c]onventional approaches to cleaning"); *id.* at 8:49–50

(claim 20 requiring both "rejuvenating" *and* "cleaning" the weathered vinyl siding surface). The rejuvenation discussed in the '991 patent is believed to result from solubilizing and replasticizing the vinyl surface due to the application of an organic solvent with a solubility parameter that matches the surface. Although the specification states that the chalky surface does not actually need to be removed in order to achieve this rejuvenation, neither the claims nor the specification categorically excludes removal of the chalky surface from being part of the claimed process. Petitioners' proposed construction encompassing either removing or transforming the chalky surface properly takes these teachings into account.

Accordingly, we maintain our construction of "rejuvenating" as "to remove or transform the chalky surface that develops on vinyl siding that is exposed to sunlight and other environmental conditions, and restore the color, luster, and/or gloss of the vinyl siding."

3. Other Claim Terms

We determine that no other claim terms need to be construed for purposes of our analysis in this Decision. *See Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017) ("we need only construe terms 'that are in controversy, and only to the extent necessary to resolve the controversy'") (quoting *Vivid Techs., Inc. v. Am. Sci. & Eng'g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999)).

b. Level of Skill in the Art

Petitioners contend that a person of ordinary skill in the art ("POSITA") for the '991 patent "was someone with a bachelor of science degree in chemistry or polymer science and three to four years of experience in developing coatings and other formulations for treating polymeric

materials," and "would have been familiar with the fundamentals of polymer solvation." Pet. 17 (citing Ex. 1005 ¶ 23). Patent Owners contend that the POSITA "would have had at least a bachelor's degree in chemistry and/or material science and two or more years of experience in the field, or [would have served as] a mechanic with five or more years of experience working with solvents and their interaction on various substrates." PO Resp. 3 (citing Ex. 2003 ¶ 8).

We preliminarily adopted Petitioners' definition of the skill level of the POSITA in our Institution Decision, as it was undisputed at the time and consistent with the evidence of record. Inst. Dec. 10–11. Although Patent Owners' newly proposed skill level appears to allow for lesser education and/or experience than Petitioners' proposed skill level, the parties have not suggested, and we do not perceive, that there is any meaningful difference between the proposals that would impact our patentability analysis. Nonetheless, we continue to adopt Petitioners' proposed skill level for a POSITA as more apt given the focus of the '991 patent on rejuvenating polymeric surfaces through the use of an organic solvent with a particular solubility parameter. We have also taken into account the level of skill in the art that is reflected in the prior art of record. *See Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001). We find that Dr. Storey and Dr. Grulke are both qualified to provide opinions as to the perspective and knowledge of a POSITA. *See* Ex. 1005 ¶¶ 23–24; Ex. 2003 ¶¶ 8–9.

c. Patentability Analysis

1. Content of the Prior Art

Petitioners rely primarily upon the following prior art teachings in their challenges.

a. Baumgärtel (Ex. 1002)

Baumgärtel is a German patent application published August 30, 1979. Baumgärtel describes compositions and methods for "Regenerating and Restoring Surfaces or Surface Layers of Molded Parts or Objects Made of Thermoplastic Resins Damaged by Light or Weather." Ex. 1002, 1 (Title). Baumgärtel notes that "[t]his weather damage becomes apparent through a change in color, or through damage to the surface, which can reach a layer depth of 50 μm and more in the case of, e.g., polyvinyl chloride molded parts damaged by weather or light." *Id.* at 9. According to Baumgärtel, "conventional commercial household cleaning agents can in some cases refresh the color to a certain degree, but cannot eliminate damage to surface layers caused by weather, or lead to a restoration of the original appearance of the surface of the plastic." *Id.* Baumgärtel teaches that using the compositions described therein will "regenerate and restore objects and molded parts made of thermoplastic resins increasingly used for exterior applications, e.g. polyvinyl chloride . . , which are exposed to weather and light effects," such that "siding . . . which already exhibit light or weather damaged surfaces or surface layers [will] appear new on one hand, and have a protected and restored surface or surface layer on the other hand." *Id.* at 12–13.

"[A]n organic chemical liquid that swells the thermoplastic resin" may be used as the treatment agent. *Id.* at 12. "According to a particularly advantageous embodiment" of Baumgärtel's method, "the molded parts or objects made of thermoplastic resins are regenerated and restored" with a composition containing "portions of (in relation to 100 parts liquid or liquid mixture) ca. 80% to 99.9% (by weight), preferably 90% to 99% (by weight),

of an organic chemical liquid or liquid mixture that swells the surface." *Id.* at 15. More specifically, for thermoplastic resins such as polyvinyl chloride, "particularly suitable" treatment agents are "composed of portions of ca. 5% to ca. 0.1% (by weight), preferably 2.5% to 0.5% (by weight), of a UV absorber and/or light stabilizer, or mixtures of one or more UV absorbers and/or light stabilizers, and dichloromethane or an organic chemical liquid mixture that swells the thermoplastic resin (e.g. polyvinyl chloride), dissolves the UV absorber and/or light stabilizer." *Id.* at 12. Baumgärtel also allows for "[t]he partial replacement of dichloromethane . . . with the provision that the overall liquid has only a swelling effect on the objects to be treated, and does not dissolve them." *Id.* at 13. In particular, "acetone, ethyl acetate or methyl acetate or a mixture of these compounds" may be used as the organic chemical liquid that "swells polyvinyl chloride, and partially replaces dichloromethane." *Id.* at 14.

Baumgärtel further teaches that an "additional restoration and/or surface treatment agent . . . should be implemented for practical purposes." *Id.* "Preferably, an optical brightener, antioxidant, antistatic, pigment, wax and/or silicone, or a mixture of one or more of these components, is used as the additional restoration and/or surface treatment agent." *Id.* at 12. Such an additional restoration/surface treatment agent may also include a pigment. *Id.* at 17. And "[w]ith the treatment agent containing pigments, it is also possible to color the molded part or object made of thermoplastic resin on the surface layer, such that either nearly the original 'restored' color, or some other color, can be obtained." *Id.* at 18.

