

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

HID GLOBAL CORP.,
Petitioner,

v.

MORPHOTRUST USA, LLC,
Patent Owner.

Case IPR2017-01941
Patent 8,083,152 B2

Before KARL D. EASTHOM, CHRISTA P. ZADO, and
STACY B. MARGOLIES, *Administrative Patent Judges*.

ZADO, *Administrative Patent Judge*.

DECISION

Final Written Decision

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

Denying Motion to Amend

35 U.S.C. § 316(d) and 37 C.F.R. § 42.121

I. INTRODUCTION

We have authority to hear this *inter partes* review under 35 U.S.C. § 6. This Final Written Decision issues pursuant to 35 U.S.C. § 318(a) and 37 C.F.R. § 42.73. For the reasons discussed herein, we determine that HID Global Corp. (“Petitioner”)¹ has shown, by a preponderance of the evidence, that claims 1–3 and 5–12 (“the challenged claims”) of U.S. Patent No. 8,083,152 B2 (Ex. 1001, “the ’152 patent”) are unpatentable. *See* 35 U.S.C. § 316(e); 37 C.F.R. § 42.1(d). In addition, we deny Patent Owner’s Motion to Amend.

A. Procedural History

Petitioner filed a Petition (Paper 1, “Pet.”) requesting an *inter partes* review of claims 1–12 of the ’152 patent. *See* Pet. 3–5. MorphoTrust USA, LLC (“Patent Owner”)² filed a Preliminary Response. Paper 10 (“Prelim. Resp.”).

We instituted an *inter partes* review (Paper 11, “Inst. Dec.” or “Institution Decision”) on the following grounds of unpatentability raised in the Petition: claim 1 under 35 U.S.C. § 103(a) over the combination of Maurer³ and Bernecker⁴; claims 2, 3, 7, and 8 under 35 U.S.C. § 103(a) over

¹ Petitioner identifies itself, Assa Abloy AB, and Assa Abloy Inc., as real parties-in-interest, pursuant to 37 C.F.R. § 42.8. Paper 1, 72.

² Patent Owner identifies itself and L-1 Secure Credentialing, LLC as real parties-in-interest, pursuant to 37 C.F.R. § 42.8. Paper 8, 1,

³ U.S. Patent No. 4,544,181 (issued Oct. 1, 1985). Ex. 1005 (“Maurer”).

⁴ U.S. Patent No. 5,958,528 (issued Sept. 28, 1999). Ex. 1006 (“Bernecker”).

the combination of Maurer, Bernecker, and Fry⁵; claims 5 and 6 under 35 U.S.C. § 103(a) over the combination of Maurer, Bernecker, and Gunn⁶; claim 9 under 35 U.S.C. § 103(a) over the combination of Maurer and Fry; claims 10 and 11 under 35 U.S.C. § 103(a) over the combination of Maurer, Fry, and Gunn; and claim 12 under 35 U.S.C. § 103(a) over the combination of Maurer, Bernecker, Fry, and Ross.⁷ We did not institute on the following ground raised in the Petition: claim 4 under 35 U.S.C. § 103(a) over the combination of Maurer, Bernecker, and Fry.

Subsequent to the April 24, 2018 decision in *SAS Inst., Inc. v. Iancu*, 2018 WL 1914661, at *10 (U.S. Apr. 24, 2018), we granted the parties' Joint Motion to Limit Petition under 37 C.F.R. § 42.71 requesting that we limit the *inter partes* review to claims 1–3 and 5–12 and remove claim 4 from the Petition and from further consideration in this proceeding. Paper 25; *see also* Paper 19 (the parties' Joint Motion to Limit Petition).

Subsequent to the Institution Decision, Patent Owner filed a Response (Paper 22, "PO Resp.") and Petitioner filed a Reply (Paper 26, "Reply"). The parties appeared for an Oral Hearing on November 15, 2018, a transcription of which appears in the record. Paper 36 ("Tr.").⁸ Patent

⁵ U.S. Patent No. 3,626,143 (issued Dec. 7, 1971). Ex. 1007 ("Fry").

⁶ U.S. Patent No. 6,066,594 (issued May 23, 2000). Ex. 1008 ("Gun").

⁷ U.S. Patent No. 5,830,529 (issued Nov. 3, 1998). Ex. 1012 ("Ross").

⁸ During the Oral Hearing, the parties argued three other related proceedings in addition to IPR2017-01941, all transcribed together in Paper 40, namely IPR2017-01938, IPR2017-01939, and IPR2017-01940. *See infra* Section I.C. (Related Cases).

Owner also submitted a Contingent Motion to Amend, followed by other papers by the parties, as discussed further below in Section III.

B. The '152 Patent

The '152 patent, titled “Laser Etched Security Features for Identification Documents and Methods of Making Same,” was filed on February 16, 2010. Ex. 1001, [22]. The '152 patent is a continuation of U.S. Application No. 11/737,533, filed on April 19, 2007, now U.S. Patent No. 7,661,600, which is a continuation of U.S. Application No. 10/330,033, filed on December 24, 2002, now U.S. Patent No. 7,207,494, which claims priority to provisional patent Application No. 60/344,716, filed December 24, 2001. *Id.* at [60], [63], 1:7–12. Accordingly, the earliest possible priority date of the '152 patent is December 24, 2001.

The '152 patent specification (“Specification”) describes etching patterns in identification cards and documents using a laser. Ex. 1001, [57], Fig. 1. Examples of identification cards and documents include “driving licenses, national or government identification cards, bank cards, credit cards, controlled access cards and smart cards, carry[ing] thereon certain items of information which relate to the identity of the bearer. Examples of such information include name, address, birth date, signature and photographic image” *Id.* at 2:44–50. The ID cards and documents may include other variant (e.g., employee number) and invariant (e.g., employer name) information. *See id.* at 2:50–54.

Figure 1, reproduced below, “is an illustrative example of a prior art identification document” 10 (*id.* at 4:7–8):

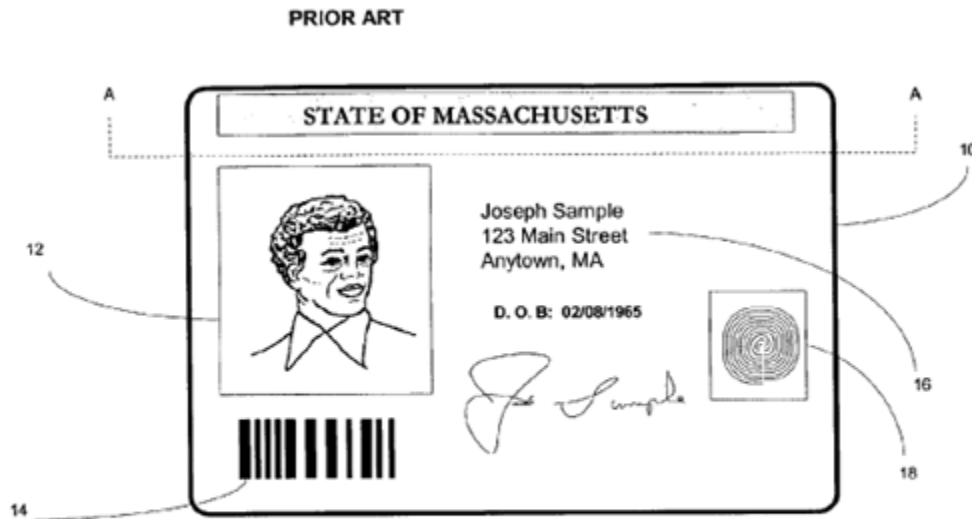


FIGURE 1

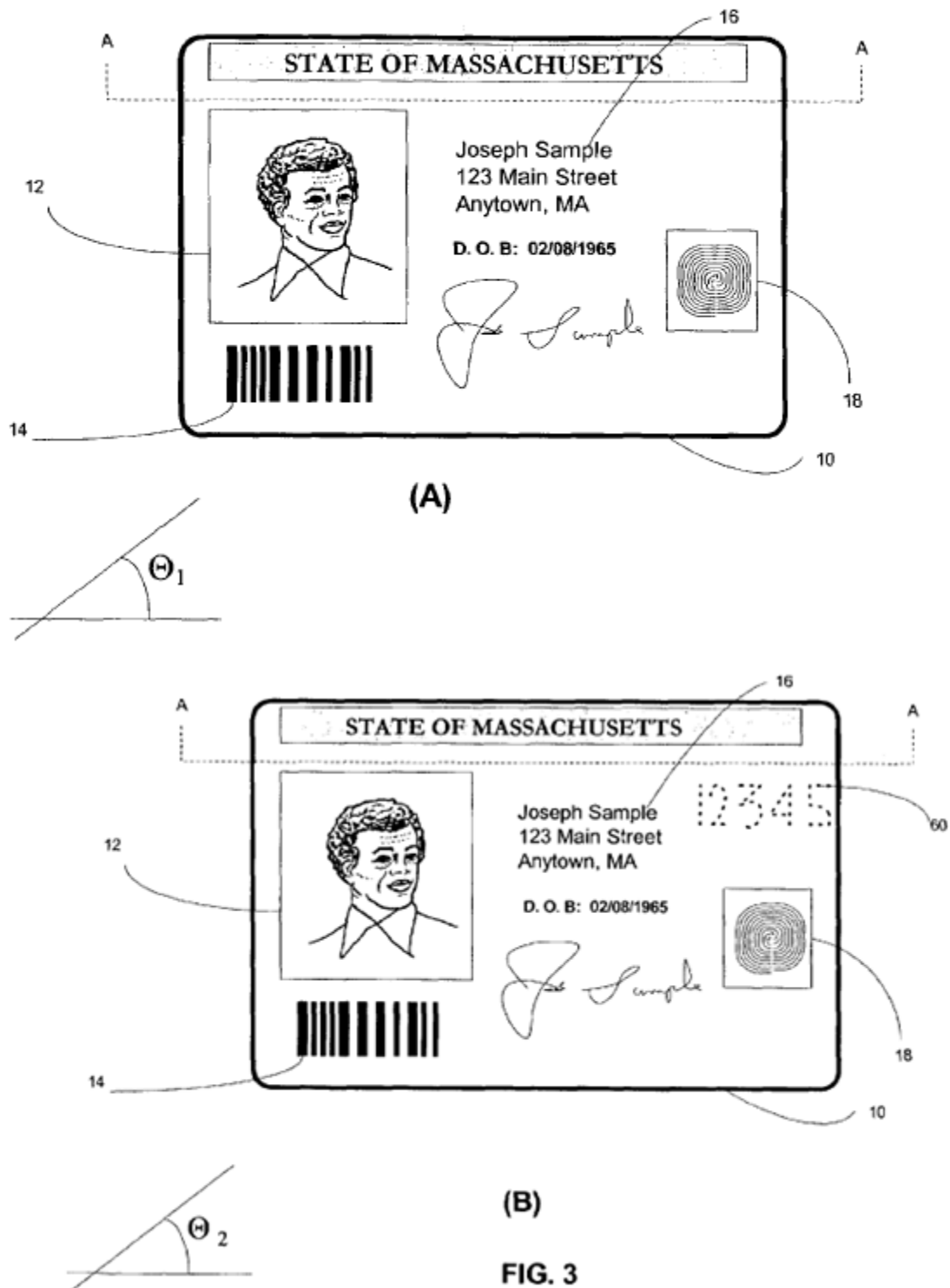
Id. at Fig. 1. Prior art ID document 10, depicted above, includes “photographic image 12, a bar code 14 (which may contain information specific to the person whose image appears in photographic image 12 and/or information that is the same from ID document to ID document), variable personal information 16, such as an address, signature, and/or birthdate, and biometric information 18” such as a fingerprint. *Id.* at 2:59–66. The ID document may also include “a magnetic stripe . . . and various security features, such as a security pattern.” *Id.* at 2:67–3:3.

As further background, the Specification states “printing techniques are not the only methods for printing information on . . . ID documents. Laser beams, for example can be used for marking, writing, bar coding, etching, and engraving many different types of materials, including

plastics.” *Id.* at 3:39–43. The Specification further states “[l]asers have been used, for example, to mark plastic materials to create indicia such as bar codes, date codes, part numbers, batch codes, and company logos. Lasers also have been used to engrave or etch very fine patterns into articles that are extremely difficult to replicate[.]” *Id.* at 3:43–48.

According to the Specification, using lasers “helps to provide unique personalized features In at least one embodiment, the effect produced by laser etching can be identified easily by a person by checking the card, often without special equipment, because the laser etching produces a visual effect and/or a tactile effect.” *Id.* at 6:64–7.3. The ’152 patent adds that “the laser removes material from the surface of the card and may (optionally) create a pattern that can be felt by touch.” *Id.* at 7:12–14. According to the ’752 patent, this tactile property may be used to further verify the authenticity of the card.” *Id.* at 7:14–15. In another embodiment “laser etching can produce a security feature having an optically variable (OV) quality . . . so that it cannot be easily seen when viewed straight on” but “becomes very apparent in reflected light because the laser etching creates reflecting surfaces that are not parallel to the surface” of the ID card. *Id.* at 7:3–12. According to the Specification the OV feature “has the added benefit of not allowing it to be photocopied.” *Id.* at 7:7–8.

Figures 3A–B of the '152 patent are reproduced below:



Ex. 1001, Figs. 3A–B. Figure 3A is a view of identification document 10 “where a viewer is looking directly at the identification document 10,” and Figure 3B is a view “as the document is rotated to an angle of about 45 to 85 degrees as compared to the view of the image in Fig. 3A.” *Id.* at 7:16–23. Notably, security feature 60 is depicted as being visible in Figure 3B (when identification document 10 is viewed at an angle), and not visible in Figure 3A (when identification document 10 is viewed directly). *Id.*; *see also id.* Figs. 3A–3B. The Specification discloses “[t]o make the laser etched security feature [60], the ID document 10 . . . is subjected to an ablative laser, such as a solid state CO₂ laser, that etches a pattern (e.g., security feature) onto its surface. Of course, other lasers may be suitabl[y] employed for such etching.”⁹ *Id.* at 7:26–32.

⁹ The ’152 patent Specification erroneously refers to security feature 60 as security feature 70. *Compare* Ex. 1001, 7:26–30, with *id.* at 7:32–33.

Figures 6A–C of the '152 patent, reproduced below, also are illustrative.

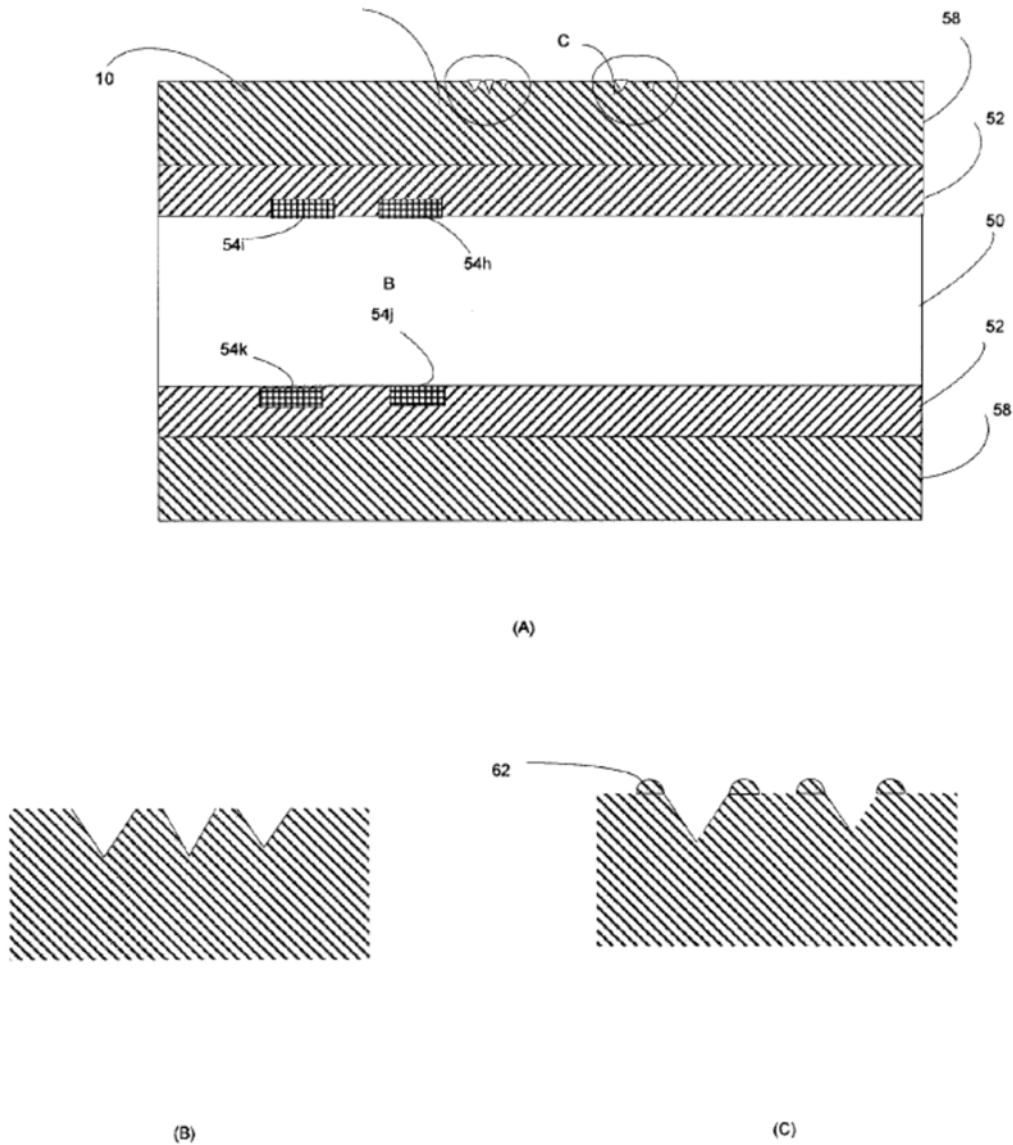


FIG. 6

Ex. 1001, Fig. 6. Figure 6A depicts a cross-section of identification document 10 that includes an exemplary pattern of engraving. *Id.* at 7:40–

42. Identification document 10 includes layer 52 disposed between an overlamine layer 58 and core layer 50. *Id.* at 7:42–44. Information 54*h–l* is formed in layer 52, and “can be formed by any known means, including, many different types of conventional printing and also laser marking.” *Id.* at 7:42–46. The Specification states “[a]s those skilled in the art will appreciate, the laser can be focused at a specific setting to produce holes of a predetermined diameter, depth, and spacing. This etching process creates a pattern that can be tactile or non-tactile, but is not readily visible when seen straight on (e.g., the pattern is visible only in low angle reflected light).” *Id.* at 7:47–52.