Example 1 of Baumgärtel is reproduced below:

> The yellowed surface layer of a white siding made of impact resistant polyvinyl chloride is rubbed with a solution of 0.3 g 2-hydroxy-4-methoxybenzophenon (UV absorber), 0.3 g dibutyl tin-bis-maleic acid isobutyl ester (light stabilizer) and 0.4 g cetyl palmitate (wax) in 99 g dichloromethane using cellulose towels, such that the damaged surface layer is removed and the layer unprotected against the effects of weather is protected by the quantity of UV absorber, light stabilizer and wax remaining in and on it against further weathering and the yellowing caused thereby.

Id. at 20.

b. Billmeyer (Ex. 1003)

Billmeyer is an excerpt from the Textbook of Polymer Science, with a copyright date of 1984. Ex. 1003. Billmeyer teaches the criteria for polymer solubility, noting that "[d]issolving a polymer is a slow process that occurs in two stages" wherein "[f]irst, solvent molecules slowly diffuse into the polymer to produce a swollen gel" and second, "the gel gradually disintegrates into a true solution." *Id.* at 151. Billmeyer teaches the selection of solvents for solvation (including swelling) of polymers using the solubility parameter (δ), as originally approximated by Hildebrand. *Id.* at 152–53. In particular, "[t]he value of the solubility-parameter approach is that δ can be calculated for both polymer and solvent," and "[a]s a first approximation, and in the absence of strong interactions such as hydrogen bonding, solubility can be expected if $\delta_1 - \delta_2$ is less than 3.5–4.0 $[J/cm^3)^{½}]$, but not if it is appreciably larger." *Id.* Billmeyer notes that this approach to polymer solubility has been extensively used, particularly in the paint industry. *Id.* at 153.

Billmeyer includes the following table of typical values of the solubility parameter for some common polymers and solvents:

TABLE 7-1. Typical Values of the Solubility Parameter δ for Some Common Polymers and Solvents[a]

Solvent	$\delta_1[(J/cm^3)^{1/2}]$	Polymer	$\delta_2[(J/cm^3)^{1/2}]$
n-Hexane	14.8	Polytetrafluoroethylene	12.7
Carbon tetrachloride	17.6	Poly(dimethyl siloxane)	14.9
		Polyethylene	16.2
Toluene	18.3	Polypropylene	16.6
2-Butanone	18.5	Polybutadiene	17.6
Benzene	18.7	Polystyrene	17.6
Cyclohexanone	19.0	Poly(methyl methacrylate)	18.6
Styrene	19.0	Poly(vinyl chloride)	19.4
Chlorobenzene	19.4	Poly(vinyl acetate)	21.7
Acetone	19.9	Poly(ethylene terephthalate)	21.9
Tetrahydrofuran	20.3		
Methanol	29.7	66-Nylon	27.8
Water	47.9	Polyacrylonitrile	31.5

[a]Collins (1973).

Id. As noted in Table 7-1 above, poly(vinyl chloride) has a solubility parameter of 19.4 $(J/cm^3)^{½}$, which converts to 9.5 $(cal/cm^3)^{½}$. Ex. 1005 ¶ 150.

c. Gladstone (Ex. 1004)

Gladstone appears to be a newspaper advice column concerning home improvement bearing a date of February 18, 2000. Ex. 1004. In the question posed to the columnist, the homeowner stated that a contractor accidently spilled tar on light colored vinyl siding and cleaned it using acetone, but the homeowner complained, "now that we are getting more sun, those places where the tar was removed have a slight shine or gloss that makes them very noticeable," and asked "how to dull these glossy spots so that they do not stand out as much?" *Id.* at 1. In response, the columnist advised as follows:

> When the tar was washed off, the solvent also removed the "chalking" on the finish, thus exposing the original luster. You could use a solvent to clean off all the siding in the same way. But if you want to avoid this big job, you may be able to get by with simply dulling the shiny places by rubbing down with a mild abrasive such as a kitchen scouring pad (sold for cleaning pots) or even an automobile cleaning and polishing compound (sold for restoring old, dull finishes).

Id. at 1–2.

2. Anticipation Based on Baumgärtel

Petitioners contend that claims 1–11, 13, 14, and 20–24 are anticipated by Baumgärtel. Pet. 23–24. Petitioners provide a claim chart detailing how each limitation of the challenged claims is allegedly taught by Baumgärtel. *Id.* at 24–34.

In our Institution Decision, we found that Petitioners demonstrated a reasonable likelihood of prevailing with respect to at least one claim based on this anticipation challenge. Inst. Dec. 14–16. We have revisited the analysis set forth in our Institution Decision and considered the question of patentability anew in view of all the evidence and arguments presented in this proceeding. Based on the record developed during this proceeding, we now determine that Petitioners have shown by a preponderance of the evidence that Baumgärtel anticipates claims 1–11, 14, and 20–24, but have not demonstrated that Baumgärtel anticipates claim 13.

Independent Claims 1, 20, and 22

With respect to independent claim 1, Petitioners contend that the preamble's recitation of "[a] method of rejuvenating the surface of vinyl siding" is satisfied by Baumgärtel's teaching of a method for regeneration and restoring surfaces of molded parts made of thermoplastic resins damaged by light or weather. Pet. 24 (citing Ex. 1002, 1). Petitioners focus

on Example 1 of Baumgärtel, which discloses the application of a composition containing 99 wt. % dichloromethane to the surface of weather-damaged vinyl siding. *Id.* at 24–25 (citing Ex. 1002, 20). Petitioners contend that dichloromethane (aka methylene chloride or methylene dichloride)[10] is an organic solvent compound that has a solubility parameter (δ) within the claimed range of about 8.0 to about 10.6 $(cal/cm^3)^{½}$, and in particular a Hildebrand solubility parameter of 9.7 $(cal/cm^3)^{½}$ and a Hansen solubility parameter of 9.9 $(cal/cm^3)^{½}$. *Id.* at 25 (citing Ex. 1005 ¶ 80; Ex. 1008 (Grulke); Ex. 1009 (Kirk-Othmer)).

With respect to the "consisting essentially of"[11] phrase in claim 1, Petitioners contend that the additional ingredients included in Example 1 (a UV absorber, light stabilizer, and wax) do not affect the rejuvenation characteristics of dichloromethane. *Id.* at 25–26 (citing Ex. 1005 ¶¶ 81–84). With regard to claim 1's optional inclusion of one or more diluents, Petitioners cite to Example 4 of Baumgärtel, which teaches the use of the diluent n-heptane, which is an aliphatic distillate. *Id.* at 26 (citing Ex. 1002, 20; Ex. 1005 ¶¶ 85–88). Additionally, with respect to other optional ingredients recited in claim 1, Petitioners cite to Baumgärtel's teaching that "an optical brightener, antioxidant, antistatic, pigment, wax and/or silicone, or a mixture of one or more of these components, is used as the additional

[10] It is undisputed that the dichloromethane referenced in Baumgärtel is the same compound as the methylene chloride referenced in the '991 patent. Ex. 1005 ¶ 53.