Figure 6B, which is an enlarged view of section B of Figure 6A, depicts a non-tactile pattern. *Id.* at 7:52–54, Fig. 6B. Figure 6C, which is an enlarged view of section C of Figure 6A, depicts “a tactile and/or non-OVD pattern” created “by adjusting the hole depth and area location of the laser engraving.” *Id.* at 7:55–57. The tactile pattern depicted in Figure 6C has raised edges 62. *Id.* at 7:58–59, Fig. 6C.

C. Related Cases

Petitioner identifies the following proceedings involving the ’152 patent: *MorphoTrust USA, LLC v. United States of America*, No. 1-16-CV-00227 (Ct. Cl.) (filed Feb. 16, 2016); *MorphoTrust USA, LLC v. CBN Secure Techs, Inc.*, No. 1-16-cv-00323 (E.D.V.A.) (filed Mar. 23, 2016). Pet. 72; *see also* Paper 8 (Patent Owner’s Updated Mandatory Notice Pursuant to 37 C.F.R. § 42.8). Also, contemporaneous with the filing of the Petition in this proceeding, Petitioner has filed petitions for *inter partes*

review of patents related to the '152 patent in IPR2017-001938, IPR2017-001939, and IPR2017-001940. *Id.*; Paper 8, 2.

D. Claims of the '152 Patent

Of the challenged claims, claims 1, 7–9, and 12 are independent, and claims 2, 4–6 and 10–11 depend either from claim 1 or 9. Claims 1, 3, 7–9, and 12, emphasized to highlight various features, follow:

1. An article comprising an outer top layer and at least one interior layer, the article conveying one or more of invariant and personalized information,

wherein at least some of the one or more of invariant personalized information is defined by voids that extend to, but not through, the laminate layer,

said voids providing a feature that can be felt by touch;

and,

wherein the article is one or more of:

an identification document, a credit card, a phone card, a prepaid card, a smart card, a contact card, a contactless card, a RFID card, an electronic component, a package, a container, a recording media, a label, a tool, a medical device, a consumer product, a toy product, and a tag.

3. The article of claim 2 and wherein the laser-ablating forms *a raised feature extending above a top surface of the outer top layer surrounding the voids and provides a tactile effect.*

7. An article comprising at least one interior layer and a laminate layer above the interior layer, an outer surface of the laminate layer defining a top surface of the article, the article conveying one or more of invariant and personalized information,

wherein at least some of the information is defined by laser-ablated voids that extend through the top surface of the article,

and wherein at least some of said voids are defined by

sidewalls that are angled obliquely, rather than perpendicularly, relative to said top surface;

wherein the article is one or more of:

an identification document, a credit card, a phone card, a prepaid card, a smart card, a contact card, a contactless card, a RFID card, an electronic component, a package, a container, a recording media, a label, a tool, a medical device, a consumer product, a toy product, and a tag;

and, wherein *said voids define a feature that can be felt by touch.*

8. A method of manufacturing an article concerning information about a person, comprising:

printing information on an article core;

applying a laminate layer atop the printed article core; and

and *laser-ablating the laminate layer to impart a tactile feature thereto, without ablating the document core,*

said tactile feature containing the information concerning said person;

and, wherein the article is one or more of an identification document, a credit card, a phone card, a prepaid card, a smart card, a contact card, a contactless card, a RFID card, an electronic component, a package, a container, a recording media, a label, a tool, a medical device, a consumer product, a toy product, and a tag.

9. An article comprising at least one layer of material, the top surface of the article including a laser-formed void pattern creating an indicia,

the article characterized by raised features that are also laser-formed,

said raised featured comprising foamed material,

the raised features extending above a nominal top surface level of the article to provide a tactile effect that aids in verifying the authenticity of the article;

and, wherein the article is one or more of: an identification document, a credit card, a phone card, a prepaid card, a smart

card, a contact card, a contactless card, a RFID card, an electronic component, a package, a container, a recording media, a label, a tool, a medical device, a consumer product, a toy product, and a tag.

12. An article comprising a core layer and at least one outer laminate layer

wherein the top surface of the outer laminate layer is laser-ablated to form a pattern, *the pattern being substantially non visible when viewed straight on, wherein the pattern provides a feature that can be felt by touch*;

and wherein the laser-ablating is performed by laser etching at an angle other than approximately 90 degrees to the top surface of the outer laminate layer;

and, wherein the article is one or more of:

an identification document, a credit card, a phone card, a prepaid card, a smart card, a contact card, a contactless card, a RFID card, an electronic component, a package, a container, a recording media, a label, a tool, a medical device, a consumer product, a toy product, and a tag.

Ex. 1001, 11:2–14, 11:16–19; 11:26–12:24, 12:29–41 (emphasis added).

E. Asserted Grounds of Unpatentability

Petitioner asserts the following combinations would have rendered the challenged claims obvious under 35 U.S.C. § 103 (Pet. 4–5):

Claim 1 as obvious over the combination of Maurer and Bernecker;

Claims 2–4, 7, and 8 as obvious over the combination of Maurer, Bernecker, and Fry;

Claims 5 and 6 as obvious over the combination of Maurer, Bernecker, and Gunn;

Claim 9 as obvious over the combination of Maurer and Fry;

Claims 10 and 11 over the combination of Maurer, Fry, and Gunn;

and

Claim 12 as obvious over the combination of Maurer, Bernecker, Fry, and Ross.

To support its showing, Petitioner relies on the Declaration of Emmanouil M. Tentzeris, Ph.D., Ex. 1002 (“the Tentzeris Declaration”), and the Reply Declaration of Dr. Tentzeris, Ex. 1017 (“the Reply Tentzeris Declaration”).

II. ANALYSIS

A. Claim Construction

In an *inter partes* review filed before November 13, 2018, claim terms in an unexpired patent are given their broadest reasonable construction in light of the specification of the patent. 37 C.F.R. § 42.100(b).¹⁰ Consistent with this standard, we assign claim terms their ordinary and customary meaning, as would be understood by one of ordinary skill in the art at the time of the invention, in the context of the entire patent disclosure. *See In re Translogic Tech., Inc.*, 504 F.3d 1249, 1257 (Fed. Cir. 2007). Only those terms that are in controversy need be construed, and only to the extent necessary to resolve the controversy. *See Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017) (citing *Vivid Techs., Inc. v. Am. Sci. & Eng’g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999)).

¹⁰ 77 Fed. Reg. 48727 (Aug. 14, 2012) (codified at 37 C.F.R. § 42.100(b)), as amended at 81 Fed. Reg. 18766 (Apr. 1, 2016); *see also* 83 Fed. Reg. 51340 (Oct. 11, 2018) (changing the standard for interpreting claims in *inter partes* reviews filed on or after November 13, 2018).

For purposes of this proceeding, Petitioner applies the broadest reasonable construction standard, and interprets all terms of the challenged claims “in accordance with their plain and ordinary meaning.” Pet. 7.¹¹ Patent Owner proposes we construe the terms “tactile feature,” “tactile effect,” and “felt by touch,” to mean “feature/effect that can be easily perceived by touch by most human beings with ordinary sensory/tactile capabilities.” PO Resp. 9–10. However, no dispute arises regarding the interpretation of these terms. Accordingly, we determine that we need not construe these terms.

Furthermore, we determine no other claim terms need be addressed or construed expressly. *See Nidec Motor Corp.*, 868 F.3d at 1017.

B. Level of Ordinary Skill in the Art

Petitioner, citing the testimony of its declarant, Dr. Tentzeris, asserts that a person having ordinary skill in the art of the alleged invention “would have held *at least* a bachelor’s degree in engineering or physics and at least one year of relevant work experience in either laser processing or security features for identity documents.” Pet. 8 (citing Ex. 1002 ¶¶ 31–34) (emphasis added). Petitioner also asserts that “[t]his is the level of ordinary skill offered by” Patent Owner’s expert (Henry Dreifus) in the Federal Court of Claims related matter. *Id.* at 8–9 (citing Ex. 1010, 7). In the cited exhibit, Mr. Dreifus states that a person of ordinary skill in the art “would have had a Bachelor’s degree in engineering or physics and at least one year of relevant

¹¹ Petitioner proposes a construction for a term in claim 4, but as we discussed above, *supra* Section I.A, claim 4 was subsequently removed from the Petition.

work experience in either one of the fields of laser processing or security features for identity documents.” Ex. 1010 ¶ 23.

In its Preliminary Response, Patent Owner did not address Petitioner’s contention regarding the level of ordinary skill. However, Patent Owner’s declarant, Darran R. Cairns, Ph.D., opined that a person of ordinary skill in the art “would have had a Bachelor’s degree in engineering or physics and at least one year of relevant work experience in either one of the fields of laser processing or security features for identity documents.” Ex. 2001 ¶ 19.

In the Institution Decision, we noted that Petitioner’s addition of “at least” to the educational background constitutes the only difference between Petitioner’s and Dr. Cairns’s proposals. Inst. Dec. 18. As noted above, however, Petitioner also asserts that its proposal tracks Patent Owner’s proposal in the Federal Court of Claims litigation, which did not include the qualifier “at least” for the educational background. The parties do not argue that any issue in the case turns on such a difference. In the Institution Decision, we determined based on the record at that time, that the challenged patent and the asserted prior art reveal a level of ordinary skill in the art that supports Petitioner’s proposal without the “at least” qualifier for the educational background. *Id.*

In the Response, Patent Owner agreed with our initial assessment of the level of ordinary skill in the art. PO Resp. 28.

Based on the full record, our assessment has not changed since our Institution Decision, and we apply Petitioner’s proposal without the “at least” qualifier for educational background.

C. Obviousness Grounds of Unpatentability

As indicated above, Petitioner asserts claims 1–3 and 5–12 would have been obvious over Maurer in combination with various additional prior art references. Pet. 4–5.

1. Overview of Asserted Prior Art References

a. Maurer (Ex. 1005)

Maurer discloses using a laser to create a “multi-layered identification card comprising a card core laminated between cover sheets with user information appearing in the card inlet.” Ex. 1005, [57]. Maurer describes “an underlying, basic need” to protect identification cards “as far as conceivably possible from being forged and/or counterfeited in entirety.” *Id.* at 1:13–16. Maurer explains that a “polylaminated identification card has proved to be valuable” in combating forgery (*id.* at 2:10–11), and that using a laser to mark a core of a laminated card “protect[s] it from manipulation or tampering to a far greater extent than with unlaminated card cores, should they fall into the wrong hands” (*id.* at 4:19–24).

Maurer discloses “inscrib[ing] individual features, in particular personal data, in the interior of [the] card after lamination of the card blank.” *Id.* at 4:5–7. Scoring the core also etches the outer lamination layer to create “a relief-type structure on the cover sheet”: “At the same time as the information is provided on the core of the card by means of the laser beam, it is possible to concurrently mark the cover sheet which is then accessible to manual inspection by virtue of the resultant, permanent relief-type structure *on the cover sheet.*” *Id.* at 4:25–30 (emphasis added). Maurer explains that by controlling the energy of the laser beam to engrave a security feature, it

“can . . . be felt manually.” *Id.* at 6:14–23; *id.* at 9:8–11 (claim 3 reciting “[a] multilayer identification card according to claim 1 in which the information on said transparent cover sheet is in relief and can be sensed by touch”) (emphasis added).

Figures 1 and 2 of Maurer appear below:

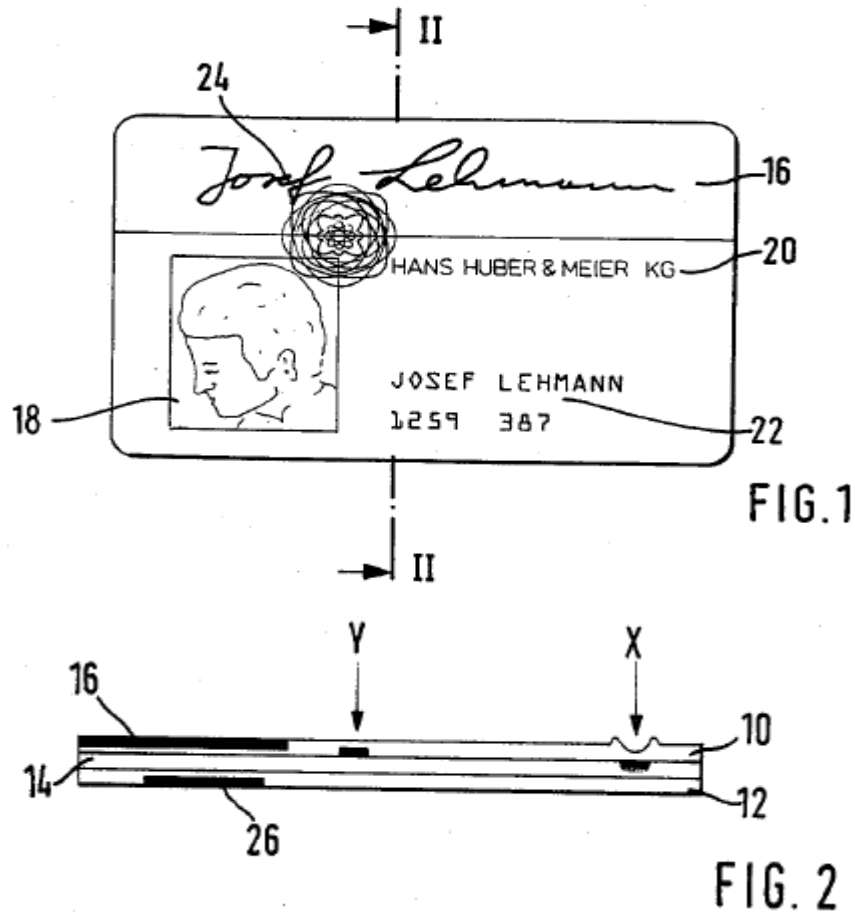


Figure 2 represents a cross-section of the security card depicted in Figure 1, and shows an example of a tactile security feature at area X on transparent cover 10. *See id.* at 6:18–23 (“Depending on the energy quantum of this laser beam, the upper cover sheet 10 can be melted concurrently in such a way that a relief is formed above the line of printed information, and in

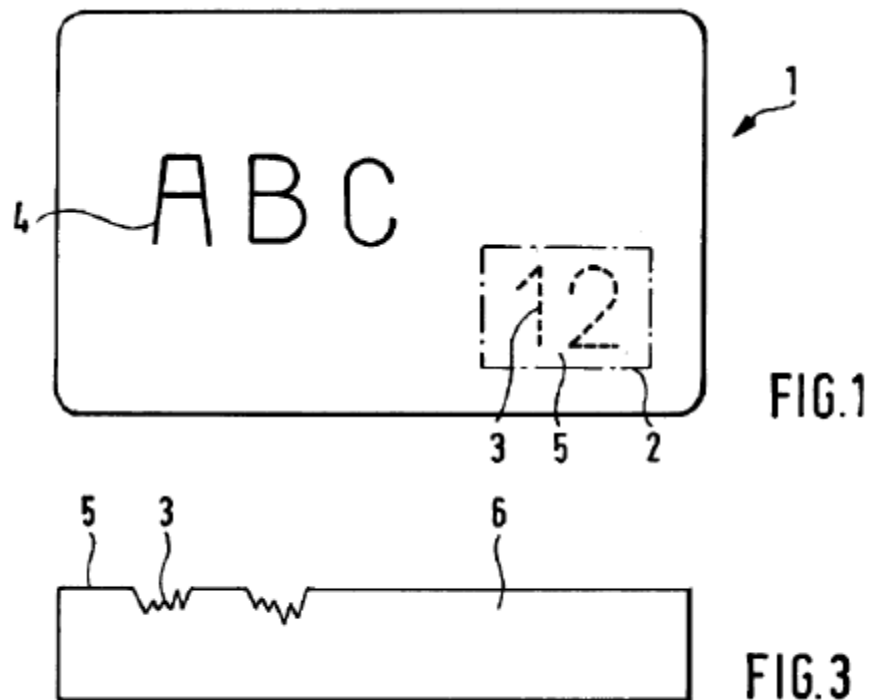
register therewith which can also be felt manually. An example is indicated by arrow X.”). The laser can cause the core to change colors (depending on the material coating the core) or to blacken/burn, thereby enhancing the ability to see the information and/or pattern (with some of the blackened information/pattern being in register with the tactile relief created by the laser melting through upper cover sheet 10). *See id.* at 6:14–36 (describing burning “alphanumeric indicia are printed on the card core 14” such as data strips 20 and 22 in register at X, and describing background pattern 24 as a different color from that of “burned-in indicia in the data strips 20 and 22”). Maurer notes that “the extent to which the core is burned [is] adjustable in a simple manner.” *Id.* at 4:38–42.

Maurer explains “[i]t is known in principle (German patent specification No. 1,499,422) to use the energy of laser beams to evaporate or even burn materials which absorb this energy.” *Id.* at 3:57–59. Maurer discloses “employing a number of different techniques” in order to safeguard cards (*id.* at 1:23–29), noting that using the multiple known techniques enhances security in part because “the amount of time and energy expended in counterfeiting or forging the document exceeds by far the gains which can be expected” (*id.* at 1:42–49). Maurer also discloses “other features not shown here may also be provided by means of the laser beam without departing from the scope of the invention.” *Id.* at 7:1–3. On the other hand, Maurer discloses that “the identification card does not have to contain all of the information and features mentioned.” *Id.* at 8:47–49.

b. Overview of Bernecker (Ex. 1006)

Bernecker discloses providing laser-produced credit cards, ID cards, and other cards with “an authenticity feature that is neither manipulable nor copiable” and “stand[s] out clearly only when viewed at the glancing angle.” Ex. 1006, 2:9–22.

Bernecker’s Figures 1 and 3 follow:



Figures 1 and 3 represent card embodiments having information areas 3 “which show readable information or a pattern or the like” with “diffusely light-scattering properties which make it possible to recognize the information clearly at a certain viewing angle.” *Id.* at 4:40–49. Figure 1 also represents a display of “usual information 4” in “color contrast” with its background. *See id.* at 4:40–41.

With respect to laser-notched information areas including area 3, Bernecker generally states “the material in the radiation-exposed areas is melted and partly decomposed, giving rise to notches without color changes of the plastic.” *Id.* at 4:8–10. Bernecker refers to “evaporated” “plastic material” to create “depressions . . . in the form of readable information.” *Id.* at 3:15–17. Bernecker also explains that a notched area, viewable at glancing areas, “offers a simple possibility for designing data to be very inconspicuous” as a “protection against forgery,” and “in any case readily recognizable at the glancing angle.” *Id.* at 4:20–28. Bernecker also describes its invention as “a method for producing . . . an authenticity feature that is neither manipulable nor copiable and can be produced simply and cost effectively on the finished product.” *Id.* at 2:10–13. Bernecker explains the “optical scattering behavior” of the notches “cannot be recognized with the illuminating methods customarily used in reproduction devices.” *Id.* at 3:9–11.

Bernecker also indicates the laser-notched area can be colored or discolored. For example, Bernecker describes creating “notches without color changes of the plastic.” *Id.* at 4:9–10. Bernecker states this notched “information . . . without color contrast is added to” other data “already inscribed in color contrast by a laser.” *Id.* at 3:49–58. Color contrast information may include “photo, name, signature, etc.” *See id.* at 3:52–57. Bernecker notes “[u]sing a power-controllable laser it is therefore possible to produce halftone images.” *Id.* at 4:3–4. By shifting the focus of the laser beam to the surface, this “give[s] rises to notches without color changes of the plastic.” *Id.* at 4:9–10. Bernecker indicates it can create surface notches

with or without color changes: “Alternatively, the material can also be melted in the surface area without any discoloration of the material occurring.” *Id.* at 5:9–10 (describing Figure 3).

Bernecker further states “[i]t is known from the field of contrasting laser inscription that discoloration occurs only as of a certain laser power, becomes stronger as the laser power increases further, and finally leads to complete burning of the material.” *Id.* at 3:66–4:3. Bernecker adds that controlled power and focus creates halftone images and focusing the laser on the “surface area of the material” produces colorless notches in the plastic. *Id.* at 3:66–4:10. Bernecker further notes its invention builds on prior art anti-forgery efforts “developed exclusively from the point of view of producing clearly readable information contrasting with its surroundings in the form of discolorations of the material.” *See id.* at 2:33–34. Bernecker states its cards “can of course also have further security features.” *Id.* at 4:50–51

c. Overview of Fry (Ex. 1007)

Fry teaches “[a] process for grooving thermoplastic sheet[s] with a laser beam.” Ex. 1007, 1:69–70. Fry states “[w]hen a groove or score is accomplished successfully, a bead is formed on both edges of the groove. The appearance of the groove is generally neat and regular, when accompanied by the bead.” *Id.* at 3:60–63.

Figure 2 of Fry follows:

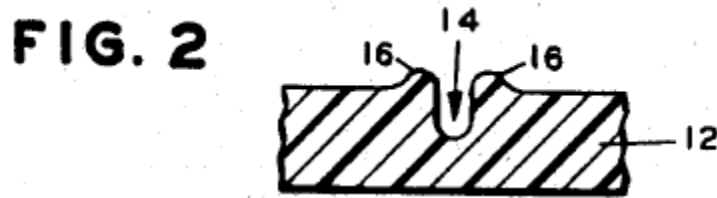


Figure 2 above shows bead 16 formed adjacent groove 14 produced by a laser in plastic substrate 12. *See id.* at 2:69–75. Fry explains “[f]airly large bubbles result in [the] process [of forming the groove], and microscopic examination reveals that the bubbles are formed only on the film side facing the [laser] beam.” *Id.* at 4:30–32. Fry generally explains “the energy density in the laser beam must be such that the plastic is evaporated or decomposed” (*id.* at 4:7–14), but the groove 14 “has a neat and clean surface, remaining unscorched after the scoring process has ended” (*id.* at 2:73–75). Fry also describes “the plastic material [a]s molten.” *Id.* at 4:23–25.

Bubbles released during the process form part of beads 16. *See id.* at 3:63–65. Fry explains “[i]n polyethylene, bubble formation occurs before the formation of the groove and not thereafter.” *Id.* at 4:52–53. Fry also explains “it is apparent that the groove is formed from the bubbles” (*id.* at 4:33–34), and states “[m]icroscopic examination of the grooves . . . reveals the presence of small bubbles in the beads formed on the sides of the grooves” (*id.* at 3:63–65).

Fry discloses two possibilities for bubble formation: 1) “the release of entrained gases or water vapor from the plastics in the molten region, with

the bubbles forming due to pressure buildup or release of these gases,” or 2) “the internal temperature of the plastics may exceed the point at which the material degrades, and thereby result in the formation of small gaseous molecules.” *Id.* at 4:41–47.

d. Overview of Gunn (Ex. 1008)

Gunn generally discloses identification documents that include a core layer sandwiched between two transparent polymer layers. Ex. 1008, [57]. Similar to the ’494 patent (*supra* Section I.A), Gunn explains that such identification documents, including driving licenses, credit cards, bank cards, and other cards, bear important information including “name, address, birth date, signature[,] and photographic image,” and also including other “variant” data (e.g., employee number) and “invariant” data with respect to a large number of cards (e.g., employer name). *Id.* at 1:10–22.¹²

Gunn discloses bar codes, explaining “the identification [data] of the bearer are often covertly repeated on the document in encrypted form for data verification in a magnetic stripe, bar code, radio frequency module[,] or integrated circuit chip.” *Id.* at 2:4–8. Gunn adds “it is often convenient to provide one or more first indicia intended for human reading of the core layer [front] surface . . . and one or more additional first indicia intended for

¹² The ’152 patent states the “present technology is also related to” several applications and Gunn, all of which the ’152 patent incorporates by reference. *See* Ex. 1001, 2:10–15. No dispute exists over whether Gunn, which issued May 23, 2000, constitutes prior art to the ’152 patent (which would have an earliest possible effective filing date of December 24, 2001, based on continuity to a provisional application). *See id.* at [60].

machine reading (e.g., bar codes) on the opposed ‘back’ surface of the core layer.” *Id.* at 3:19–25.

e. Overview of Ross (Ex. 1012)

Ross generally discloses “the application and uses of coatings including precious metals, metallic, inks, toners, and the like applied to an original base, intermediate or final surface for numerous purposes including identification documents, as a deterrent to counterfeiting.” Ex. 1012, 1:7–11. Ross discloses “[i]t is particularly beneficial when a coating has an end point or a transitional point between two separate coatings.” *Id.* at 1:21–22. One of the objects of Ross is “being able to control the location and limit [e.g., edge perimeter] of one or more types or combinations of coatings on one or more bases or coatings on or in other surfaces or materials.” *Id.* at 4:62–66. According to Ross, “[a] laser is useful to deliberately modify a previously edge aligned layer of coatings for identification purposes, by maneuvering the laser at a variety of angles to create distinctive patterns in conjunction with selective coating orientations.” *Id.* at 35:15–19. Ross discloses “[t]he use of laser or other radiation is often desirable, because it can be precisely programmed to change both angle intensity, speed of movement over the surface, and other factors to provide a difficult if not possible to replicate pattern, unless the user knows the original control software for the laser.” *Id.* at 35:19–24.

2. Discussion

a. Introduction

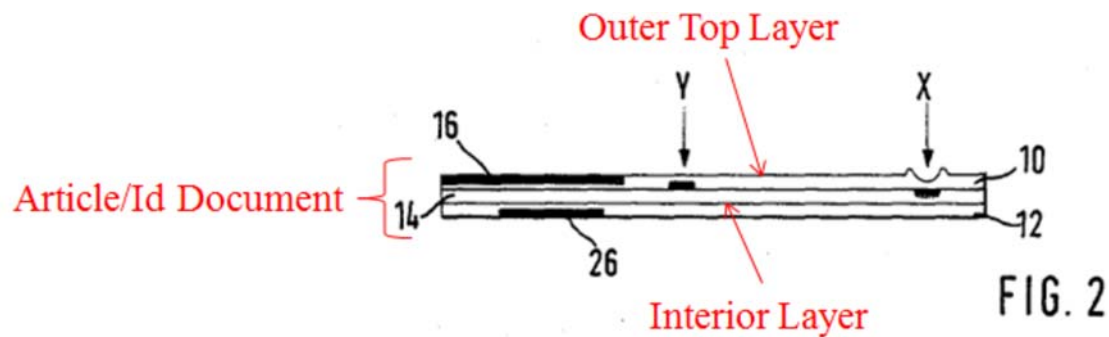
Independent claims 1, 7, 9 and 12 are directed to an article, and independent claim 8 is directed to a method of manufacturing an article. Ex.

1001, 11:1–13; 11:26–12:24, 12:29–41. In particular, the article of claims 1, 7–9, and 12 is “one or more of: *an identification document*, a credit card, a phone card, a prepaid card, a smart card, a contact card, a contactless card, a RFID card, an electronic component, a package, a container, a recording media, a label, a tool, a medical device, a consumer product, a toy product, and a tag.” *Id.* at 11:8–13, 11:34–40; 12:6–11; 12:19–24; 12:36–41 (emphasis added). We are persuaded that Maurer’s multi-layered identification card discloses an “article” because the claims recite than an “article” includes “an identification document.” Pet. 20, 24, 30, 35, 36, 43, 48, 52, 65, 72; Ex. 1002 ¶ 74 (“*Maurer* further explained that ‘the term identification card is understood to include all cards of similar structure such as ‘identity cards, *credit cards*, check cards, membership cards, passports and similar documents.[’]”). Patent Owner does not dispute that Maurer’s multi-layered identification card discloses an “article” as recited in claims 1, 7–9, and 12.

The claims recite that the article comprises various layer[s] (e.g., “an outer top layer and at least one interior layer,” claim 1; “at least one interior layer and a laminate layer above the interior layer,” claim 7; “printing information on an article core” and “applying a laminate layer atop the printed article core,” claim 8; “at least one layer of material,” claim 9; “a core layer and at least one outer laminate layer,” claim 12).

We are persuaded that Maurer discloses an article comprising the various recited layer[s] because Maurer’s multi-layered identification card includes a core layer between two cover sheet layers. Pet. 20, 30–31, 36–38, 48–49, 65. Petitioner provides annotated versions of Figure 2 of Maurer to

identify which layer[s] of Maurer's identification card Petitioner maps to the various layer[s] recited in claims 1, 7–9, and 12. *Id.* By way of example, with regard to Petitioner's analysis for claim 1, Petitioner's annotated Figure 2 of Maurer is reproduced below:



Pet. 20 (reproducing Ex. 1005, Fig. 2 (Petitioner's annotations in red)). Annotated Figure 2 depicts an identification card, which according to Maurer comprises core layer 14 and cover sheets 10 and 12. *Id.*; *see also* Ex. 1005, 5:38–41; Fig. 2. Depicted in the annotated figure, Petitioner identifies upper cover sheet 10 as satisfying claim 1's recitation of "an outer top layer," and core layer 14 as satisfying claim 1's recitation of "at least one interior layer." Pet. 20. Petitioner similarly provides annotated versions of Maurer's Figure 2 for its analysis for claims 7–9 and 12, and identifies which layer in Maurer it contends satisfies each layer recited in these claims. *Id.* at 30–31, 36–38, 48–49, 65. For claim 7, Petitioner identifies Maurer's core layer 14 and cover sheet 10 as an "interior layer" and "laminate layer above the interior layer," respectively. *Id.* at 30. For claim 8, Petitioner identifies Maurer's core layer 14 as an "article core," and Maurer's cover sheet 10 as "a laminate layer atop the printed article core." *Id.* at 37–38. For claim 9, Petitioner identifies core layer 14 and cover layers 10 and 12 of

Maurer as each disclosing “at least one layer of material.” *Id.* 48. For claim 12, Petitioner identifies Maurer’s core layer 14 and cover layers 10 and 12 as “a core layer” and “at least one outer laminate layer,” respectively. *Id.* at 65.

Patent Owner does not dispute that Maurer’s multi-layered identification card discloses the various layer[s] as recited in claims 1, 7–9, and 12.

Petitioner also relies on Maurer for the requirement that the article “convey[] one or more of invariant and personalized information,” as recited in claims 1 and 7. We are persuaded that Maurer’s identification card conveys “invariant information,” because Maurer discloses data area 20 on the card that includes “the name of the issuing authority” of the card, i.e., information that does not vary from card-to-card and therefore is invariant. Pet. 20 (citing Ex. 1005, 5:54–57). We are furthermore persuaded that Maurer’s identification card conveys “personalized information,” because Maurer discloses that the identification cards “also include as a rule variable information such as the personal particulars of the card owner, his photograph and other data specific to his person.” *Id.* at 20–21 (citing Ex. 1005, 1:55–59). Based on the foregoing, we are persuaded that Maurer discloses conveying one or more of invariant and personalized information as recited in claims 1 and 7. Patent Owner does not dispute this.

Upon review of the record, we are persuaded that Maurer discloses the subject matter discussed in this subsection. We turn now to the remaining limitations of claims the challenged claims.

We note first, however, that Maurer is relied upon for most of the subject matter recited in the challenged claims. Petitioner introduces Bernecker for its disclosure of *colorless* engravings, *see, e.g.*, Pet. 33, and for creating a security feature that is optically visible only at certain viewing angles as recited in claim 12, *see, e.g., id.* at 66. Petitioner introduces Fry for its disclosure of evaporation techniques to score, or *ablate*, thermoplastic as recited in claims 2, 3, 7, 8, and 12, *see, e.g., id.* at 27, 29, 34, 39, 40, 50, 67, and for creating *raised* features that comprise *foamed* material and produce a *tactile* effect as recited in claims 3 and 9, *see, e.g., id.* at 28, 50–51, 68. Petitioner introduces Gunn for its disclosure of implementing the laminate layer of a card using *polycarbonate* as recited in claims 5 and 10, *see, e.g., id.* at 43–45, 52–54, and for its disclosure of including a *semi-conductor device* in a card as recited in claims 6 and 11, *see, e.g., id.* at 45–46, 55–56. Petitioner introduces Ross for achieving laser etching an *angle other than approximately 90 degrees* as recited in claim 12. *See, e.g., id.* at 64.

b. Claim 1—Obviousness over Maurer and Bernecker

Petitioner asserts that claim 1 is unpatentable under § 103 over Maurer and Bernecker. Pet. 4. Petitioner identifies where it contends the prior art discloses each recitation of claim 1. *Id.* at 20–24. Although the ground is based on the combination of Maurer and Bernecker, Petitioner argues that Maurer discloses every recitation of claim 1. *Id.* Patent Owner does not dispute that Maurer discloses each recitation of claim 1. *See generally* PO Resp. 30–49. Rather, Patent Owner argues generally that Petitioner has failed to show a reason to combine Maurer with Bernecker,

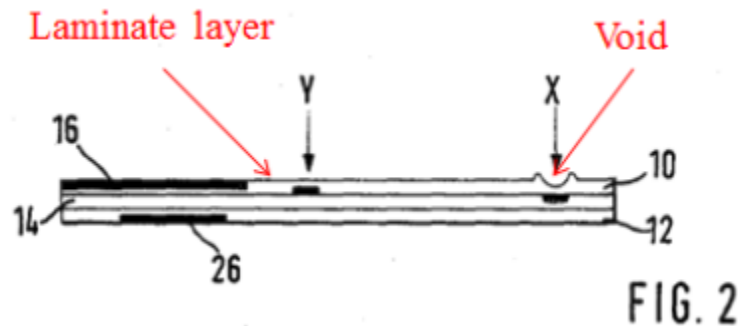
without identifying any particular claim limitation that is missing from Maurer. *See generally id.*

- i. *“An article comprising an outer top layer and at least one interior layer, the article conveying one or more of invariant and personalized information”*

For reasons discussed above, *supra* Sec. II.C.2.a, Petitioner has shown persuasively, and Patent Owner does not dispute, that Maurer’s multi-layered identification card discloses “an article comprising an outer top layer and at least one interior layer, the article conveying one or more of invariant and personalized information,” as recited in claim 1. Pet. 20–21.

- ii. *“wherein at least some of the one or more invariant information and personalized information is defined by voids that extend into, but not through, the laminate layer, said voids providing a feature that can be felt by touch”*

Claim 1 recites “wherein at least some of the one or more invariant information and personalized information is defined by voids that extend into, but not through, the laminate layer, said voids providing a feature that can be felt by touch.” Ex. 1001, 11:4–8. For disclosure of voids that extend into, but not through, a laminate layer, Petitioner persuasively argues that Maurer’s relief-type structure, as depicted in Figure 2 of Maurer as having a depressed region, discloses a void.



Ex. 1005, Fig. 2 (with Petitioner's annotations, Pet. 22). Figure 2 shows a cross-section of a multi-layered identification card, including core layer 14 between coversheets 10 and 12, and arrow X indicating a relief-type structure. *Id.* at 5:38–41, 6:18–22. We find persuasive Petitioner's argument that the depressed region of the relief-type structure indicated by arrow X in Figure 2 shows a void that extends into but not through cover sheet 10, i.e., the asserted laminate layer, because the depressed region does not extend into core layer 14. Pet. 22. We find persuasive Petitioner's argument that the voids provide a feature that can be felt by touch, as recited in claim 1, based on Maurer's disclosure that the relief-type structure “can also be *felt manually*.” Pet. 23 (quoting Ex. 1005, 6:18–23). Claim 3 of Maurer confirms that the relief can be felt by touch, disclosing that “the information on said transparent cover sheet is in relief and *can be sensed by touch*.” Ex. 1005, 9:9–11 (emphasis added). Patent Owner acknowledges that Maurer's relief-type structure provides “voids that extend into, but not through, the laminate layer, said voids providing a feature that can be felt by touch,” as recited in claim 1. PO Resp. 33 (arguing that the basic concept of Maurer was to melt cover sheet 10 to form a depression that can be felt manually).

For the recitation that the voids define “at least some of the one or more invariant information and personalized information” Petitioner relies on the combination of Maurer with Bernecker. Pet. 22–23. Petitioner persuasively argues that Maurer discloses personal information on an identification card, because Maurer discloses “‘inscrib[ing] individual features, in particular *personal data*, in the interior of said card after lamination of the card blank.’” *Id.* at 22 (quoting Ex. 1005, 4:3–7). Maurer explains that at the same time the information, e.g., personal data, is printed on the core of the card by means of a laser beam, the laser beam is also used to melt cover layer 10 to form a relief above, and in register with, the printed line. *Id.* (citing Ex. 1005, 4:25–30). We agree with Petitioner, therefore, that it would have been obvious that Maurer’s relief-type structure conveys at least some of the personalized and invariant information. *Id.* at 23; *see also id.* at 18 (“It would have been a straightforward and obvious design choice to use *Maurer’s* tactile relief structure to implement personalized information . . . *Maurer* also disclosed a tactile relief structure in the *transparent* laminate layer, formed in conjunction and ‘in register’ with visible information underneath”).