[11] The transitional phrase "consisting essentially of" is understood to exclude additional ingredients that would "materially affect the basic and novel characteristics" of the claimed composition. *Atlas Powder Co. v. E.I. du Pont De Nemours & Co.*, 750 F.2d 1569, 1574 (Fed. Cir. 1984).

restoration and/or surface treatment agent." *Id.* (citing Ex. 1002, 12). Petitioners rely upon the same teachings to assert that independent claims 20 and 22 are anticipated by Baumgärtel. *Id.* at 31–33.

Patent Owners do not separately argue the challenged claims in their Response. Instead, Patent Owners argue that Petitioners failed to show that Baumgärtel anticipates any claim because the reference "does not teach that its disclosed solvents will restore the color of the vinyl siding." PO Resp. 12. Patent Owners do not dispute that the dichloromethane used in Example 1 of Baumgärtel is an organic solvent that inherently meets the solubility parameter requirements of the challenged claims. *See* Ex. 1005 ¶¶ 53, 80. Patent Owners, however, contend that the solvent mixture disclosed in Baumgärtel does not restore the color of vinyl siding on its own; instead, the reference discloses that the addition of pigments is required to restore color. *Id.* (citing Ex. 1002, 14, 17–18). Patent Owners additionally contend that Baumgärtel does not teach that the disclosed organic solvent rejuvenates the vinyl siding because the reference does not specify that the solvent restores color, but rather only discusses the regeneration and restoration of objects and molded parts such that they "appear new" and "have a protected and restored surface or surface layer." *Id.* at 13 (citing Ex. 1002, 12–13).

Consistent with their claim construction position, Petitioners in their Reply contend that the claimed methods of "rejuvenating" do not require restoration of color. Reply 11–12. Petitioners further argue that Baumgärtel anticipates the claims even if "rejuvenating" were construed to require restoration of both color and luster. *Id.* In support of this argument, Petitioners cite Baumgärtel's teaching that dichloromethane can be applied

"to vinyl siding that has 'weather damage [that has] become[] apparent through a change in color' in order to 'regenerate and restore' that vinyl siding and to make that vinyl siding 'appear new.'" *Id.* at 12–13 (citing Ex. 1002, 9, 12–13). Petitioners explain that, in Example 1, Baumgärtel demonstrates the application of 99% dichloromethane to remove a "yellowed" layer from the surface of weather-damaged vinyl siding. *Id.* at 13–14 (citing Ex. 1002, 20). Petitioners admit it is "not clear that Baumgärtel's Example 1 restored the vinyl siding to the 'original' color when it removed the yellowed surface layer to reveal the unprotected layer of white vinyl siding underneath," but contend that the claims do not require restoring the "original" color and "there is no doubt that Example 1 results in ***some*** restoration of color." *Id.* at 14.

Having considered the parties' arguments and the evidence of record, we find that Baumgärtel teaches either explicitly or inherently all the limitations of independent claims 1, 20, and 22. As set forth above, we have construed "rejuvenating" as it appears in the preambles of each of these claims to mean "remove or transform the chalky surface that develops on vinyl siding that is exposed to sunlight and other environmental conditions, and restore the color, luster, and/or gloss of the vinyl siding." Additionally, we have construed "solubility parameter" to encompass either the Hildebrand solubility parameter or the Hansen solubility parameter as taught in the '991 patent.

Although Baumgärtel does not mention solubility parameters, it is undisputed that dichloromethane is an organic solvent compound with a Hildebrand solubility parameter of 9.7 $(cal/cm^3)^{½}$ and a Hansen solubility parameter of 9.9 $(cal/cm^3)^{½}$, thereby falling within the claimed range of

about 8.0 to about 10.6 $(cal/cm^3)^{½}$ using either method of calculation. Ex. 1005 ¶ 80; Ex. 1008; Ex. 1009. It is also undisputed that the additional ingredients besides the 99 g dichloromethane included in the composition of Baumgärtel's Example 1 would not materially affect the basic and novel properties of the claimed composition. Indeed, as noted by Dr. Storey, two of those additional ingredients, namely, the UV absorber (0.3 g 2-hydroxy-4-methoxybenzophenon) and light stabilizer (0.3 g dibutyl tin-bis-maleic acid isobutyl ester), are among the "optional" ingredients recited in claim 1.[12] Ex. 1005 ¶ 81; Ex. 1020 (teaching that dihydrocarbyl tin maleic acid esters provide stabilization of vinyl chloride resins against both heat and light). Dr. Storey further attests, without dispute, that the third additional ingredient of Baumgärtel's Example 1 composition (0.4 g cetyl palmitate wax) would not have affected the rejuvenation characteristics of the composition at such low concentrations. Ex. 1005 ¶ 82. As such, we find that the composition in Baumgärtel Example 1 "consists essentially of one or more organic solvent compounds" meeting the solubility parameter requirement, i.e., dichloromethane.

Furthermore, in view of both the specific teaching in Example 1 that the weather-damaged "yellowed surface layer" of a white polyvinyl chloride siding was removed as well as the more generalized teachings elsewhere in

[12] Given that the additional ingredients are identified as optional, they need not be taught by the prior art for us to find anticipation. *Cf. Cadence Pharm. Inc. v. Exela PharmSci Inc.*, 780 F.3d 1364, 1373 (Fed. Cir. 2015) (finding optional claim limitation did not need to be satisfied for a finding of infringement). Petitioners, nonetheless, identify ingredients taught by Baumgärtel that correspond to at least some of these optional ingredients. *See* Pet. 26–27.