Petitioner provides further argument in view of the combination of Maurer and Bernecker. Pet. 22–23. In particular, Petitioner relies on Bernecker for its disclosure of providing personal data both in printed form and in the form of an engraving. *Id.* (citing Ex. 1006, 3:19–23 (“at least parts of the *personalization data* which are produced in the form of a color contrast and are thus easily readable are *provided on the document once again* in the form of a colorless laser engraving”) (emphasis added)).

According to Petitioner, this disclosure confirms that the use of engravings to provide personal information was well known. *Id.* at 23. As we discussed above, Maurer discloses that its relief-type structure conveys information that can be sensed by touch, *see, e.g.*, Ex. 1005, claim 3, and discloses conveying personal and invariant information on the card. Petitioner’s argument, therefore, is persuasive that skilled artisan would have found it obvious for Maurer’s relief-type structure to implement at least some of personalized and invariant information, and that Bernecker confirms this by expressly disclosing that microrelief that conveys personal information. *Id.* (citing Ex. 1002 ¶ 72).

Patent Owner does not dispute that Maurer discloses, teaches, or suggests that the information in Maurer’s relief-type structure includes at least some of personalized information and invariant information, as recited in claim 1. *See generally* PO Resp. 30–49 (arguing that Petitioner has not shown a motivation to combine Maurer with Bernecker, but not addressing whether a skilled artisan would have understood that Maurer’s relief-type structure conveys information); *see also* Reply 15 (“Nor does Indemia dispute that it would have been obvious to use *Maurer’s* relief to implement personalized information”). Even without Bernecker, Maurer discloses that the relief-type structure conveys information. For example, claim 3 of Maurer states that *the information* on the transparent cover sheet *is in relief* and can easily be sensed by touch. Ex. 1005, 9:9–11. Therefore, there is no dispute that Maurer’s relief-type structure conveys information. Moreover, as we discussed above, *supra* Sec. II.C.2.a, Maurer discloses conveying personal data and invariant information on an identification card, Pet. 20–21

(citing Ex. 1005, 5:54–57 (explaining that the identification card includes the name of an issuing authority (invariant information) and personal data)), and Dr. Tentzeris provides credible testimony that a skilled artisan would have understood that the information conveyed by printing is the same as the information conveyed in the relief because both are created concurrently with the same laser, Ex. 1002 ¶ 120. Petitioner’s reliance on Bernecker bolsters Petitioner’s argument that a skilled artisan would have understood Maurer’s relief-type structure to convey personal and/or invariant information. However, this reliance is not necessary, for reasons discussed above in this subsection, in light of Maurer’s express disclosure of information that is in relief and of conveying personal data and invariant information, as well as Maurer’s disclosure of creating the relief concurrently, and in register with, printed information. *Id.*

As we noted above, Patent Owner does not specifically address whether Maurer discloses, teaches, or suggests that the relief-type structure conveys at least some of one or more of personal information and invariant information. Rather, Patent Owner provides general arguments that Petitioner’s “Ground 1” based on the combination of Maurer and Bernecker should fail because there would not have been a motivation to combine these references. *Id.* at 30–49. Patent Owner argues the combination is based on three flawed interpretations by Petitioner of what these references disclose:

First, Maurer does not teach a *raised* tactile feature. Second, Maurer does not teach a *colorless* laser engraving technique or a *colorless* security feature. Finally, Bernecker does not teach forming colorless laser engraved features *in register with* contrasting features.

PO Resp. 32. Patent Owner explains the basis for its assertion that Maurer and Bernecker do not teach the above features. *Id.* at 30–49. However, the parties do not assert, nor do we find, any language in claim 1 that recites these features. Ex. 1001, 11:2–13.

Even though claim 1 does not require the features Patent Owner argues are lacking in Maurer and Bernecker, Patent Owner’s argument does not appear to be that claim 1 requires these features. *See generally* PO Resp. 30–49. Rather, Patent Owner’s position appears to be that because Petitioner’s motivation to combine is premised on the prior art having these features, Petitioner has failed to show a motivation to combine. *See generally id.* Such a general argument, however, fails to address the combinations, and their underlying motivations, made by Petitioner that are specific to particular claim limitations.

As we noted above, with regard to the requirement that voids define at least some of the one or more invariant information and personalized information, Petitioner relies on Bernecker for providing confirmation that colorless engraving (which results in grooving or voids) provides personal information. Pet. 22–23. Given that Maurer, alone, discloses a relief structure in the laminate layer of an identification card that conveys information, we find persuasive Petitioner’s argument that Bernecker, which like Maurer relates to providing security features on a multi-layer identification card, confirms that providing information in the form of scoring (engraving) in a laminate layer was well known in the art. *Id.* Given the limited nature of Petitioner’s reliance on Bernecker, *see, e.g.*, Reply 14 (explaining Bernecker is relied on to confirm that it was known for

engravings to define information), and Maurer’s disclosure and teachings discussed above, Patent Owner’s arguments regarding Maurer and Bernecker’s alleged failure to disclose the above-mentioned features do not undermine Petitioner’s showing. As Petitioner points out, Patent Owner advances arguments that appear to relate to claim 12, not to claim 1. *Id.* at 15. Patent Owner does not, however, address the motivation argued by Petitioner that is specific to claim 1. *Id.* at 14–15.

For the reasons discussed above, Petitioner has made a persuasive showing for this claim limitation, and Patent’s Owner’s arguments do not undermine Petitioner’s showing.

We address Patent Owner’s arguments in greater detail in our discussion of claim 12, *supra* Sec. II.C.2.g.ii, and for the reasons stated therein, we do not agree with Patent Owner’s arguments. For this additional reason, Patent Owner’s arguments do not undermine Petitioner’s showing for this claim limitation.

iii. “*wherein the article is one or more of: an identification document . . .*”

For reasons discussed above, *supra* Sec. II.C.2.a, Petitioner has shown persuasively, and Patent Owner does not dispute, that Maurer’s multi-layered identification card discloses “wherein the article is one or more of: an identification document,” as recited in claim 1. Pet. 24.

iv. *Summary*

Upon review of the record, for the reasons stated above, we determine that Petitioner has shown, by a preponderance of the evidence, that claim 1 of the ’152 patent is unpatentable under 35 U.S.C. § 103(a) over the combination of Maurer and Bernecker.

c. Claims 2, 3, 7, and 8—Obviousness over Maurer, Bernecker, and Fry

i. Claim 2

Claim 2 recites “[t]he article of claim 1 in which said voids are formed by laser-ablating the outer top layer of the article.” Ex. 1001, 11:14–15. As we noted above for claim 1, Petitioner relies on the depressions in Maurer’s relief-type structure for disclosure of voids. We are persuaded that the depression’s in Maurer’s relief-type structure are formed by laser-ablation because Maurer discloses that the relief-type structure is formed by melting cover sheet 10 with a laser. Pet. 26 (Ex. 1005, 6:18–23). As Dr. Tentzeris explains, a skilled artisan would have understood that the resulting groove is formed using a laser ablation process because the process removes material from the cover, or laminate, sheet. *Id.* at 26–27 (citing Ex. 1002 ¶ 83). We credit Dr. Tentzeris’s testimony because it is supported by evidence upon which he relies, namely that Fry explains that scoring or grooving plastic (e.g., forming depressions) results from removing material (laser-ablation). Ex. 1003 ¶ 84.

Even though Petitioner argues that Maurer’s process discloses laser-ablation, Pet. 26–27 (“Maurer disclosed a laser process in the form of laser ablation”), Petitioner provides additional argument based on Fry, namely that Fry confirms that a scoring or grooving process results from laser ablation, Pet. 27. According to Petitioner

Fry confirms that the scoring or grooving process results from laser ablation (removes material) and further disclosed particular implementation details. *Fry* described the detailed process of grooving or scoring thermoplastic, which “*degrade[s] or melt[s] the thermoplastic.*” Ex.

1007, 1:69–72. *Fry* explained that plastic may undergo decomposition, which “completely vaporize[s] the regions upon which the [laser] beam impinges.” *Id.* 1:31–44. *Fry* explained that in grooving or scoring thermoplastic, “the energy density in the laser beam must be such that *the plastic is evaporated or decomposed* while the relative motion between the beam and the sample is of the velocity whereby the groove does not extend entirely through the depth of the material.” *Id.* 4:6–12. A POSITA would have understood vaporizing or evaporating plastic with a laser to be within the scope of laser ablation. Ex. 1002, ¶84. *Fry*’s Fig. 2 shows its groove is likewise a void.

Id. We are persuaded that a skilled artisan would have been motivated to apply known techniques for scoring and grooving thermoplastic, such as those disclosed in *Fry*, to create Maurer’s security feature, and would have understood that using such techniques would have resulted in voids formed by laser-ablation. *Id.* at 28.

Patent Owner does not dispute that Maurer discloses laser-ablation. *See generally* PO Resp. 49–52 (arguing Petitioner’s ground 2 which includes Petitioner’s challenge of claim 2). Rather, Patent Owner argues that Petitioner has not shown motivation to combine Maurer and *Fry*. *Id.* at 49. According to Patent Owner, *Fry* is in a divergent field of endeavor—“*Fry*’s laser processing techniques were designed for scoring plastics to form a weakened line, not for use in contrasting or contrastless laser processes taught in Maurer or Bernecker.” *Id.* at 50. Patent Owner further argues that the dimensions involved in *Fry* would have rendered *Fry*’s techniques useless in Maurer, in which features are formed on identification documents. *Id.* Finally, Patent Owner argues that *Fry* discloses a scorched bead, which

Patent Owner argues undermines Petitioner's suggestion that Fry's process would have created a raised feature that "lacks discoloration." *Id.*

Patent Owner's arguments do not relate to the feature recited in claim 2, namely using laser-ablation to form voids. Nor does Patent Owner address the arguments and combination argued by Petitioner, namely whether a skilled artisan would have understood Maurer to disclose creation of voids using laser-ablation and whether a skilled artisan would have understood Fry as confirming that this is what Maurer discloses. *See generally* PO Resp. 49–52. Given the limited nature of Petitioner's reliance on Fry for claim 2, and in view of Maurer's disclosure and teachings discussed above, Patent Owner's arguments regarding Fry do not undermine Petitioner's showing.

For the reasons discussed above, Petitioner has made a persuasive showing for claim 2, and Patent's Owner's arguments do not undermine Petitioner's showing.

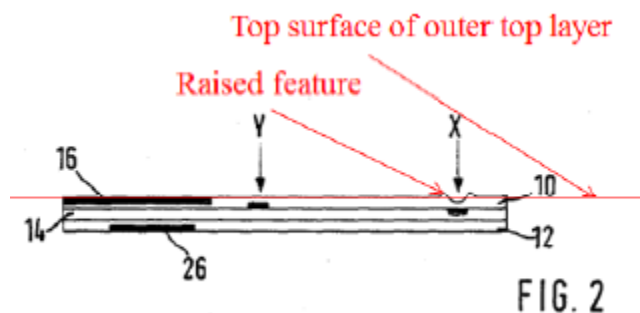
We address Patent Owner's arguments in greater detail in our discussion of claim 3, *supra* Sec. II.C.2.c.ii, and for the reasons stated therein, we do not agree with Patent Owner's arguments. For this additional reason, Patent Owner's arguments do not undermine Petitioner's showing for claim 2.

Upon review of the record, for the reasons stated above, we determine that Petitioner has shown, by a preponderance of the evidence, that claim 2 of the '152 patent is unpatentable under 35 U.S.C. § 103(a) over the combination of Maurer, Bernecker, and Fry.

ii. *Claim 3*

Claim 3 recites “[t]he article of claim 2 and wherein the laser-ablating forms a *raised feature* extending above a top surface of the outer top layer surrounding the voids and *provides a tactile effect*.” Ex. 1001, 11:16–19 (emphasis added).

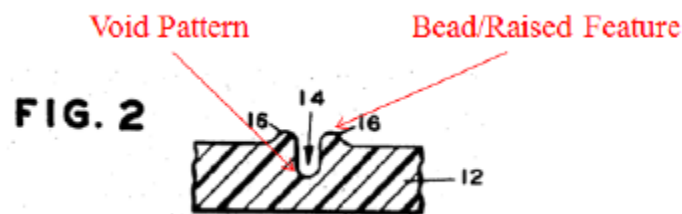
For disclosure that the laser-ablating “forms a raised feature extending above a top surface of the outer top layer surrounding the voids,” Petitioner relies on Maurer’s disclosure of a relief-type structure on cover sheet 10, and Figure 2 of Maurer which illustrates the relief-type structure. Pet. 28 (citing Ex. 1005, 4:25–30, Fig. 2). We agree with Petitioner that Maurer’s Figure 2 clearly depicts Maurer’s relief-type structure as being formed by a void surrounded by raised edges. Figure 2 is reproduced below with Petitioner’s annotations in red.



Id. (reproducing Ex. 1005, Fig. 2 (Petitioner’s annotations in red)). Figure 2 depicts a cross-section of a multi-layered identification card having core layer 14 between cover layers 10 and 12. Ex. 1005, 5:38–41, Fig. 2. A relief-type structure that can be felt manually is indicated by arrow X. *Id.* at 6:18–23, Fig. 2. The relief-type structure is depicted as a void, or groove, in cover layer 10 having raised edges on each side and is directly above and in

register with a blackened area indicating where alpha numeric indicia is printed on core layer 14. *Id.* at 6:14–23. Maurer discloses that the alphanumeric indicia are printed on core layer 14 by burning, thereby blackening, the surface of the layer with an appropriately controlled laser beam. *Id.* at 6:14–18. Maurer explains that depending on the energy of the laser beam, cover sheet 10 can be melted concurrently with the burning of core layer 14 in a manner that a relief that can be felt manually is formed above, and in register with, the printed indicia. *Id.* at 6:18–23.

As can be seen from Fry’s Figure 2, Fry, like Maurer, similarly discloses a process for scoring or grooving thermoplastic with laser ablation that forms a bead along the sides of the score or groove (voids). Pet. 29 (citing Ex. 1007, 2:69–75, Fig. 2). Figure 2 of Fry is reproduced below with Petitioner’s annotations in red.



Pet. 29 (reproducing Ex. 1007, Fig. 2 (Petitioner’s annotations in red)). Figure 2 illustrates a cross sectional view of a score or groove 14 generated by laser beam 11 in substrate 12 having beads 16 along the sides of the score or groove. Ex. 1007, 2:69–70. Fry explains that when the relative motion between laser beam 11 and substrate 12 is at the correct velocity, beads 16 form along the sides of the score or groove. *Id.* at 2:69–73. Fry states that

“[a]side from this bead, the score 14 has a neat and clean surface, remaining unscorched after the scoring process has ended. *Id.* at 2:73–75.

We are persuaded that a person of ordinary skill in the art would have understood that creating a tactile/raised security feature, as disclosed in Maurer, using implementation details as disclosed in Fry, would have resulted in a document including raised features surrounding voids, because Maurer teaches a feature that is accessible to manual inspection, and a skilled artisan would have understood that a tactile security feature predictably aids in verifying the authenticity of a document. Pet. 29 (citing Ex. 1002 ¶ 88).

For motivation to combine Fry with Maurer and Bernecker, Petitioner argues that, for the same reasons argued for claim 1, it would have been obvious to use Maurer’s relief type structure to implement personalized information. Pet. 24. We find Petitioner’s arguments persuasive. Petitioner argues that a skilled artisan would have found it obvious, in view of Fry’s teachings, that the relief structure in Maurer results from laser ablation and includes foamed laminate material. Pet. 24 (citing Ex. 1002 ¶¶ 75–79). Petitioner’s argument is supported by the record. Maurer discloses that formation of its relief-type structure “depend[s] on the energy quantum of th[e] laser beam” used to form the relief. Ex. 1005, 6:18–19. Maurer does not disclose the precise energy quantum used, thereby leaving the implementation details to one of ordinary skill in the art. Pet. 25 (arguing that Maurer teaches a tactile relief but provides limited disclosure regarding implementation, which was within the knowledge of a skilled artisan at the time); Ex. 1002 ¶ 78. Therefore, we are persuaded that a skilled artisan

would have been motivated to look to other references for implementation details. Pet. 25 (arguing that a skilled artisan would have been motivated to look to and apply known techniques for scoring and grooving thermoplastic materials to create a relief-type structures); Ex. 1002 ¶¶ 78–79. Moreover, because Maurer is presumed to be enabling, *see Amgen Inc. v. Hoechst Marion Roussel, Inc.*, 314 F.3d 1313, 1355 (Fed. Cir. 2003), and this presumption has not been overcome, we find that it would have been within the ability of a skilled artisan to do so. Pet. 25–26 (arguing that the combination of Maurer and Fry would work and provide the expected functionality to yield predictable results).

We find persuasive Petitioner’s argument that a skilled artisan would have looked to Fry, because it discloses particular implementation details for creating grooves in a variety of thermoplastics, which are commonly used for identification cards. Pet. 24 (citing Ex. 1007, Table II; Ex. 1002 ¶ 76). For example, Table II of Fry discloses experimental data encountered when grooving plastic films of various materials, the data including laser output in watts and relative speeds between the lasers and substrates. Ex. 1007, Table II. We find it reasonable that a skilled artisan, in view of Maurer’s disclosure that a relief is formed depending on the quantum energy of the laser beam, would have looked to Fry whose Table II includes experimental data regarding the scoring and grooving of various plastics, including laser output in watts, and which describes implementation details for scoring and grooving.

We also find persuasive Petitioner’s argument that a skilled artisan would have understood that the process for creating grooves (or voids) and

beads results from at least some evaporation because Fry explains that the process from which the groove is formed, and from which raised beads including microscopic bubbles are formed, is achieved when plastic is “evaporated or decomposed.” Pet. 24–25 (citing (Ex. 1007, 3:63–65, 4:28–30, 4:6–12)). Fry states that the energy of the laser beam vaporizes the substrate ““without affecting the regions adjacent [to] the area where the beam impinges.”” *Id.* at 25 (citing Ex. 1007, 1:41–44).

Petitioner argues that a person of ordinary skill in the art, in view of the foregoing, would have recognized that Maurer’s permanent relief-type structure, when implemented based on Fry, would have resulted in the removal of material because Fry teaches that its scoring/grooving process removes material and that it would have included foamed material because it results in microscopic bubbles. *Id.* at 26. We find this persuasive because Fry discloses that the process from which the groove is formed, and from which raised beads including microscopic bubbles are formed, is achieved when plastic is “evaporated or decomposed.” Ex. 1007, 3:63–65, 4:28–30, 4:6–12.

Moreover, we find persuasive Petitioner’s argument that the combination of Maurer and Fry would have resulted in a raised feature providing a tactile effect because, for reasons discussed above in this subsection, it would have resulted in the formation of a relief having raised features/beads surrounding grooves/voids, and because Maurer teaches a feature that is accessible to manual inspection, Ex. 1005, 4:25–30, and a skilled artisan would have understood that a tactile security feature

predictably aids in verifying the authenticity of a document. Pet. 29 (citing Ex. 1002 ¶ 88).

For the reasons stated above, we find Petitioner has made a persuasive showing as to claim 3. For reasons discussed below, Patent Owner's arguments and evidence do not undermine that showing.

In its discussion of the ground under which claim 3 is argued, i.e., based on the combination of Maurer, Bernecker, and Fry, Patent Owner does not provide any arguments specific to claim 3. PO Resp. 49–52. Rather, Patent Owner provides general arguments that the ground should fail due to lack of motivation to combine Fry with Maurer and Bernecker. *Id.* (discussing lack of motivation to combine, and discussing claim 9).

Patent Owner presents two reasons that Petitioner has not shown motivation to combine Fry with Maurer and Bernecker: (1) Fry is in a divergent field of endeavor, and (2) Fry's bead is scorched, not colorless as argued by Petitioner. PO Resp. 50.

Also, with regard to claim 1 Patent Owner addresses the *raised feature* limitation, arguing that Maurer does not disclose this feature. *Id.* at 14–23 (discussing the scope of the prior art), 32–35 (discussing claim 1, even though claim 1 does not recite a *raised feature*), 56–58 (discussing *raised feature*). Because claim 3 is the first claim we address in this Final Written Decision that recites a *raised feature*, we address the issue below as part of our discussion of claim 3. Patent Owner also asserts that it would have been impossible to form raised edges using Maurer's process of melting to create a relief-type structure. PO Resp. 19–20, 57.

a) Divergent field of endeavor

As to Patent Owner’s first argument, Patent Owner explains that Fry’s laser processing techniques were designed for scoring plastics to form a weakened line, not for use in the contrasting or contrastless laser processes taught in Maurer and Bernecker. PO Resp. 50. Patent Owner argues further that the disclosed dimensions of the line in Fry would have rendered Fry’s techniques useless in Maurer and Bernecker. *Id.*

As to Patent Owner’s “divergent field of endeavor” argument, we find this argument unavailing. We find that the ’152 patent and Fry fall in the same field of endeavor of using a laser to form grooves in plastic layers. Even if it were not in the same field of endeavor, Fry is still reasonably pertinent because the matter with which it deals, logically would have commended itself to the inventor’s attention in considering his problem. *In re Clay*, 966 F.2d 656, 658–659 (Fed. Cir. 1992); *see also Unwired Planet, LLC v. Google Inc.*, 841 F.3d 995, 1000–01 (Fed. Cir. 2016) (relying on *Clay*).

The ’152 patent states the technical field “generally relate[s] to identification documents, and in one particular arrangement *concerns laser engraving* security features onto such identification documents.” Ex. 1001, 2:21–24 (emphasis added). The ’152 patent provides that “identification documents” covers a broad range of items

including (but are not limited to), documents, magnetic disks, credit cards, bank cards, phone cards, stored value cards, prepaid cards, smart cards (e.g., cards that include one more semiconductor chips, such as memory devices, microprocessors, and microcontrollers), contact cards,

contactless cards, proximity cards (e.g., radio frequency (RFID) cards), passports, driver's licenses, net-work access cards, employee badges, debit cards, security cards, visas, immigration documentation, national ID cards, citizenship cards, social security cards and badges, certificates, identification cards or documents, voter registration and/or identification cards, police ID cards, border crossing cards, security clearance badges and cards, gun permits, badges, gift certificates or cards, membership cards or badges, tags, CD's, consumer products, knobs, keyboards, electronic components, etc., or any other suitable items or articles that may record information, images, and/or other data, which may be associated with a function and/or an object or other entity to be identified.

Id. at 4:40–58. In addition, the '152 patent states that its inventive laser engraving techniques can be employed to mark a wide variety of items *in addition to* identification documents

Also, instead of ID documents, the present techniques can be employed with product tags, product packaging, business cards, bags, charts, maps, labels, etc., etc., particularly those items including engraving of an over-laminate structure. The term ID document is broadly defined herein to include these tags, labels, packaging, cards, etc.

Ex. 1001, 10:21–27. Also, the claims of the '152 patent recite conveying information using laser techniques on an *article*, which is broader than an identification document, reciting that the article is one or more of

an identification document, a credit card, a phone card, a prepaid card, a smart card, a contact card, a contactless card, a RFID card, an electronic component, a package, a container, a recording, media, a label, a tool, a medical device, a consumer product, a toy product, and a tag.

See, e.g., Ex. 1001, 11:8–13.

Also, the '152 patent emphasizes marking “many different articles” using laser techniques without limiting marking to inscribing information or security features:

Of course, it will be appreciated that embodiments [of the invention] *have applicability for the laser engraving and/or marking of plastic materials used to make many different articles formed by virtually any known method, including molding and extruding.*

Id. at 8:37–41; *accord id.* at 8:42–59 (it is expressly contemplated that the laser etching methods can be used with virtually any layer that is affixed to “virtually any product” and “the laser etching methods . . . have applicability to the manufacture [of] many different articles that can be marked with . . . a tactile pattern,” including “packaging,” “containers,” “military products,” “consumer products,” and “toys”). The '152 patent further notes “the technology disclosed herein can be used in combination with other technologies.” *Id.* at 10:19–20.

Therefore, the field of technology includes simply marking any type of document, package or container, without necessarily providing textual information or security features, just like Fry.

Moreover, Fry is reasonably pertinent to problems the '152 patent sought to address. The '152 patent states that it is often desirable to mark a portion of a structure with “text, information, graphics, logos, security indicia, security features, marks, images and/or photographs,” and that laser etching helps provide unique individualized features. Ex. 1001, 6:55–59, 64–67. Because the '152 patent contemplates broad categories of types of

etching, such as “marks,” on a broad range of items, Fry’s disclosure of implementation details for scoring using laser techniques logically would have commended itself to the attention of the inventor of the ’152 patent. *In re Clay* at 659. Also, Petitioner notes, Fry is generally applicable to the same types of “plastic film or sheet material,” Pet. Reply 16 (citing Ex. 1007, 2:18) involved in identification cards, *id.* (citing Ex. 1002 ¶¶ 55, 76).

With regard to Patent Owner’s argument that the dimensions of the score or groove in Fry would have rendered Fry’s techniques useless in creating *identification documents*, as we discussed above, the ’152 patent is not solely concerned with marking identification documents, but expressly states its laser engraving techniques apply to “virtually any product,” including, for example, packaging, containers, building materials, construction materials, plumbing materials, automotive, aerospace, and military products, computers, recording media, labels, tools and tooling, medical devices, consumer products, and toys. Ex. 1005, 8:42–59.

Also, as Petitioner points out, Patent Owner relies on a single, non-limiting embodiment of Fry in arguing that the dimensions disclosed in Fry would have been inapplicable in Maurer and Bernecker. Reply 12–13. Patent Owner relies on the testimony of Dr. Cairns, PO Resp. 50, who describes an embodiment in which a laser beam is focused at a width of 3/16 of an inch on a polyethylene film and results in a groove that is about 1/8 of an inch wide, Ex. 2007 ¶ 112 (citing Ex. 2:62–68). Dr. Cairns notes that the polyethylene film’s disclosed thickness is 0.006 inches, therefore resulting in a groove that is over 20 times wider than the thickness of the film. Ex. 2007

¶ 112. Conspicuously absent from Dr. Cairns’ testimony is any discussion of the significance of these dimensions in the context of ’152 patent and whether Fry is in a different field of endeavor. *Id.* ¶¶ 110–115 (discussing Fry). In addition, he does not provide any testimony that supports Patent Owner’s conclusion that the dimensions disclosed in this embodiment would have rendered Fry’s techniques useless in Maurer and Bernecker. *See* Ex. 1007 ¶¶ 112–113; *see also* PO Resp. 50. Therefore, Patent Owner’s conclusion amounts to attorney argument.

Moreover, Petitioner correctly points out that Fry is not limited to the one embodiment discussed by Dr. Cairns and discloses using a variety of film thicknesses and laser speeds. Reply 12–13 (citing Ex. 1007, 2:66–68, 3:44–68, 2:19–20). Fry does not attribute any specific importance to the dimensions in the disclosed embodiment, or indicate that they are limiting. *Id.* (citing Ex. 1007, 2:29–38; Ex. 1017 ¶¶ 29–30). In fact, Fry elsewhere describes (in connection with a different embodiment) “bubbles are about 6 mils [0.006 inches] wide,” *id.* at 13 (citing Ex. 1001 4:32–33), which is the same thickness of the film described in the embodiment upon which Patent Owner relies.

b) Scorched bead

As we noted above, Patent Owner states that Fry discloses a scorched bead. Patent Owner’s argument is that “Fry discusses a scorched bead, which undermines Petitioner’s suggestion that Fry’s process would have created a raised feature that ‘lacks discoloration.’” PO Resp. 50. In connection with this assertion, Patent Owner neither provides an explanation, nor cites to anything, in support of its position that Fry

discloses a scorched bead. *Id.* However, elsewhere in its response, Patent Owner provides an explanation. Patent Owner interprets a statement in Fry, namely what the words “aside from this bead” refer to. PO Resp. 27–28. Fry states “[a]side from this bead, the score 14 has a neat and clean surface, remaining unscorched after the scoring process has ended. Ex. 1007, 2:73–75. Patent Owner interprets “[a]side form this bead” to mean that while score 14 has a neat and clean surface, remaining unscorched, the bead is scorched. PO Resp. 27–28 (citing Ex. 2007 ¶ 115). The cited testimony of Dr. Cairns to support Patent Owner’s position restates the argument in the response, and adds nothing. Ex. 2007 ¶ 115. Petitioner argues a different interpretation, namely that “[a]side from this bead” refers to the structural irregularity (i.e., the raised feature) produced by the bead, which makes the surface less smooth (neat and clean). Reply 14 (citing Ex. 1017 ¶¶ 31–32. Petitioner argues that this is consistent with Fry’s focus on structural features, rather than cosmetic ones. *Id.*; *see, e.g.*, Ex. 1007, 1:69–2:3 (“without cutting through the sheet”); *id.* at 3:62–3 (“the appearance of the groove is generally neat and regular”); *id.* at 2:67 (focusing on “smooth and regular” structural features). Petitioner argues that Fry’s unscorched groove serves only to demonstrate that the implementation details for creating colorless laser engravings, including those with beads, was known in the art, a fact that Patent Owner does not dispute in view of the ’152 patent’s absence of any implementation details. Reply 14.

Upon weighing the evidence, we find Petitioner’s interpretation more credible. Fry specifies “[a] score, by definition, is a groove into a material surface and penetrates only a portion of the total depth of the material being

scored.” Ex. 1007, 2:32–33. So, a score does not include the bead. In the relied upon sentence, Fry emphasizes that the groove does not include the bead in the first clause, compares the bead and groove in the second clause (i.e., the groove is neat and regular), and then further describes the groove in the last clause (i.e., without comparing it to the bead). *See* Ex. 1017 ¶¶ 31–32 (testifying Fry does not teach a scorched bead, noting the relied upon sentence only refers to the “structural irregularity (i.e., the raised feature) produced by the bead, which makes the surface less smooth”); *id.* (testifying Fry does not teach discoloration/scorching). At another place, Fry states “[t]he appearance of the groove is generally neat and regular, when accompanied by the bead.” *Id.* at 3:62–63. Fry describes observing “small bubbles in the beads” via “microscopic examination” and “small cracks . . . in the groove bottom and on the beaded edge of the polyethylene.” *Id.* at 3:63–67. But, Fry does not describe any bead scorching. Moreover, the ’152 patent does not describe how it obtains an unscorched bead, which as Petitioner notes, indicates that the implementation details for creating colorless laser engravings, including those with beads, was known in the art. Reply 14.

c) Maurer Figure 2’s depiction of raised edges

Patent Owner does not dispute that Figure 2 of Maurer depicts raised edges around a void/depression. *See generally* PO Resp. 19–22, 32–33; Reply 3 (“Indemia does not dispute that Figure 2 of *Maurer depicts or illustrates* a raised feature”). However, Patent Owner argues that Figure 2 does not accurately represent the dimensions or features of Maurer’s identification card. PO Resp. 32–33. Patent Owner argues that the Figure is

intended only to demonstrate the concept of Maurer, namely that of burning indicia into core layer 14 with a laser so as to, at the same time, form a depression in cover layer 10 that can be felt manually. *Id.* (citing Ex. 2007 ¶¶ 73, 86, 126). Patent Owner argues that the raised edges appear to have been added by the artist to frame the depressed region. *Id.* at 57; *see also id.* at 19 (“Like other features in the artist’s cartoon-like illustration, the dimensions of the melted depressed area at arrow X is not intended to be an accurate depiction of the features and dimensions of the final identification card”). Patent Owner’s argument as to the intent of Maurer’s Figure 2 is pure speculation. Maurer never states the “intent” of Figure 2, nor limits its intent to that stated by Patent Owner. Maurer states that “FIG. 2 is a cross section through the identification card.” Ex. 1005, 5:27–28. Nothing in Maurer states or indicates that the raised edges depicted in Figure 2 should be disregarded as not depicting what they appear to depict, or that they were added by an artist merely to frame a depressed region. Therefore, we give little credit to Patent Owner’s unsupported arguments as to the intent of Figure 2.

Moreover, evidence provided by Patent Owner cuts against the argument that the raised edges shown in Figure 2 are merely to frame a depression. PO Resp. 22–23. To support its position that Maurer does not disclose a raised feature, Patent Owner relies on Figure 2 of another patent issued to the inventors of Maurer, U.S. Patent No. 4,579,754 (“the ’754 patent”), also relating to a multi-layered identification card. PO Resp. 22–23. Figure 2 of the ’754 patent is reproduced below.

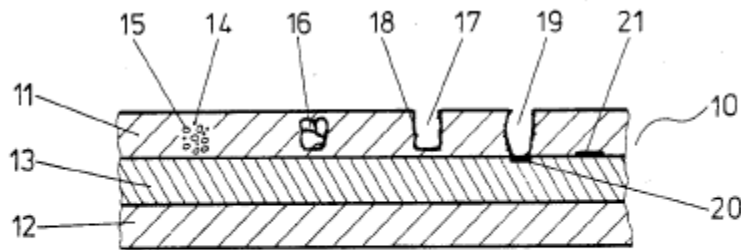


Fig.2

Ex. 2004, Fig. 2. Like Maurer, Figure 2 of the '754 patent shows a cross-section of a multi-layered identification card having card inlay 13 (similar to Maurer's core layer 14) and cover films 11 and 12 (similar to Maurer's cover sheets 10 and 12). *Id.* at 4:16–17, 4:67–5:1. Like Maurer, the '754 patent uses a laser beam to engrave cover film 11 to create discolored area 20 on card inlay 13 while at the same time creating channel 19, depicted as a groove in Figure 2, that can be felt by hand on the card surface. *Id.* at 5:34–41. However, unlike Maurer, Figure 2 of the '754 patent does not depict raised edges on the sides of channel 19. *Id.* at Fig. 2. Accordingly, in this rendition, the artist did not depict raised features to “frame” the depiction of the groove formed by channel 19. Also, although the description of channel 19 refers to a feature that can be felt by hand, unlike Maurer, the '754 patent does not use the term *relief* to describe the feature formed by the laser. Rather, the '754 patent uses the term “channel.” *Id.* at 5:26–30. Therefore, this evidence supports Petitioner's position, rather than Patent Owner's, that a skilled artisan could have relied on the depiction in Maurer's Figure 2 of a void and raised edges, in conjunction with Maurer's description of a relief, as disclosing, teaching, or suggesting, raised edges.

We note that Patent Owner takes issue with the dictionary definition of the term “relief” cited in the Institution Decision. PO Resp. 33–34; *see also* Inst. Dec. 45–46. Patent Owner asserts that the definition provides little help in interpreting Maurer, arguing that the definition is taken from the context of art rather than from the relevant field. PO Resp. 33. We disagree that the definition we cited is limited to the context of art. The definition reads “[t]he projection of figures or forms from a flat background, or such a projection that is apparent only, as in painting.” Ex. 3002, 993. Reference to “as in painting” refers to “such a projection that is apparent only.” However, the definition, in particular the description of a projection of figures or forms from a flat background, is not limited to art. *Id.* Patent Owner argues that another definition of “relief” from the same general dictionary defines the term as “variations in elevation,” PO Resp. 33 (citing Ex. 3002), but fails to quote the entire definition, which states “variations in elevation *of a portion of the earth’s surface*” Ex. 3002 (emphasis added). Relying on the testimony of Dr. Cairns, Patent Owner argues that in any event a person of ordinary skill in the art would not find a general purpose dictionary helpful in understanding the laser-formed features in Maurer. PO Resp. 33 (citing Ex. 2007 ¶ 104). According to Dr. Cairns, the term “relief” as used in the relevant field does not mean “raised feature.” Ex. 2007 ¶ 104. To support his assertion, Dr. Cairns relies on disclosure in Bernecker of a “microrelief” that is formed by engraved depressions rather than by raised features. *Id.* (citing Ex. 1006, 2:57–60; 3:13–17).