Baumgärtel that weather damage becomes apparent through a change in color and Baumgärtel's stated objective of restoring such damaged surfaces to its original appearance (e.g., Ex. 1002, 9), we find that Baumgärtel teaches removing or transforming the chalky surface that develops on vinyl siding that is exposed to sunlight and other environmental conditions, and restoring the color, luster, and/or gloss of the vinyl siding. Additionally, we find that Baumgärtel's teaching that the composition "swells the surface of the plastic, but does not dissolve the resin" (*id.*) is consistent with the '991 patent's teaching that "conventional wisdom suggests that the use of a matched solvent would lead to the destruction, via solubilization, of the surface," but instead such use unexpectedly results in rejuvenation of the surface ("believed to result from a replasticization of the vinyl surface"). Ex. 1001, 3:23–28, 5:65–66. This is evidenced by Billmeyer, which is a textbook teaching that dissolving a polymer generally involves "solvent molecules slowly diffus[ing] into the polymer to produce a swollen gel" and that matching the solubility parameter of the solvent with the polymer enhances solubility. *See* Ex. 1003, 151–53. Thus, we find that Baumgärtel teaches "rejuvenating" the surface of vinyl siding using such a composition in the same manner as the '991 patent.

Accordingly, we determine that Baumgärtel anticipates claims 1, 20, and 22.

Dependent Claims 2–11, 13, 14, 21, 23, and 24

Petitioners provide a claim chart and supporting expert testimony showing how the challenged dependent claims are taught by Baumgärtel. Pet. 27–34. Patent Owners have not have made any separate arguments for these dependent claims. We nonetheless ascertain whether Petitioners have met their burden with respect to these claims.

Claim 2 recites that "the organic solvent compound is a polar compound." Dr. Storey explains that dichloromethane has a dipole moment and is thus a polar compound. Ex. 1005 ¶ 94. Claim 3 recites that the organic solvent compound can be a chlorinated hydrocarbon while claim 4 recites that the organic solvent compound can be methylene chloride. Dr. Storey explains that dichloromethane also meets these requirements. *Id.* ¶¶ 96–99. Claims 5, 6, and 7 specify progressively narrower ranges for the solubility parameter of the organic solvent compound, with the narrowest recited range of "from about 8.9 to about 10.0 $(cal/cm^3)^{½}$." As noted above, dichloromethane has a Hildebrand solubility parameter of 9.7 $(cal/cm^3)^{½}$ and a Hansen solubility parameter of 9.9 $(cal/cm^3)^{½}$, which fall within these narrower ranges. *Id.* ¶¶ 100–105. Claim 8 (dependent from claim 1), claim 9 (dependent from claim 3), and claim 10 (dependent from claim 4) specify that the composition includes from about 50 to about 100 percent by weight of the organic solvent compounds. We find this requirement to be satisfied by Baumgärtel's Example 1 composition, which includes 99 % (by weight) of dichloromethane. *Id.* ¶¶ 106–111. Claim 11 specifies that "the step of applying includes wiping the surface with a cloth or sponge." We find this to also be satisfied by Baumgärtel's Example 1, which teaches the application of the dichloromethane composition using cellulose towels. *Id.* ¶¶ 112–113. Claim 14 (dependent from claim 1), claim 21 (dependent from claim 20), and claim 24 (dependent from claim 22) specify that the vinyl surface comprises poly(vinylchloride) or a vinyl chloride copolymer having a solubility parameter of from about 9.4 to about 9.8 $(cal/cm^3)^{½}$. We find that the polyvinyl chloride surface treated according to Baumgärtel's

Example 1 inherently satisfies this solubility parameter requirement. *Id.* ¶¶ 117–119, 125–127, 139–140; Ex. 1001, 3:10–12; Ex. 1003, 153.

Claim 13 (dependent from claim 1) specifies that "the organic solvent compound is selected from the group consisting of ethyl 3-ethoxypropionate, ethylene glycol monobutyl ether acetate, and acetone." Similarly, claim 23 (dependent from claim 22) specifies that "the one or more organic solvent compounds include ethyl 3-ethoxypropionate, ethylene glycol monobutyl ether acetate, and acetone." For both these requirements, Petitioners rely upon Baumgärtel's teaching that dichloromethane can be partially replaced with an "aliphatic, acyclical liquid that swells the thermoplastic resin," including in particular acetone. Pet. 30, 34 (citing Ex. 1002, 13–14). However, as recognized by Petitioners, Baumgärtel teaches just *partially* replacing dichloromethane with another solvent such as acetone. While this teaching is sufficient to satisfy claim 23, which uses the open-ended transitional phrase "include," we do not find it satisfies claim 13, which only recites acetone as part of a closed Markush group. As such, claim 13 does not allow for the inclusion of ingredients other than the specifically enumerated organic solvent compounds, which does not include dichloromethane. *See Multilayer Stretch Cling Film Holdings, Inc. v. Berry Plastics Corp.*, 831 F.3d 1350, 1357–62 (Fed. Cir. 2016) (applying presumption that a Markush group using the transitional phrase "consisting of" is closed to other unrecited ingredients).

Accordingly, we determine that Baumgärtel anticipates dependent claims 2–11, 14, 21, 23, and 24. Petitioners, however, have not met their burden of showing that Baumgärtel anticipates dependent claim 13.

3. Obviousness Based on Baumgärtel and Billmeyer

Petitioners contend that claims 1–11, 13, 14, and 20–24 are also rendered obvious by the combined teachings of Baumgärtel and Billmeyer. Pet. 34–38. Petitioners provide a claim chart detailing how each limitation of the challenged claims is taught by Baumgärtel and Billmeyer. *Id.* at 38–50. Because we having determined that Baumgärtel alone anticipates claims 1–11, 14, and 20–24, we only address this challenge as applied to dependent claim 13. Petitioners do not rely upon Billmeyer to argue that it would have been obvious to entirely replace the dichloromethane taught by Baumgärtel with acetone or any of the other organic solvent compounds enumerated in claim 13. *See id.* at 46 (relying only upon Baumgärtel's teachings in obviousness challenge as to claim 13). Accordingly, for the reasons discussed above, we determine that Petitioners have not met their burden of showing that the combination of Baumgärtel and Billmeyer renders obvious dependent claim 13.

4. Anticipation/Obviousness Based on Gladstone

Petitioners contend that claims 1–10, 13, and 20 are anticipated by Gladstone, and that claim 11 is rendered obvious by Gladstone. Pet. 51–60. Petitioners provide claim charts detailing how each limitation of the challenged claims is allegedly taught or suggested by Gladstone. *Id.* at 53–60.

In our Institution Decision, we determined that Petitioners did not demonstrate a reasonable likelihood of prevailing with respect to the challenges based on Gladstone. Inst. Dec. 17–19. We have revisited the analysis set forth in our Institution Decision and considered the question of patentability anew in view of all the evidence and arguments presented in

this proceeding. Based on the record developed during this proceeding, we determine that Petitioners have not shown by a preponderance of the evidence that claims 1–10, 13, and 20 are anticipated by Gladstone, or that claim 11 is rendered obvious by Gladstone.

According to Petitioners, Gladstone describes the treatment of weathered vinyl siding with acetone to "remove[] the 'chalking' on the finish, thus exposing the original luster." Pet. 51. Although Gladstone does not discuss solubility parameters, Petitioners assert that "the solubility parameter is an inherent property of a solvent," and that the Hildebrand and Hansen solubility parameters of the acetone are 9.8–9.9 $(cal/cm^3)^{½}$. *Id.* (citing Ex. 1005 ¶¶ 54, 223). Furthermore, Petitioners rely upon Patent Owners' Infringement Contentions from the co-pending District Court litigation, in which Patent Owners allegedly admitted that a 75–100% acetone formulation meets the limitations of the challenged claims. *Id.* at 51–53 (citing Ex. 1009, Table 1).

Patent Owners argue that Gladstone does not anticipate or render any claim obvious because it does not endorse using acetone to restore the luster of vinyl siding and does not mention color restoration. PO Resp. 15–17 (citing Ex. 1004, 1). Patent Owners also argue that Gladstone does not disclose the exact composition of the acetone solvent referenced in the article, so Petitioners have not established that Gladstone teaches a composition consisting essentially of an organic solvent having the claimed solubility parameters. *Id.* at 17. Additionally, Patent Owners contend that there is no statutory basis for Petitioners to rely upon Patent Owners' infringement contentions to support its grounds. *Id.* at 16 (citing 35 U.S.C. § 311).

Petitioners have not demonstrated why the POSITA would have understood this newspaper column to teach the claimed methods. *See Sundance, Inc. v. DeMonte Fabricating Ltd.*, 550 F.3d 1356, 1361 (Fed. Cir. 2008) ("What a prior art reference discloses or teaches is determined from the perspective of one of ordinary skill in the art."). For instance, other than simply referring to "acetone," no details are provided in Gladstone as to the exact composition of the solvent discussed therein. That is, Petitioners have not established that a POSITA would have understood Gladstone to teach a composition "consisting essentially" of an organic solvent having the claimed solubility parameters as required by claim 1. Petitioners, in their Reply, contend that a POSITA reading Gladstone would have concluded that the acetone identified therein is the "same, pure acetone that can be purchased in [the] corner hardware store." Reply 19. Petitioners, however, do not point to any evidence of record showing the composition or purity level of acetone that can be purchased in a hardware store. Petitioners' reliance upon Patent Owners' infringement contentions from the district court litigation does not remedy this deficiency since there is no basis to conclude that the products accused of infringement have the same composition as the "acetone" identified in Gladstone.

Furthermore, we agree with Patent Owners that Gladstone did not endorse using acetone to restore the luster of vinyl siding—rather, the homeowner had complained that acetone made a patch of vinyl siding shiny, and the columnist responded that "[y]ou *could* use a solvent to clean off all the siding in the same way," but noted that was a "big job" to be avoided, and instead recommended "simply dulling the shiny places by rubbing down with a mild abrasive." Ex. 1004, 1–2 (emphasis added). While we agree

with Petitioners that "teaching away is not relevant to an anticipation analysis," Reply 16 (citing *Krippelz v. Ford Motor Co.*, 667 F.3d 1261, 1269 (Fed. Cir. 2012)), we find that Gladstone's recommendation against using acetone to clean off the siding is relevant to at least Petitioners' obviousness contentions as to claim 11.

Accordingly, we determine that Petitioners have not demonstrated that claims 1–10, 13, and 20 are anticipated by Gladstone, or that claim 11 is rendered obvious by Gladstone.

III. PATENT OWNERS' MOTION FOR CONDITIONAL AMENDMENT

As discussed above, we determine that Petitioners have demonstrated by a preponderance of the evidence that claims 1–11, 14, and 20–24 are unpatentable. Accordingly, we address Patent Owners' Motion to Amend with respect to proposed substitute claims 25–35 and 37–42. Mot. 2–6. Because we did not find claim 13 unpatentable, we do not address Patent Owners' Motion to Amend with respect to proposed substitute claim 36. *Id.* at 4.

Proposed substitute claim 25, reproduced below, is illustrative:

> 25. (Proposed substitute for claim 1) A method for rejuvenating the surface of vinyl siding, the method comprising: applying a composition to the surface of the vinyl siding, <u>wherein applying the composition restores a color and luster of the surface of the vinyl siding,</u> where the composition consists essentially of one or more organic solvent compounds that have a solubility parameter (δ) of from about 8.0 to about 10.6 $(cal/cm^3)^{½}$, optionally one or more diluents selected from the group consisting of aliphatic distillates, aromatic distillates, naphtha, pine oil, tricresyl phosphate, and mixtures thereof, and optionally one or more antioxidants, thermal stabilizers, bacteriostats, ultraviolet absorbers, and a mixture thereof.

Id. at 2. Patent Owners have proposed similar amendments in independent claims 38 (proposed substitute for claim 20) and 40 (proposed substitute for claim 22). *Id.* at 4–5.

a. Procedural Requirements for Motion to Amend

In an *inter partes* review, amended claims are not added to a patent as of right, but rather must be proposed as a part of a motion to amend. 35 U.S.C. § 316(d). "During an inter partes review instituted under this chapter, the patent owner may file 1 motion to amend the patent," and "[f]or each challenged claim, propose a reasonable number of substitute claims." *Id.*; *see also* 37 C.F.R. § 42.121(a)(3). The Board must assess the patentability of proposed substitute claims "without placing the burden of persuasion on the patent owner." *Aqua Prods., Inc. v. Matal*, 872 F.3d 1290, 1296 (Fed. Cir. 2017) (en banc). However, Patent Owners' proposed substitute claims must meet the statutory requirements of 35 U.S.C. § 316(d) and the procedural requirements of 37 C.F.R. § 42.121. *See Lectrosonics, Inc. v. Zaxcom, Inc.*, IPR2018-01129, Paper 15 at 2 (PTAB Feb. 25, 2019) (precedential); Memorandum "Guidance on Motions to Amend in view of *Aqua Products*" (Nov. 21, 2017) (https://www.uspto.gov/sites/default/files/documents/guidance_on_motions_to_amend_11_2017.pdf) ("Board's Memorandum").