The definition cited by the panel more closely tracks Maurer’s flat card and raised bead at Figure 2 as a “projection of . . . forms from a flat

background,” as Maurer’s card does not include the “earth’s surface.” *See* Ex. 3002. Even if Patent Owner’s definition also applies, “variations in elevation” still include the raised portions of Maurer’s Figure 2 (e.g., like mountains and valleys on the earth’s surface). Also, as Petitioner persuasively argues, even though Bernecker refers to a microrelief as a depression, another prior art reference entered into the record by Patent Owner supports Petitioner and shows that the ordinary meaning of “relief” in the art means a raised feature. *See* Paper 21, 21–22 (citing Ex. 2014, U.S. Patent 5,005,872 or “the ’872 patent”). The ’872 patent, like Maurer and Bernecker, relates to a multilayer identity card comprising at least one top surface layer made of plastic and has an area with characters in a *relief* structure usable as a printing block. Ex. 1014, 1:9–13. Notably, the ’872 patent refers to raised features as relief structures, *id.* at 2:32–35 (describing a relief height *above* the surface of the card), and depressed features as being in negative relief, *id.* at 1:64–2:1 (describing depressions as a negative relief).

In view of disclosures such as these, and in view of the ordinary meaning of relief as referring to projections on a surface, we decline to exclude from the meaning of “relief” structures that have raised surfaces. Although we acknowledge Bernecker’s use of the term microrelief, we determine that the term “relief” also encompasses structures having raised surfaces. Patent Owner does not dispute that the term “relief” encompasses structures having raised features, but rather argues that a “relief” *does not necessarily* have raised features. PO Resp. 34. Patent Owner argues that, as a result, one cannot conclude from Maurer’s use of the term “relief” that the

structure has raised features. *Id.* However, Petitioner does not rely on use of the word “relief” alone. As we discussed above, Petitioner relies on the depiction of a void with raised edges in Figure 2 in conjunction with Maurer’s description that this structure forms a relief. Pet. 49–50. In view of this evidence, we are persuaded that a person of ordinary skill in the art would have interpreted Figure 2 of Maurer in combination with disclosure of Maurer’s relief-type structure as being formed by voids whose edges are raised.

Patent Owner also argues that Maurer’s figures are not drawn to scale. PO Resp. 17–19. Patent Owner argues, for example, that the thickness of the information printed at arrow Y is depicted as about half the thickness of cover sheet 10, whereas in reality the thickness of the printed information would be a very minor fraction of the thickness of cover sheet 10. *Id.* at 18. However, the inquiry as to whether a figure provides precise dimensions, and/or is drawn to scale, is different from the question of whether the figure illustrates features such as a depression/void and raised edges. Clear drawings can be relied upon for what they teach. *See In re Mraz*, 455 F.2d 1069, 1072 (CCPA 1972) (“[W]e did not mean that things patent drawings show clearly are to be *disregarded*.”); *In re Wagner*, 63 F.2d 987, 986–87 (CCPA 1933) (“While it is true that drawings may not always be relied upon for anticipation of a later application, it is also true that, if a drawing clearly suggests to one skilled in the art the way in which the result sought is accomplished by a later applicant, it is immaterial whether the prior patentee’s showing was accidental or intentional.”) (internal citations omitted); *In re Seid*, 161 F.2d 229, 231 (CCPA 1947) (“[A]n accidental

disclosure, if clearly made in a drawing, is available as a reference.”); *Jockmus v. Leviton*, 28 F.2d 812, 814 (2d Cir. 1928) (“We know of no rule that figures can never of themselves be an adequate anticipation of mechanical inventions, as of course they must be of designs, and we can see no reason for importing into the statute an arbitrary distinction, unrelated to its purposes.”) (L. Hand, J.); *see also Vas-Cath Inc. v. Mahurkar*, 935 F.2d 1555, 1563 (Fed. Cir. 1991) (earlier-filed design drawings support later-filed utility claims reciting certain dimensions). Here, Maurer’s Figure 2 depicts a void having raised edges, regardless of whether the figure is drawn to scale, and regardless of precise dimensions. Reply 11.

We note also that Patent Owner’s assertion that Figure 2 cannot be relied on to show raised features strains credibility in light of Patent Owner’s reliance on Figure 2 as accurately portraying other features such as a depressed area. PO Resp. 21–21. Patent Owner stresses the position of area X only conforms to the depression in the cover sheet—a position that relies on allegedly precise features of Figure 2 to support it. *See id.* (arguing that Maurer points the arrow directly at the center of the depressed area). Patent Owner also argues “‘arrow X’ merely designates the depression formed by melting the top laminate layer” and “is not intended to be an accurate depiction of the features and dimensions of the final identification card” (PO Resp. 19), but then Patent Owner contends “Maurer . . . pointed the arrow [from X] directly at the center of this depressed area” (*id.* at 20). Patent Owner explains Maurer “used a slightly curved line connecting the reference number 10” “to generally identify the entire cover sheet 10.” *Id.* at 21. Patent Owner’s arguments, taken to their logical extreme, contradict each

other, because if the arrow from the X only points to the center of the depression, it must relate only to the center per Patent Owner's theory, yet Patent Owner also maintains the arrow from the X represents the whole depression. These arguments, and related arguments about the nature of Maurer's Figure 2, and Dr. Cairns' related testimony, lack sufficient factual and logical support.

Patent Owner relies on *Hockerson-Halberstadt*, PO Resp. 58, in which the Federal Circuit states that patent drawings that do not define *precise proportions* may not be relied on to show particular sizes if the specification is completely silent on the issue. *Hockerson-Halberstadt, Inc. v. Avia Group Int'l*, 222 F.3d 951, 956 (Fed. Cir. 2000). However, unlike the patentee in *Hockerson*, Petitioner does not rely on Figure 2 of Maurer for its *precise proportions*. Rather, Petitioner relies on Figure 2 as showing a void having edges raised above cover sheet 10. Also, Patent Owner's argument that Maurer teaches a depression only because "nowhere does Maurer teach" using a laser to form a "raised tactile feature," is not persuasive. PO Resp. 22; Ex. 2007 ¶ 86 (citing Ex. 1005, 4:25–30, 6:18–23). The disclosure Dr. Cairns relies on does not expressly mention *raised* features, but is also *does not mention* depressions. Ex. 1005, 4:25–30, 6:18–23. Maurer's lack of express description of *raised* edges and *depressions*, if anything, indicates that such description was unnecessary because the figure, combined with the knowledge of one of ordinary skill in the art, could be relied on as to its depiction of a void and raised edges.

d) Argument that it would have been impossible to form raised edges

Patent Owner asserts that it would have been impossible to form raised edges using Maurer's process of melting to create a relief-type structure. PO Resp. 19–20, 57. In support of this assertion, Patent Owner relies on the testimony of Dr. Cairns, who explains that the process in Maurer is a melting process. *Id.* at 19–20 (citing Ex. 2007 ¶ 74). According to Dr. Cairns, the cover sheet is transformed into a liquid during the melting process, and gravity would have forced the liquefied material to sink downward to fill holes or cavities, thus making impossible the creation of raised features. Ex. 2007 ¶ 74. Dr. Cairns does not cite evidence to support this testimony that Maurer involves a gravitational process that creates mere depressions without raised ridges, which Figure 2 of Maurer depicts. *Id.* is limited to disclosing a melting process. *Id.* Thus, this testimony is entitled to little weight.

Petitioner argues that a skilled artisan would not have understood Maurer's process resulting in the relief-type structure to be limited to melting. Reply 4 (Ex. 1017 ¶¶ 18–20). Petitioner argues that a skilled artisan would have understood that the techniques described in Maurer involved both melting and vaporization, that the processes are not mutually exclusive, and that Patent Owner presents an oversimplified and idealized understanding of melting based on an unsupported premise that Maurer's reference to melting excludes any vaporization from also occurring. *Id.* at 4–5. We find Petitioner's arguments persuasive because Petitioner's arguments find support in the record:

A POSITA would have understood that both melting and vaporization (of thermoplastics) are complicated processes that typically involve all three states (solid, liquid, and gas). *Id.* They are not “mutually exclusive” as the POR contends. POR, 14. In practical terms, laser-induced melting of thermoplastics includes bringing some of the material to a gaseous state, and vaporization includes bringing some to a molten state. Ex. 1017, ¶22; Ex. 2006, 62:11–24, 64:9–67:12. How a POSITA would view the term melting in *Maurer* differs from how a 5th grade student would understand the term. Ex. 2006, 69:16–70–15 (“We’re not talking about how a fifth grade kid would understand melting”). A POSITA would understand that *Maurer* is not referring to a simplified, “idealized” form of melting that specifically excludes bringing *any* of the material to a gaseous state (i.e., idealized vaporization). Rather, *Maurer* simply notes that its process includes/involves melting. Ex. 1017, ¶22–23.

Id. at 5. We find Dr. Tentzeris’s testimony credible, and Petitioner’s arguments persuasive, because it is supported by evidence that laser-induced melting includes bringing some of the material to a gaseous state, Ex. 1017, ¶ 22; Ex. 2006, 62:11–24, 64:9–67:12, and because Maurer’s use of the term “melting” does not provide a reason to conclude a negative, namely that no vaporization occurs, Reply 6. On other hand, Patent Owner does not support its suggestion that melting processes exclude vaporization from occurring.

Patent Owner also asserts that it would have been impossible to blacken core layer 14 and create raised features at the same time. PO Resp. 14–23. To support this argument, Patent Owner argues, in reliance on Dr. Cairns’ testimony, that the focal position of the laser beam to blacken the core would have been different from the focal position needed to create a

raised tactile feature. *Id.* at 14 (citing Ex. 2007¹³ ¶¶ 86–97). To illustrate the different alleged focal positions, Dr. Cairns relies on two figures that appear to have been created either by Dr. Cairns or Patent Owner’s counsel.

Ex. 2007 ¶ 95; PO Resp. 15. The left figure demonstrates where Dr. Cairns alleges the laser would need to be focused to blacken core layer 14.

Ex. 2007 ¶ 95. The right figure illustrates where Dr. Cairns alleges the laser would need to be focused, in a vaporization process, to form raised edges.

Id. According to Dr. Cairns, at the focal position shown in the right figure, the laser beam could not melt the bottom portion of cover sheet 10 in contact with core layer 14. *Id.*

As Petitioner persuasively explains, however, Patent Owner’s arguments rely on an improper characterization of Maurer and the combined teachings of Bernecker, Maurer, and Fry, *see* Reply 2–16, and is premised on the false assumption that the process in Maurer is limited to melting, Ex. 1017 ¶ 25–28. Patent Owner and Dr. Cairns argue that Maurer requires the laser to be focused within the card core, *id.* ¶ 26 (citing PO Resp. 13; Ex. 2010 ¶¶ 69–67, 86–97), which Dr. Tentzeris states is inconsistent with the prior art, *id.* Dr. Tentzeris explains that the prior art does not refer to the focal point as an important variable for controlling laser engraving. *Id.* Dr. Tentzeris states correctly that Maurer never specifies that the focal point of

¹³ Patent Owner cites paragraphs 86–97 of Ex. 2010, but this appears to be an error. PO Resp. 14. Exhibit 2010 does not have numbered paragraphs, but instead has page numbers. *See generally* Ex. 2010. Petitioner appears to have meant Ex. 2007—Dr. Cairns’ declaration—wherein paragraphs 86–97 relate to the Patent Owner’s argument.

the laser must be the card core. *Id.* Rather, “the process described in Maurer depends on many other factors, including (1) the energy quantum of the laser (Ex. 1005 at 6:18–20), (2) whether the card core is coated (*id.* at 6:24–28), and (3) the degree to which the material absorbs energy (*id.* at 3:57–60).” *Id.*

Dr. Tentzeris testifies further that a person of ordinary skill in the art would have understood that primary factors determining groove characteristics were the energy of the laser and the absorptivity of the material/coating, rather than on the focal point. *Id.* ¶ 27. We find this credible because it is consistent with other prior art of record upon which Dr. Tentzeris relies. *Id.* For example, Fry explains that the characteristics of its groove depend primarily on (1) the energy of the laser, Ex. 1007, Tables I, II, and (2) the absorptivity of the material, *id.* Table I. Ex. 1017 ¶ 27. Fry also discusses additional factors, including the thermal conductivity and diffusivity of the plastic, Ex. 2007, 3:31–42, but it does not specify that the focal point of the laser must be at a specific depth in the laminate. Ex. 1017 ¶ 27. Dr. Tentzeris states that persons of skill in the art reading Fry “would have understood the opposite,” namely that the depth of the focal point of the laser is not a factor. *Id.* To support this assertion, he relies on an embodiment in Fry wherein the laser output is focused by reflecting mirrors to a spot that is 3/16 of an inch wide. *Id.* (citing Ex. 1007, 2:62–65). Dr. Tentzeris explains that with the laser applying energy to a spot about 3/16 inches wide at the surface, the focal point could be anywhere, so long as the spot size at the surface is of a particular size. *Id.* That is, Fry simply requires (for that embodiment) that the laser spot is of a certain size at the

surface. *Id.* Dr. Tentzeris concludes that in Fry, therefore, the focal point is at the surface or at any particular point (depth) within the substrate, which we credit because it is supported by the evidence in Fry upon which he relies. *Id.*

Dr. Tentzeris also clarifies that Dr. Cairns and Patent Owner rely on a mischaracterization of Dr. Tentzeris's opinion. Ex. 1017 ¶ 28. In particular, to support his hypothetical vaporization process illustrating differences that result from different focal points, Dr. Cairns states that he relies on the same vaporization process that Dr. Tentzeris outlines in his deposition. Ex. 2007 ¶ 89 n.6 (citing Ex. 2006, 188:23–189:7¹⁴). Dr. Cairns relies on a hypothetical process that “applies no energy to the core” and is “incapable of melting the very bottom of [the] laminate contacting [the] core.” PO Resp. 21. Dr. Tentzeris explains that Dr. Cairns mischaracterizes his testimony because, contrary to Dr. Cairns' assertion, Dr. Tentzeris does not specify, for any combination, that no energy is applied to the core, nor does it specify a particular focal point. Ex. 1017 ¶ 28. Dr. Tentzeris explains that laser energy is not absorbed only at a focal point in the material. *Id.* He explains that, for example, for a laser to apply energy only to a surface layer and no energy to the core, the surface layer would have to absorb all the laser energy or the core would have to comprise a material that absorbs no energy. *Id.*

¹⁴ Dr. Cairns cites to Ex. 2008, which appears to be an error. Ex. 2008 is Dr. Cairns' declaration in support of Patent Owner's Contingent Motion to Amend. It appears Dr. Cairns meant to cite to Ex. 2006, the deposition transcript of Dr. Tentzeris.

We credit Dr. Tentzeris’s testimony because, for example, Fry explains that “heat is generated by absorption of the beam *within the material*. This means that the initial hot spot in plastics irradiated by the laser beam is *within the material and not on the surface*.” Ex. 1007, 1:51–53 (emphasis added). In addition, Fry’s claim 1 specifically recites “generating a groove in a thermoplastic, substrate material” using a “beam of laser light . . . of such intensity that said beam *does not cause substantial vaporization*.” *Id.* at 5:7–13 (emphasis added). Emphasizing the point about absorption of heat inside the plastic, Fry teaches that “plastics are not strong absorbers of laser light, because if they were, *most of the light would be absorbed at or near the surface and little light would penetrate into the substrate*.” *Id.* at 3:20–23 (emphasis added). Fry does not specify how deep the laser energy penetrates into the plastic. Fry suggests the energy could reach the white paper core layer of Maurer—especially because sufficient energy can cut all the way through the plastic in Fry—i.e., cutting through it by focusing the laser “on any given spot on the material 12, for too long at a time.” *See* Ex. 1007, 2:29–38; Ex. 1005, 4:37–42, 6:14–16, 6:59–60 (burning white paper core). Furthermore, Bernecker provides evidence that an artisan of ordinary skill knew how to adjust a laser focus to obtain optimal results, including halftone images and evaporation of plastic material. *See* Ex. 1007, 3:64–4:18.

We note that Patent Owner’s arguments also fail to recognize the knowledge of an artisan of ordinary skill reading Maurer and Fry. On one hand, Patent Owner’s arguments assume an artisan of ordinary skill reading the ’152 patent needs no explanation for how to form a raised tactile feature,

and on the other hand, Patent Owner argues an artisan reading Maurer and Fry would be unable to combine the teachings to form a raised tactile feature. For example, nothing in the '152 patent describes any difficulty in producing any of the features, and the '152 patent provides no detail in the use of a laser for producing the raised OV features.

The '152 patent states in the background that “[i]t will be appreciated that laser engraving or marking generally involves a process of inscribing or engraving a document surface with identification marks, characters, text, tactile marks,” indicating that a skilled artisan knew how to form tactile features. Ex. 1001, 3:49–52. The '152 patent also describes that in one embodiment, “the effect produced by laser etching can be identified easily by a person checking the card, often without special equipment, because the laser etching produces a visual effect and/or a visual effect,” *id.* at 6:67–7:3, and that “the laser removes material from the surface of the surface of the card and may (optionally) create a pattern that can be felt by touch,” *id.* at 7:12–14, but never discloses any details of any laser engraving techniques, and like Maurer, never specifies that the tactile feature is raised, as opposed to a void.

In any event, for reasons we discussed above, Petitioner persuasively shows that Maurer teaches a raised tactile beaded groove, and Fry teaches a similar raised tactile beaded groove formed via small bubbles released during a laser groove forming process, using a process that an artisan of ordinary skill would have recognized as the same or similar to the laser groove forming process in Maurer.

e) Summary

Upon review of the record, for the reasons stated above, we determine that Petitioner has shown, by a preponderance of the evidence, that claim 3 of the '152 patent is unpatentable under 35 U.S.C. § 103(a) over the combination of Maurer, Bernecker, and Fry.

iii. Claim 7

Petitioner asserts that claim 7 is unpatentable under § 103 over Maurer, Bernecker, and Fry. Pet. 4. Petitioner identifies where it contends the prior art discloses each recitation of claim 7. *Id.* at 30–36. Although the ground is based on the combination of Maurer, Bernecker, and Fry, Petitioner argues that Maurer discloses every recitation of claim 7. *Id.*

In its discussion of the ground under which claim 7 is argued, i.e., based on the combination of Maurer, Bernecker, and Fry, Patent Owner does not provide any arguments specific to claim 7. PO Resp. 49–52. Rather, Patent Owner provides general arguments that the ground should fail due to lack of motivation to combine Fry with Maurer and Bernecker. *Id.* (discussing lack of motivation to combine, and discussing claim 9). In our discussion for claim 3, we addressed Patent Owner's arguments regarding motivation to combine Fry with Maurer and Bernecker. *Supra* Sec. II.C.2.c.ii. As we discussed above as to claim 3, we do not agree with Patent Owner's arguments. *Id.*

- a) *“An article comprising at least one interior layer and a laminate layer above the interior layer, an outer surface of the laminate layer defining a top surface of the article”*

For reasons discussed above, *supra* Sec. II.C.2.a, Petitioner has shown persuasively, and Patent Owner does not dispute, that Maurer’s multi-layered identification card discloses “an article comprising at least one interior layer and a laminate layer above the interior layer, an outer surface of the laminate layer defining a top surface of the article.” Pet. 30–31.