Accordingly, Patent Owners must demonstrate: (1) the amendment proposes a reasonable number of substitute claims; (2) the amendment responds to a ground of unpatentability involved in the trial; and (3) the amendment does not seek to enlarge the scope of the claims of the patent or introduce new subject matter, such that the proposed claims are supported in the original disclosure. *See* 35 U.S.C. § 316(d); 37 C.F.R. § 42.121. We

determine that these procedural requirements are satisfied. In particular, Patent Owners propose one substitute claim per challenged claim, which is a presumptively reasonable number of substitute claims. *See* 37 C.F.R. § 42.121(a)(3) ("The presumption is that only one substitute claim would be needed to replace each challenged claim."). Furthermore, through its proposed amendments and supporting arguments, Patent Owners specifically respond to the unpatentability grounds set forth in the Petition.

Additionally, we find that the written description provides adequate support for the proposed amended claims. Patent Owners point out that support for the added limitation "wherein applying the composition restores a color and luster of the surface of the vinyl siding" can be found in the originally-filed application, No. 10/102,714 (Ex. 1010) at 3:17–19; 8:18–28; and 9:9–10:24. Mot. 6. Petitioners argue that "these are the same passages that Patent Owners previously identified, and the Board rejected, as support for a finding that both color and luster are required during the rejuvenation process." Opp. 21 (citing Inst. Dec. 9). However, we did not suggest in our Institution Decision (and do not suggest here) that the '991 patent fails to provide written description support for restoring both color and luster. Rather, as we recognized previously, the specification contemplates (but does not require) restoration of both color and luster as one example of "rejuvenation." *See* Ex. 1001, 2:20–27 ("[T]he color, luster, and gloss of the surface can be restored"); *id.* at 5:62–65 ('[I]t has been found that the rejuvenation, e.g., restoration of color and luster, does not necessarily result from cleaning the surface."). Accordingly, we determine that the proposed amendments do not seek to enlarge the scope of the claims of the patent or introduce new subject matter.

In addition to the requirements of 37 C.F.R. § 42.121, Petitioners contend that Patent Owners' Motion should be denied because Patent Owners did not inform Petitioners of their conferral with the Board prior to filing the Motion. Opp. 19–20. We discussed this argument with the parties in a conference call and rejected it in an Order issued on Nov. 9, 2018. Paper 18, 3. As discussed in our Order, "[u]pon consideration of the arguments and positions presented during the call, we waived the requirement to confer with the Board for Patent Owners' Motion to Amend in order 'to secure the just, speedy, and inexpensive resolution of this proceeding.' 37 C.F.R. § 42.1(b); *see also id.* § 42.5(b)." *Id.* Therefore, we refuse to deny Patent Owners' Motion on this basis.

b. Patentability Analysis for Proposed Amended Claims

In accordance with *Aqua Products*, Patent Owners do not bear the burden of persuasion to demonstrate the patentability of the substitute claims presented in the Motion to Amend. Rather, ordinarily, "the petitioner bears the burden of proving that the proposed amended claims are unpatentable by a preponderance of the evidence." *Bosch Auto. Serv. Sols., LLC v. Matal*, 878 F.3d 1027, 1040 (Fed. Cir. 2017), *as amended on reh'g in part* (Mar. 15, 2018). The Board itself also may justify any finding of unpatentability by reference to evidence of record in the proceeding. *Id.* (citing *Aqua Products*, 872 F.3d at 1311 (O'Malley, J.)). Thus, the Board determines whether the proposed substitute claims are unpatentable based on the entirety of the record, including any opposition made by Petitioners.

In their Opposition, Petitioners assert that the proposed substitute claims are unpatentable due to 1) anticipation based on the explicit teachings of, as well as inherency by, Baumgärtel; 2) obviousness based on

Baumgärtel in view of Billmeyer; 3) lack of enablement under § 112(a); and 4) indefiniteness under § 112(b). Opp. 6–19. Because we are persuaded by Petitioners' arguments and the evidence of record that the proposed substitute claims are still anticipated by Baumgärtel, we deny the Motion to Amend on that basis and do not address the other unpatentability arguments argued by Petitioners.

Construction of "Restores a Color and Luster"

Before we turn to our anticipation analysis, we address one disputed issue of claim construction with respect to the proposed amended claims. In effect, Patent Owners' proposed amendments seek to incorporate as an explicit recitation at least part of their proposed claim construction for the term "rejuvenating" that we rejected in our analysis of the original claims. However, in contrast to their prior construction requiring "restoring *the* color and luster of the surface of vinyl siding," the proposed amendments now only require "restor[ing] *a* color and luster of the surface of the vinyl siding."

Petitioners contend that the broadest reasonable interpretation of this phrase is "to alter the surface of vinyl siding to noticeably improve any aspects of both the color and luster." Opp. 4–5. Patent Owners, on the other hand, contend that "restores a color and luster" has its plain and ordinary meaning, which is "to return to the original color and luster." Amend. Reply 1–3.

We find Petitioners' proposed construction for this phrase to be unreasonably broad and unsupported by the specification. Although Petitioners assert that the '991 patent "discloses the restoration of color and luster generally and that color and luster are improved in some meaningful

way," none of the cited passages of the specification discuss restoration in such broad terms. Opp. 4 (citing Ex. 1001, 2:23–24, 2:29–34, 5:62–65, 6:44–47, 7:1–4). Furthermore, adopting Petitioners' construction would introduce ambiguity since it depends on the purely subjective preferences of the observer as to what constitutes an improvement. *See Sonix Tech. Co. v. Publications Int'l, Ltd.*, 844 F.3d 1370, 1378 (Fed. Cir. 2017) (noting that claims terms that "turned on a person's tastes or opinion" or "a value judgment that inherently varies from person to person" are likely indefinite).