- b) *“the article conveying one or more of invariant and personalized information, wherein at least some of the information is defined by laser-ablated voids that extend through the top surface of the article”*

For the limitation “the article conveying one or more of invariant and personalized information, wherein at least some of the information is defined by laser-ablated voids that extend through the top surface of the article,” as recited in claim 7, Petitioner persuasively argues this feature would have been obvious in view of the combination of Maurer, Bernecker, and Fry. Pet. 31–32.

As with Petitioner’s analysis for claim 1, here Petitioner relies on Maurer for disclosure of “the article conveying one or more of invariant and personalized information,” *id.* at 31 (“Maurer taught this feature”); *see also id.* at 32 (“Maurer disclosed ‘inscrib[ing] individual features, in particular *personal data*, in the interior of said card after lamination of the card blank”). For reasons discussed above, *supra* Sec. II.C.2.a, Petitioner has shown persuasively, and Patent Owner does not dispute, that Maurer discloses an article conveying one or more of invariant and personalized information.

Similar to its analysis for claim 1, here Petitioner relies on Maurer's relief-type structure for disclosure that "at least some of the information is defined by laser-ablated voids that extend through the top surface of the article," as recited in claim 7. *Id.* at 32–34. We are persuaded that Maurer's relief-type structure provides a void that extends through the top surface of the article, because, for example, Maurer's Figure 2 clearly depicts that the depressions do not extend into core layer 14. *Id.* at 32. Moreover, we are persuaded that these voids define at least some of the information based, for example, on Maurer's disclosure that the relief-type structure can be felt manually, Ex. 1005, 6:18–23, and of information in relief that can be sensed by touch, *id.* at claim 3. Patent Owner does not dispute that Maurer's relief-type structure provides a void extending through the top surface of an article. *See, e.g.*, PO Resp. 52 (acknowledging that Maurer "describes the formation of depressions or grooves through a 'melting' of the laminate layer").

For disclosure that the void is formed using a laser-ablation process, as recited in claim 7, Petitioner relies on Maurer's disclosure of melting cover sheet 10 with a laser. Pet. 33 (citing Ex. 1005, 6:18–23). According to Petitioner, the disclosed process of melting with a laser would have been understood to be a laser-ablation process, "i.e., one that removes material from the upper cover sheet or laminate." *Id.* at 33–34 (citing Ex. 1002 ¶ 100). For reasons we discussed above for claim 2, we are persuaded that Maurer discloses a laser-ablation process. *Supra* Sec. II.C.2.c.i. Patent Owner does not argue that Maurer fails to disclose a laser-ablation process in its arguments for claim 7. *See generally* PO Resp. 49–52 (arguing

Petitioner has not provided a motivation to combine Maurer and Fry, but not addressing whether Maurer's process discloses laser-ablation).

Even though Petitioner argues that Maurer alone discloses laser-ablation, *id.* at 33–34 (“A POSITA would have understood from this disclosure and the resulting groove that *Maurer* disclosed a laser ablation process”), Petitioner also provides argument that Fry confirms that the process described in Maurer results from laser-ablation. Pet. 34. Petitioner argues Fry describes using a laser to evaporate or vaporize (e.g., ablate) plastic material on an identification card, thereby leaving score 14 (void, according to Petitioner) and beads 16 (raised edges, according to Petitioner) in substrate 12 (depicted in Figure 2 of Fry). *Id.* (citing Ex. 1007, 1:31–44, 4:6–12, 4:6–12); *see also* Ex. 1007, Fig. 2. Petitioner argues a skilled artisan “would have been motivated to apply the techniques known in the art for scoring and grooving thermoplastics, like those in Fry, to create a security feature in a laminated identification document” and “would have understood that creating such a security feature would result in voids formed from laser ablating the document.” Pet. 34–35.

Petitioner argues a skilled artisan would have been motivated to look to Fry in order to apply known techniques in the art for scoring and grooving thermoplastic. *Id.* at 24–26.

For reasons we discussed above for claim 2, we are persuaded that Fry confirms that Maurer's process is a laser-ablation process. *Supra* Sec. II.C.2.c.i.

Patent Owner does not identify any limitation of claim 7 that it contends Petitioner has failed to show is disclosed by Maurer. *See generally*

PO Resp. 49–52. Rather, Patent Owner argues that Petitioner does not provide a motivation for combining Fry with Maurer and Bernecker, asserting that (1) Fry is in a divergent field of endeavor, and (2) Fry’s bead is scorched, not colorless as argued by Petitioner. *Id.* at 50.

For reasons discussed in this subsection and discussed above with regard to claim 2, *supra* Sec. II.C.2.c.i, which recites “[t]he article of claim 1 in which said voids are formed by laser-ablating the outer top layer of the article,” we find Petitioner’s arguments persuasive, even without the combination with Fry.

We address Patent Owner’s arguments about the combination with Fry in greater detail in our discussion of claim 3, *infra* Sec. II.C.2.c.ii, and for the reasons stated therein, we do not agree with Patent Owner’s arguments. For this additional reason, Patent Owner’s arguments do not undermine Petitioner’s showing for this claim limitation.

c) “*wherein at least some of the voids are defined by sidewalls that are angled obliquely, rather than perpendicularly, relative to said top surface*”

For the limitation “wherein at least some of the voids are defined by sidewalls that are angled obliquely, rather than perpendicularly, relative to said top surface,” recited in claim 7, Petitioner relies on the angle of the surface of the voids depicted in Figure 2 of Maurer. *Id.* at 35 (citing Ex. 1005, Fig. 2; Ex. 1002 ¶ 103). We find Petitioner’s argument persuasive because Figure 2 clearly depicts the sidewalls of the void as being angled obliquely, rather than perpendicularly, relative to the top surface of cover sheet 10. Ex. 1005, Fig. 2. Patent Owner does not dispute that the sidewalls

of Maurer's relief-type structure are angled obliquely, rather than perpendicularly, relative to the top surface of cover sheet 10.

d) *“wherein the article is one or more of: an identification document . . .”*

For reasons discussed above, *supra* Sec. II.C.2.a, Petitioner has shown persuasively, and Patent Owner does not dispute, that Maurer's multi-layered identification card discloses “wherein the article is one or more of: an identification document,” as recited in claim 7. Pet. 35.

e) *“wherein said voids define a feature that can be felt by touch”*

We are persuaded that Maurer discloses the limitation “wherein said voids define a feature that can be felt by touch,” recited in claim 7, because Maurer discloses that the relief-type structure “can also be felt manually”. *Id.* at 36 (citing Ex. 1005, 6:18–23, claim 3 (citation omitted); Ex. 1002 ¶ 105). Claim 3 of Maurer provides further support, stating that the relief “can be sensed by touch.” Ex. 1005, claim 3. Patent Owner does not dispute that Maurer's relief-type structure can be felt by touch.

f) *Summary*

Upon review of the record, for the reasons stated above, we determine that Petitioner has shown, by a preponderance of the evidence, that claim 7 of the '152 patent is unpatentable under 35 U.S.C. § 103(a) over the combination of Maurer, Bernecker, and Fry.

iv. *Claim 8*

- a) *“a method of manufacturing an article concerning information about a person” and “wherein the article is one or more of: an identification document . . .”*

We are persuaded that Maurer discloses “a method of manufacturing an article concerning information about a person,” as recited in the preamble of claim 8 because, as explained by Petitioner, Maurer discloses a method of “producing” a “multi-layered identification card,” that includes data area 22 comprising personal data about a client. Pet. 36. Patent Owner does not dispute that Maurer discloses the preamble of claim 8.

In addition, for reasons discussed above, *supra* Sec. II.C.2.a, Petitioner has shown persuasively, and Patent Owner does not dispute, that Maurer’s multi-layered identification card discloses “wherein the article is one or more of: an identification document,” as recited in claim 8. Pet. 43.

- b) *“printing information on an article core”*

We are persuaded that Maurer discloses “printing information on an article core,” because Maurer discloses printing alphanumeric indicia, i.e., information, on core layer 14 (asserted article core) “by burning them into the surface thereof.” Pet. 37 (quoting Ex. 1005, 6:14–16); *see also* Ex. 1005, claim 5 (“a background pattern printed on the card core”); *see also id.* at 6:31–34 (disclosing printing by “conventional printing technology”). Patent Owner does not dispute that Maurer discloses this limitation.

- c) *“applying a laminate layer atop the printed article core”*

We are persuaded that Maurer discloses “applying a laminate layer atop the printed article core,” because Maurer discloses a multi-layered

identification card in which card core 14 is laminated between cover sheets 10 and 12, i.e., laminate layers. Pet. 37. Patent Owner does not dispute that Maurer discloses this limitation.

d) “*ablating the laminate layer to impart a tactile feature thereto*”

Petitioner persuasively argues that Maurer discloses “ablating the laminate layer to impart a tactile feature thereto,” as recited in claim 8. Pet. 37–38. Petitioner relies on Maurer’s disclosure of, by means of a laser beam, concurrently marking cover sheet 10, i.e., the asserted laminate layer, with a “permanent relief-type structure.” *Id.* at 38 (citing Ex. 1005 (4:25–30)). As we discussed above, we agree with Petitioner that the process used to create the relief-type structure is an ablation process because Maurer discloses that the structure is formed when cover sheet 10 is melted with a laser, and a skilled artisan would have understood that this discloses laser-ablation because Maurer’s process is one that removes material from cover sheet 10. *Id.* at 38–39 (citing Ex. 1005, 6:18–23; Ex. 1002 ¶ 111); *see also supra* Sec. II.C.2.c.i–ii. Patent Owner does not argue in the context of claim 8 that the process disclosed in Maurer fails to describe laser ablation in the context of claim 8.

Petitioner argues persuasively that the relief-type structure in Maurer involves a *tactile feature*, as recited in claim 8, because Maurer discloses that the relief-type structure can be felt manually. *Id.* at 38 (citing Ex. 1005, 6:18–23 (“a relief is formed above the line of the printed information and in register therewith which can also be *felt manually*”) (emphasis added)); *see also* Ex. 1005, 9:9–11 (“the information on said transparent cover sheet is in relief and can be *sensed by touch*” (emphasis added))). Patent Owner does

not dispute that the relief-type structure disclosed in Maurer is a tactile feature. *See generally* PO Resp. 49–52 (arguing about motivation to combine Maurer with Fry, but not addressing whether Petitioner has shown that Maurer’s relief-type structure discloses a tactile feature). Indeed, to do so would directly contradict Maurer’s express disclosure that the relief-type structure can be felt manually and can be sensed by touch. Ex. 1005, 6:18–23, 11:9–11.

Even though Petitioner argues, and shows persuasively, that Maurer discloses “ablating the laminate layer to impart a tactile feature thereto,” Pet. 38–39, as discussed above, Petitioner also argues that Fry provides confirmation that scoring and grooving of plastic removes material and discloses implementation details. *Id.* at 39. Petitioner provides the same arguments as those for claim 7, discussed above, *supra* Sec. II.C.2.c.iii, with regard to the combination of Maurer with Fry. Pet. 39. Patent Owner does not provide any arguments for claim 8 in addition to those for claim 7. PO Resp. 49–52.

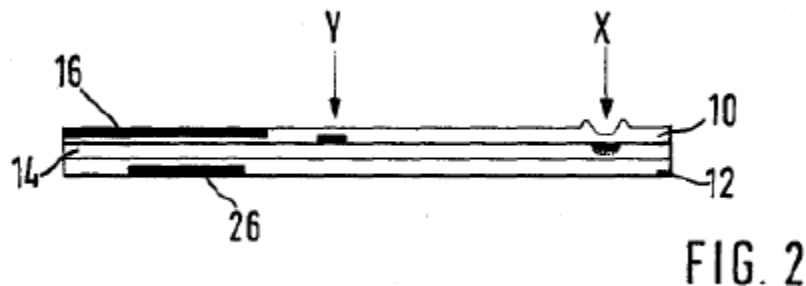
For the reasons discussed in this subsection and discussed above with regard to claim 7, *supra* Sec. II.C.2.c.ii–iii, and claim 2, *supra* Sec. II.C.2.c.i, which recites “[t]he article of claim 1 in which said voids are formed by laser-ablating the outer top layer of the article,” we find Petitioner’s arguments persuasive, even without the combination with Fry.

We address Patent Owner’s arguments about the combination with Fry in greater detail in our discussion of claim 3, *infra* Sec. II.C.2.c.ii, and for the reasons stated therein, we do not agree with Patent Owner’s

arguments. For these additional reasons, Patent Owner's arguments do not undermine Petitioner's showing for this claim limitation.

e) “without ablating the document core”

For the limitation “without ablating the document core,” as recited in claim 8, Petitioner argues that the relief-type structure disclosed in Maurer's cover sheet 10 does not extend into core layer 14, i.e., the asserted document core. Pet. 39–40. We are persuaded by Petitioner's argument, which is supported by Figure 2 of Maurer, which Petitioner argues, and from which can be seen below, shows that the relief-type structure denoted by arrow X does not extend into core layer 14.



Ex. 1005, Fig. 2. Figure 2 illustrates a cross-section of a multi-layered identification card. *Id.* at 5:27–28. The card includes card core layer 14 between cover sheets 10 and 12. *Id.* at 5:38–41. Maurer discloses that cover sheet 10 can be melted with a laser beam such that a relief-type structure is formed above, and in register with, a line of information printed on core layer 14. *Id.* at 6:18–22; *see also id.* at 5:41–51 (describing printed information on core layer 14), 6:14–16 (describing printing alphanumeric indicia on core layer 14). The relief-type structure is indicated by arrow X. *Id.* at 6:23. Figure 2 clearly depicts the relief-type structure designated by

arrow X as a groove in cover sheet 10, but the groove does not extend into core layer 14. *Id.* at Fig. 2. This depiction is consistent with Maurer’s disclosure, which states *cover sheet 10* can be melted, but does not describe any melting of core layer 14. *Id.* at 6:18–22. Petitioner’s declarant, Dr. Tentzeris, states that a person of ordinary skill in the art would have understood that the process in Maurer does not ablate core layer 14 because the groove of Maurer’s relief-type structure extends only into cover layer 10, and does not extend into core layer 14. Ex. 1002 ¶ 115. We find this testimony credible in light of Figure 2’s clear depiction of a groove that extends only into cover layer 10 and Maurer’s description of melting cover layer 10. Patent Owner does not dispute that Maurer alone discloses the limitation “without ablating the document core.” We find, therefore, that Petitioner has shown persuasively that Maurer discloses this limitation.

Even though Petitioner argues, and shows, that Maurer discloses this limitation, Petitioner provides additional arguments, namely that Bernecker and Fry each disclose this limitation. Pet. 40–41.

With regard to Bernecker, Petitioner relies on disclosure that *colorless* engravings can be disposed “on a separate information carrier,” e.g., on something separate from the document core. *Id.* at 40. Petitioner’s argument appears to be that Bernecker therefore discloses imparting a colorless engraving, e.g., a tactile feature, without ablating the document core. With regard to claim 8, Patent Owner does not make any arguments about the appropriateness of combining Maurer with Bernecker. PO Resp. 49–52. Also, the parties’ arguments regarding the combination of

Maurer and Bernecker do not alter our finding that Petitioner has shown persuasively that Maurer discloses the limitation at issue.

With regard to Fry, Petitioner argues that this reference discloses how to score a *single* thermoplastic layer that does not penetrate into, and therefore does not ablate, lower layers. Pet. 40 (citing Ex. 1007, 2:29–31, 2:31–33; Ex. 1002 ¶ 117). Petitioner argues that a skilled artisan would have been motivated to apply the known techniques disclosed in Fry to create Maurer’s relief structure. Pet. 41. Petitioner argues that a skilled artisan, in further view of Bernecker, would have been motivated to implement Maurer’s relief-type structure by itself rather than in conjunction with printed information beneath it, and in so doing, the laser would not have ablated layers underneath core layer 14. *Id.*

Patent Owner does not identify any limitation of claim 8 that it contends Petitioner has failed to show is disclosed by Maurer. *See generally* PO Resp. 49–52. Rather, Patent Owner argues claim 8 together with claims 2 and 7. *Id.* As we discussed above for claim 7, Patent Owner argues that Petitioner does not provide a motivation for combining Fry with Maurer and Bernecker, asserting that (1) Fry is in a divergent field of endeavor, and (2) Fry’s bead is scorched, not colorless as argued by Petitioner. *Id.* at 50.

For reasons discussed in this subsection, and above with regard to claim 7, *supra* Sec 2. II.C.2.c.iii, claim 2, *supra* Sec. II.C.2.c.i, which recites “[t]he article of claim 1 in which said voids are formed by laser-ablating the outer top layer of the article,” we find Petitioner’s arguments persuasive, even without the combination with Fry.

We address Patent Owner’s arguments about the combination with Fry in greater detail in our discussion of claim 3, *infra* Sec. II.C.2.c.ii, and for the reasons stated therein, we do not agree with Patent Owner’s arguments. For these additional reasons, Patent Owner’s arguments do not undermine Petitioner’s showing for this claim limitation.

Petitioner argues that Maurer discloses “said tactile feature containing the information concerning said person,” as recited in claim 8. Pet. 41–42. Petitioner relies on Maurer’s disclosure of inscribing personal data in the interior of a multi-layered identification card, e.g., printing personal data on to core layer 14. *Id.* at 41 (citing Ex. 1005, 4:3–7). Petitioner points out that Maurer discloses that at the same time personal data is printed on core layer 14, a laser beam concurrently marks cover layer 10 with a permanent relief-type structure. *Id.* (citing Ex. 1005, 4:25–30). Petitioner, in reliance on Dr. Tentzeris’s declaration, argues that a person of ordinary skill in the art would have understood that the relief-type structure, like the information printed on core layer 14, also contains the personal information because both are inscribed at the same time by means of the laser beam. *Id.* at 42 (citing Ex. 1002 ¶ 120). We credit Dr. Tentzeris’s testimony because it is consistent with Maurer’s disclosure that the printing of alphanumeric indicia on core layer 14 occurs concurrently, and in register, with the formation of the relief-type structure in cover layer 10 by using the same laser beam. Ex. 1005, 6:14–23. The laser beam, at the same time, both burns the surface of core layer 14 and melts cover sheet 10 to form a relief-type structure. *Id.* We find it credible, therefore, that the personal data that is printed on core layer 14 also is formed in cover sheet 10 as a relief-type structure.