We find Patent Owners' proposed construction to be more reasonable. Although the phrase "*a* color and luster" might be read in isolation to suggest that *any* color or luster might be the end result of the claimed methods, Patent Owners point out that the reason they used "a" instead of "the" in the proposed amendments is because "basic tenets of claim drafting" normally require claim terms to have proper antecedent basis. Amend. Reply 3 (citing MPEP § 2173.05(e), which states that a claim term without antecedent basis could potentially, but not necessarily, be indefinite). Additionally, the plain and ordinary meaning of "restores," like the term "rejuvenating," already means returning to an original state. *See* Ex. 2005 (defining "rejuvenate" as: "1. to restore to youthful vigor, appearance etc.; make young again. 2. to restore to a former state; make fresh again. . . . 3. to undergo rejuvenation."). Furthermore, the '991 patent specifically mentions that restoration of the "original color" or the "original luster" of the surface is either an unexpected advantage or an objective of the invention. *See* Ex. 1001, 3:29–31 ("[T]he fact that the composition of this invention restores the *original luster* of the surface . . . was highly unexpected." (emphasis added)); *id.* at 6:49–50, 7:1–4 (describing

colorimeter test used "to establish the degree to which the *original color* of the vinyl siding was restored" and indicating that "[t]he results of the colorimeter tests indicated that . . . the *original color* of the vinyl siding was restored within 1 Delta E (0.92 Delta E)." (emphasis added)).

Thus, in view of the foregoing, we determine that "restores a color and luster" in the proposed amendments should be construed as "to return to the original color and luster." We note, however, that neither the claims nor the specification require the treated surface to have the exact same color and luster as the original or otherwise require a quantitative determination of those parameters. While the specification reports that the colorimeter test results showed a difference of less than 1 Delta E, which is within the quality assurance standards of most vinyl siding manufacturers, it does not suggest that the use of a colorimeter test is required in order to assess whether restoration has been achieved. Rather, consistent with the teaching that "the restoration and color provided by practicing this invention is tantamount to the color differentiation of new products" and such "a difference . . . is not noticeable to the human eye" (Ex. 1001, 7:4–9), we determine that the requirement to "restore[e] a color and luster" in the proposed substitute claims is satisfied so long as any differences in color and luster between the original and treated surfaces are not noticeable to the normal human eye.

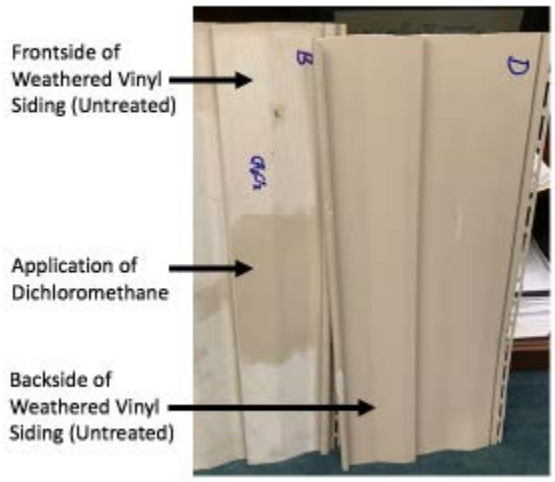
Anticipation by Baumgärtel

Petitioners rely upon the same teachings of Baumgärtel discussed above to assert that the proposed substitute claims are also anticipated. In particular, with respect to the additional requirement to restore color recited in the proposed substituted claims, Petitioners contend that by "teaching the

application of dichloromethane to vinyl siding that has 'weather damage [that has] become[] apparent through a change in color' in order to 'regenerate and restore' that vinyl siding and to make it 'appear new,' Baumgärtel teaches the restoration of color." Opp. 6–7 (citing Ex. 1002, 9, 12–13). Petitioner further contends that Baumgärtel, in Example 1, explicitly teaches that the solvent restores color, as well as luster, by teaching that dichloromethane removed the yellowed, damaged surface layer of white siding. *Id.* at 7 (citing Ex. 1002, 20). Petitioners include a claim chart detailing how each of the limitations of proposed substitute claim 25 are taught by Baumgärtel. *Id.* at 8–12.

In addition to relying on the explicit teachings of Baumgärtel, Petitioners contend that the proposed substitute claims are inherently anticipated because restoration of color and luster is likewise the natural result of the method disclosed in Baumgärtel. *Id.* at 12–17. Petitioners contend that, "[a]s taught by the '991 patent, the restoration of color and luster is the natural result of the following steps: 1) having an organic solvent with a solubility parameter of from about 8.0 to about 10.6 $(cal/cm^3)^{½}$ and 2) applying that organic solvent to the surface of vinyl siding." *Id.* at 13.

Petitioners further rely upon experiments performed by Dr. Storey in which he applied a dichloromethane solution (99.5% purity) to the surface of weathered vinyl siding according to the methods disclosed in Baumgärtel and observed a change in both color and luster, as seen in the photo below:



Id. at 15–16; *see also* Ex. 1022 (Second Storey Decl.) ¶¶ 19–25. As shown above, Dr. Storey compared a portion of the siding that was treated with dichloromethane with the untreated (weathered) front and back sides of siding, and attests that both color and luster was restored after application. Ex. 1022 ¶¶ 31–36. Dr. Storey explains that he relied on his visual inspection instead of a colorimeter to analyze the degree of color restoration because the colorimeter test data presented in the '991 patent were unreliable since it did not use the prescribed and accepted calculation for determining the numerical color difference value (ΔE^*). *Id.* ¶¶ 26–30. With respect to restoration of luster, Dr. Storey relied upon both his visual inspection as well as gloss measurements taken using a BYK micro-TRI-gloss meter. *Id.* ¶¶ 31–36.

Patent Owners argue that the proposed substitute claims are not anticipated by Baumgärtel because it explicitly teaches that it is necessary to separately add pigments to the mixture in order to restore the original color. Mot. 9–10 (citing Ex. 1002, 14, 17–18); Amend. Reply 5. Furthermore, Patent Owners argue that the claims require more than simply applying an organic solvent with the required solubility parameter to the surface of vinyl

siding. Amend. Reply 4. Patent Owners assert that "Baumgärtel does not teach the use of dichloromethane in the claimed proportions," but "[r]ather, Baumgärtel teaches the use of dichloromethane in small proportions sufficient to dissolve UV absorbers and/or light stabilizers that have migrated to the surface in the thermoplastic resin and replace the UV absorbers, not to replasticize the thermoplastic resin." *Id.* at 4–5 (citing Ex. 1002, 12). As such, Patent Owners contend that "Baumgärtel subscribes to the conventional wisdom the '991 patent identifies as contradicted by the claimed invention." *Id.* at 5 (comparing Ex. 1002, 15 with Ex 1001, 3:25-29). With regard to the experiment conducted by Dr. Storey to show inherent anticipation, Patent Owners contend that "the experiment used 'pure dichloromethane,' not the mixture disclosed in Baumgärtel," and thus "Petitioners have failed to show that the method in Baumgärtel 'must *necessarily* include the unstated limitation.'" *Id.* at 6 (emphasis added) (citing *Transclean Corp. v. Bridgewood Servs., Inc.*, 290 F.3d 1364, 1373 (Fed. Cir. 2002)).

Having considered the parties' contentions, we are persuaded that Petitioners have demonstrated by a preponderance of the evidence that the proposed substitute claims are anticipated, either explicitly or inherently, by Baumgärtel. Contrary to Patent Owners' arguments, we do not interpret Baumgärtel as requiring pigments for the composition in all instances. While Baumgärtel states that "nearly the original 'restored' color, or some other color, can be obtained" with pigments, the reference plainly suggests that such pigments are optional and may only be needed to restore certain colors. Ex. 1002, 18 ("Thus, by way of example, white light-damaged or weather-damaged profiles made of hard polyvinyl chloride are regenerated

or restored using a treatment agent that contains pigments, wherein the molded parts can be colored light pink, pale blue, light green or light yellow."). Indeed, Example 1 of Baumgärtel does not mention the use of pigments yet discusses the removal of the yellowed/damaged surface layer of white siding using a composition containing 99% dichloromethane. *Id.* at 20.

Furthermore, we are not persuaded by Patent Owners' arguments that Baumgärtel only teaches the use of dichloromethane in "small proportions." Baumgärtel teaches generally that molded parts are regenerated and restored with a swelling liquid or swelling liquid mixture composed of about "80% to 99.9% (by weight), preferably 90% to 99% (by weight), of an organic chemical liquid or liquid mixture that swells the surface" of the thermoplastic resin. Ex. 1002, 15. Furthermore, Example 1 of Baumgärtel specifically teaches a composition containing 99% (by weight) dichloromethane. *Id.* at 15. Patent Owners misleadingly quotes Baumgärtel as suggesting that smaller proportions of dichloromethane (5% to about 0.1% by weight) are used (Amend. Reply 4–5), but the cited portions only mention the amount of UV absorbers and/or light stabilizers in the composition, and not the amount of dichloromethane or other organic chemical liquids. Ex. 1002, 12; *see also* Tr. 48:1–12 (Patent Owners counsel acknowledging that page 12 of Baumgärtel only discusses only the amount of UV absorber).

We also are not persuaded that Baumgärtel simply follows what the '991 patent identifies as "conventional wisdom" as compared to the claimed invention. As we discussed with respect to the original claims, Baumgärtel's teaching that the composition "swells the surface of the plastic, but does not

dissolve the resin" (Ex. 1002, 9) is fully consistent with the '991 patent's teaching that "conventional wisdom suggests that the use of a matched solvent would lead to the destruction, via solubilization, of the surface," but instead such use unexpectedly resulted in rejuvenation of the surface ("believed to result from a replasticization of the vinyl surface"). Ex. 1001, 3:23–28, 5:65–66. In order words, despite the '991 patent characterizing the result as unexpected, Baumgärtel recognizes that rejuvenation can result from the use of particular solvents that swell the thermoplastic resin. This swelling of the polymer is due to increased solubility as a result of the matched solubility parameter. *See* Ex. 1003, 151–53 (teaching that "solvent molecules slowly diffuse into the polymer to produce a swollen gel" and that matching the solubility parameter of the solvent with the polymer enhances solubility). Although Baumgärtel may not have recognized the role of the solubility parameter in this process, "the discovery of a previously unappreciated property of a prior art composition, or of a scientific explanation for the prior art's functioning, does not render the old composition patentably new to the discoverer." *Atlas Powder Co. v. IRECO Inc.*, 190 F.3d 1342, 1347 (Fed. Cir. 1999).

Finally, we are persuaded that the experiments conducted by Dr. Storey also support a finding of inherent anticipation by Baumgärtel. Ex. 1022 ¶¶ 12–36. Patent Owners' only argument as to these experiments is that "Dr. Storey has merely confirmed what the inventor discovered and disclosed in the '991 patent." Amend. Reply 6. But Dr. Storey based his experiments on the composition of Baumgärtel's Example 1. Although we recognize that the 99.5% pure dichloromethane used by Dr. Storey for his experiments did not include the 1% of additional ingredients identified in

Example 1 (i.e., 0.3 g UV absorber, 0.3 g light stabilizer, and 0.4 g wax), Dr. Storey attests that those additional ingredients in such small proportions would not have materially affected the rejuvenation characteristics of dichloromethane. Ex. 1005 ¶¶ 81–82. Despite having the right to do so under 37 C.F.R. § 42.51(b)(1)(ii), Patent Owners did not cross-examine Dr. Storey as to his declaration testimony in this proceeding; nor did Patent Owners' expert Dr. Grulke address these points in his own declaration. *See* Ex. 2003 ¶ 25–29. We, therefore, credit Dr. Storey's opinion based on his experiments that "performing the method set forth in Baumgärtel necessarily results in the restoration of color and luster on the surface of vinyl siding." Ex. 1022 ¶ 37.

Accordingly, we deny Patent Owners' Motion to Amend.

IV. CONCLUSION

After reviewing the entire record and weighing evidence offered by both parties, we determine that Petitioners have shown by a preponderance of the evidence that claims 1–11, 14, and 20–24 of the '991 patent are unpatentable as anticipated by Baumgärtel. We determine that Petitioners have not shown by a preponderance of the evidence that claim 13 is unpatentable. We also determine that Petitioners have shown by a preponderance of the evidence that proposed substitute claims 25–35 and 37–42 are unpatentable as anticipated by Baumgärtel.

V. ORDER

Accordingly, it is:

ORDERED that claims 1–11, 14, and 20–24 of the ’991 patent are determined to be unpatentable;

FURTHER ORDERED that Patent Owner’s Motion for Conditional Amendment is *denied*; and

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

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