Accordingly, Petitioner shows persuasively that Maurer discloses the limitation at issue.

Even though Petitioner argues that Maurer discloses ablating the laminate layer without ablating the document core, Petitioner provides additional argument, namely that Bernecker confirms use of tactile structures, such as Bernecker's colorless engravings, to convey personal information. Pet. 43 ("Bernecker confirmed that colorless engraving also provides the personal information"). Petitioner argues that, in view of Bernecker, it would have been obvious for Maurer's relief-type structure to convey personal information. *Id.* at 42–43. We find this credible because it is consistent with Maurer, which discloses including personal data on a multi-layered identification card, Ex. 1005, 5:54–57, and further that the relief-type structure formed on the card conveys information, *id.*, claim 3 ("the information on said transparent cover sheet is in relief"). Patent Owner does not provide arguments for claim 8 that specifically addresses Petitioner's argument that Bernecker confirms it would have been obvious for Maurer's relief-type structure to convey personal information. *See generally* PO Resp. 49–52 (discussing the ground under which Petitioner argues claim 8).

f) *"wherein the article is one or more of: an identification document
...*"

For reasons discussed above, *supra* Sec. II.C.2.a, Petitioner has shown persuasively, and Patent Owner does not dispute, that Maurer's multi-layered identification card discloses "wherein the article is one or more of: an identification document," as recited in claim 8. Pet. 43.

g) Summary

Upon review of the record, for the reasons stated above, we determine that Petitioner has shown, by a preponderance of the evidence, that claim 8 of the '152 patent is unpatentable under 35 U.S.C. § 103(a) over the combination of Maurer, Bernecker, and Fry.

*d. Claims 5 and 6—Obviousness over Maurer, Bernecker, and Gunn—
Claims 5 and 6*

Claim 5 recites “[t]he article of claim 1, wherein the at least one layer comprises a polycarbonate.” Ex. 1001, 11:22–23.

Claim 6 recites “[t]he article of claim 1, wherein the article further comprises a semi-conductor core.” Ex. 1001, 11:24–25.

Petitioner relies on Gunn for these limitations. Pet. 43–46. Petitioner provides reasoned analysis as to why a skilled artisan, in view of Gunn, would have used polycarbonate for the cover sheet in Maurer, and would have included a semi-conductor add-on device in Maurer’s identification card. *Id.* For example, for claim 5, we find persuasive Petitioner’s reliance on Gunn’s disclosure of polycarbonate as a well-known option for the laminate layer in an identification card such as the card in Maurer. *Id.* at 44. For claim 6, we find persuasive Gunn’s disclosure of integrating an integrated circuit chip, e.g., semiconductor device, on an identification card, to provide additional information because Gunn discloses that it was well-known to include such circuit chip in addition to a magnetic strip, such as the magnetic strip disclosed in Maurer. *Id.* at 46.

Patent Owner does not provide any arguments for claims 5 and 6 in addition to those argued for claim 1. PO Resp. 52–53.

Upon review of the record, for the reasons stated above, we determine that Petitioner has shown, by a preponderance of the evidence, that claims 5 and 6 of the '152 patent are unpatentable under 35 U.S.C. § 103(a) over the combination of Maurer, Bernecker, and Gunn.

e. Claim 9—Obviousness over Maurer and Fry

i. “An article comprising at least one layer of material”

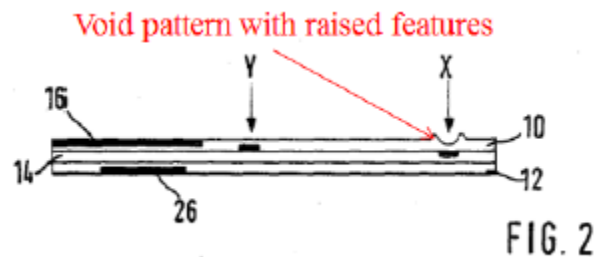
For reasons discussed above, *supra* Sec. II.C.2.a, Petitioner has shown persuasively, and Patent Owner does not dispute, that Maurer’s multi-layered identification card discloses “an article comprising at least one layer of material.” Pet. 48–49.

ii. “the top surface of the article including a laser-formed void pattern creating an indicia the article characterized by raised features that are also laser-formed”

Petitioner relies on Maurer’s disclosure of cover sheet 10 for a top surface and Maurer’s relief-type structure formed by a laser beam in cover sheet 10 for a laser-formed void pattern. Pet. 48–49. Petitioner argues that the relief-type structure includes a void pattern, or empty space. *Id.* at 49. We are persuaded that the a skilled artisan would have understood that the void pattern in the relief-type structure provides an indicia because the relief-type structure is created at the same time, with the same laser, and in register with printed information on core layer 14. *Id.* As explained by Petitioner, the printed information and the pattern in the relief-type structure are indicia because the '152 patent states that the terms “indicium” and “indicia” are used to cover “markings suitable for human reading [and]

machine reading,” and that Maurer’s relief-type structure is suitable for human reading. *Id.* (citing Ex. 1001, 5:28–30; Ex. 1002 ¶ 138).

For the recitation that the article is “characterized by *raised* features that are also laser-formed,” Petitioner argues that Maurer’s relief-type structure provides raised features. *Id.* at 49–50. Petitioner relies on Figure 2, reproduced below with Petitioner’s annotations in red.



Ex. 1005, Fig. 2 (with annotations by Petitioner in red). Figure 2 depicts a cross-section of a multi-layered identification card, and shows core layer 14 between cover layers 10 and 12. *Id.* A relief-type structure is indicated by arrow X. *Id.* We are persuaded that the relief-type structure is characterized by raised features that are laser-formed because the relief-type structure is depicted as a void, or groove, in cover layer 10 having raised edges on each side formed by a laser. *Id.*

Petitioner argues that Fry, like Maurer, similarly discloses a process for scoring or grooving thermoplastic with a laser beam to form a bead along the sides of the score or groove. Pet. 50 (citing Ex. 1007, 2:69–75, Fig. 2). According to Petitioner, a person of ordinary skill in the art would have understood that creating a tactile/raised security feature, as disclosed in Maurer, using implementation details as disclosed in Fry, would have resulted in a void pattern creating an indicia in the top surface of a laminate

layer, characterized by raised features along the edges of the void pattern. *Id.* (citing Ex. 1002 ¶ 140).

Patent Owner argues claim 9 as a group with claims 2, 3, 7, and 8. PO Resp. 49–52. Patent Owner’s argument specific to claim 9 is that Maurer does not disclose *raised features* that can be felt by touch. PO Resp. 51–52, 56–58; *see also id.* at 14–23 (characterizing Maurer as not disclosing raised features). This is the same argument Patent Owner raises at to claim 3. *Id.* at 56–58. We addressed the parties’ arguments as to Maurer’s disclosure of *raised features* in our discussion of claim 3. *Supra* Sec. II.C.2.c.ii.

As we discussed above as to claim 3, we find Petitioner’s showing that the relief-type structure is characterized by raised features that are laser-formed to be persuasive and Patent Owner’s arguments do not undermine Petitioner’s showing. *Id.*

iii. “said raised featured comprising foamed material”

We are persuaded that Fry teaches “said raised features comprising foamed material,” are recited in claim 9, Pet. 50–51, because Fry discloses that grooving or scoring of thermoplastic results in “small bubbles” in the bead. *Id.* (citing Ex. 1007, 3:63–68). Dr. Tentzeris credibly testifies that that a person of ordinary skill in the art would have understood that these small bubbles in the bead are within the scope of “foamed material” recited in claim 9, because the bubbles in the bead are visible to microscopic inspection. *Id.* at 51 (citing Ex. 1002 ¶ 141). Therefore, we find persuasive Petitioner’s arguments that a skilled artisan would have understood from Fry that implementing a raised feature based on Maurer’s and Fry’s teachings

would have resulted in raised features comprising foamed laminate material.
Pet. 51.

With regard to reasons to combine Fry with Maurer, Petitioner relies on the testimony of Dr. Tentzeris and argues that Maurer teaches forming a raised feature in the laminate layer of a multi-layered identification document, and Fry teaches implementation details for forming raised features in a laminate layer in a manner that results in foamed raised features. *Id.* at 47–48 (citing Ex. 1002 ¶ 132–136). We find it persuasive that a skilled artisan, reading Maurer’s disclosure regarding using a laser to melt a laminate layer to form features would have looked to other references that provide additional details about laminate layers, and how to form features on such layers using a laser beam, because Maurer discloses, for example, that “other features not shown here may also be provided by means of the laser beam without departing from the scope of the invention.” Ex. 1005, 7:1–3.

Patent Owner does not dispute that Fry’s small bubbles disclose foamed material. PO Resp. 50–51. However, Patent Owner argues that Petitioner has not shown a reason to combine Maurer with Fry. *Id.* Patent Owner’s argument is the same as for claims 2, 3, 7, and 8, which are argued as a group with claim 9. *Id.* at 50. We discuss this argument above with regard to claim 3. *Supra* Sec. II.C.2.c.ii.

For reasons discussed in this subsection and above, *Supra* Sec. II.C.2.c.ii, we find Petitioner has made a persuasive showing and Patent Owner’s arguments do not undermine Petitioner’s showing.

- iv. *“the raised features extending above a nominal top surface level of the article to provide a tactile effect that aids in verifying the authenticity of the article”*

Claim 9 recites “the raised features extending above a nominal top surface level of the article to provide a tactile effect that aids in verifying the authenticity of the article.” Ex. 1001, 12:16–18. Petitioner argues that the asserted raised features, i.e., the raised edges of Maurer’s relief-type structure, extend above the top surface of the multi-layer identification card. Pet. 51 (relying on Ex. 1005, Fig. 2). We agree with Petitioner that Figure 2 of Maurer depicts raised edges that extend above the top surface of the identification card. *Id.*; *see also* Ex. 1005, Fig. 2.

For the requirement that the raised features “provide a tactile effect that aids in verifying the authenticity of the article,” Petitioner relies on Maurer’s disclosure that of marking cover sheet 10 to create a security feature that is ““accessible to *manual inspection*.”” Pet. 51 (citing Ex. 1005, 4:25–30; Ex. 1002 ¶ 142–143). Petitioner argues that a skilled artisan would have understood this to “‘provide a tactile effect’ and would aid in verifying the authenticity of a document” because it would have been understood and obvious that a security feature that can be felt by touch predictably aids in verifying the authenticity of a document. *Id.* (citing Ex. 1002 ¶ 143). To support its arguments, Petitioner relies on Dr. Tentzeris’s testimony that a skilled artisan reading claim 3 of Maurer, which recites that *the information is in relief and can be sensed by touch*, would have understood that the purpose of providing information that can be sensed by touch is to provide another layer of security against counterfeiting. Ex. 1002 ¶ 143 (citing

Ex. 1005, claim 3). We credit this testimony because it is consistent with Maurer’s disclosure of a basic need to protect against forgery and counterfeiting, Ex. 1005, 1:13–1, and disclosure that marking the cover sheet with a permanent relief-type structure that renders the card accessible to manual inspection makes it impossible to remove the information without visibly damaging the cover sheet, *id.* at 4:25–36.

Patent Owner does not dispute that Maurer’s relief-type structure provides a tactile effect that aids in verifying the authenticity of the article. PO Resp. 49–52. However, Patent Owner argues that Maurer’s relief does not have raised edges that *extend above the top surface* of the identification card, as required by claim 9, but rather is formed of depressions that provide the tactile effect. *Id.* at 56–58; *see also id.* at 14–23 (characterizing Maurer). These are the same arguments Patent Owner makes for claim 3, which Patent Owner argues as a group with claim 9.

Above, in our discussion for claim 3, we addressed Patent Owner’s arguments, *supra* Sec. II.C.2.c.ii.

For reasons discussed in this subsection and above, *supra* Sec. II.C.2.c.ii, we find Petitioner has made a persuasive showing and Patent Owner’s arguments do not undermine Petitioner’s showing that Maurer’s relief-type structure provides raised features that provide a tactile effect.

- v. “*wherein the article is one or more of: an identification document*
...”

For reasons discussed above, *supra* Sec. II.C.2.a, Petitioner has shown persuasively, and Patent Owner does not dispute, that Maurer’s multi-

layered identification card discloses “wherein the article is one or more of: an identification document,” as recited in claim 9. Pet. 52.

vi. Summary

Upon review of the record, for the reasons stated above, we determine that Petitioner has shown, by a preponderance of the evidence, that claim 9 of the ’152 patent is unpatentable under 35 U.S.C. § 103(a) over the combination of Maurer and Fry.

f. Claims 10 and 11—Obviousness over Maurer, Fry, and Gunn

Claims 10 and 11 involve the same features as claims 5 and 6, namely that the laminate layer comprises a polycarbonate, and that the article further comprise a semi-conductor device, respectively.

Claim 10 recites “[t]he article of claim 9, wherein at least one layer of material comprises a polycarbonate.” Ex. 1001, 12:25–26.

Claim 11 recites “[t]he article of claim 9, wherein the article further comprises a semi-conductor device.”

As with for claims 5 and 6, Petitioner relies on Gunn for claims 10 and 11. Pet. 52–56. For the same reasons as with regard to claims 5 and 6, we find Petitioner’s arguments and evidence to be persuasive.

Patent Owner does not provide any arguments for claims 5 and 6 in addition to those argued for claim Petitioner’s grounds 2 and 4 (*see* Pet. 4). PO Resp. 52–53.

For reasons discussed above, *Supra* Sec. II.C.2.d, we find Petitioner has made a persuasive showing and Patent Owner’s arguments do not undermine Petitioner’s showing.

Upon review of the record, for the reasons stated above, we determine that Petitioner has shown, by a preponderance of the evidence, that claims 10 and 11 of the '152 patent are unpatentable under 35 U.S.C. § 103(a) over the combination of Maurer, Fry, and Gunn.

g. *Claim 12—Obviousness over Maurer, Bernecker, Fry, and Ross*

i. *“an article comprising a core layer and at least one outer laminate layer”*

For reasons discussed above, *supra* Sec. II.C.2.a, Petitioner has shown persuasively, and Patent Owner does not dispute, that Maurer’s multi-layered identification card discloses “an article comprising at least one layer of material.” Pet. 65.

ii. *“wherein the top surface of the outer laminate layer is laser-ablated to form a pattern, the pattern being substantially non visible when viewed straight on, wherein the pattern provides a feature that can be felt by touch”*

With regard to claim 12’s recitation that the outer laminate layer of the article “is laser-ablated to form a pattern” that is “substantially non visible when viewed straight on, wherein the pattern provides a feature that can be felt by touch,” Petitioner refers to these requirements as a combined security feature “ha[ving] *both* (1) a tactile effect and (2) a quality of being substantially non visible when viewed straight on.” Pet. 56. Petitioner argues persuasively that it would have been obvious to implement a multi-layered security card having a combined security feature based on the combined teachings of Maurer, Bernecker, and Fry. Pet. 65–69.

For disclosure of a pattern that is formed by laser-ablation Petitioner relies on Maurer’s relief-type structure. *Id.* at 56, 65–66. For the recitation

that the pattern is substantially non visible when viewed straight on, Petitioner relies on Bernecker's disclosure of a security feature that "appears only at a glancing angle," but has no color contrast with its surroundings and therefore is not visible when viewed straight on. *Id.* at 68 (citing Ex. 1006, 2:16–22, 2:53–56, 2:63–65); *see also* Ex. 1006, [57] ("information is readable at least at a certain viewing angle but has no color contrast with its surroundings"). For the recitation that the pattern provides a feature that can be felt by touch Petitioner relies on Maurer, Bernecker, and Fry. *Id.* at 69.

Petitioner provides a reasoned rationale to combine the collective teachings of Maurer, Bernecker, and Fry for implementing the combined security feature.

Petitioner argues that the relief-type structure in Maurer upon which Petitioner relies is formed in the top surface laminate layer of the card, and furthermore is formed by a laser process. *Id.* at 66–67. Petitioner points out that this is similar to Bernecker in that Bernecker, like Maurer, discloses forming a security feature—i.e., a microrelief in the form of characters, patterns or the like that can be seen only at a glancing angle (optically variable or OV quality)—in the top laminate layer of a card using a laser process. *Id.* at 67; Ex. 1006, 2:19–22, 2:57–65. Petitioner argues further that both laser processes, Maurer's and Bernecker's, disclose removing material from an upper coversheet or laminate. Pet. 66–67. We find Petitioner's arguments persuasive. Maurer discloses the relief is formed when the upper cover sheet is melted, which Dr. Tentzeris explains would have been understood to remove material from the upper cover sheet or laminate, and Bernecker discloses heat from the laser removing areas by

evaporating material to form depressions in the form of readable information. *Id.* (citing Ex. 1005, 6:18–23, Ex. 1002 ¶ 172, Ex. 1006, 2:22–25).

Petitioner explains that Fry provides further confirmation that scoring or grooving of plastics removes, or ablates, material and discloses further implementation details. *Id.* at 67.

Petitioner persuasively argues that it would have been obvious to a person of ordinary skill in the art to combine the *tactile* property of Maurer with the *optically variable* feature of Bernecker because both features are formed using laser-ablation on the top, or outer, laminate layer, and both provide security. We are persuaded, moreover, that Fry would have provided further implementation details. For example, for the reasons we discussed above with regard to claim 8’s recitation of laser-ablating the laminate layer to impart a tactile feature and claim 7’s recitation of information defined by laser-ablated voids, we are persuaded that Maurer discloses laser-ablating the top surface of an outer laminate layer to form a pattern, as recited in claim 12, and that Fry confirms this. *See supra* Sec. II.C.2.c.iv.d (discussing claim 8), II.C.2.c.iii.b (discussing claim 7). Also, we are persuaded Bernecker discloses laser-ablation because Bernecker expressly discloses that plastic is evaporated, or removed, by a laser, Pet. 67 (citing Ex. 1006, 3:13–17), and Dr. Tentzeris explains, and Patent Owner does not dispute, that ablation removes material, Ex. 1002 ¶ 83.

Moreover, Petitioner provides as further motivation to combine Maurer’s tactile security feature with Bernecker’s OV security feature the following considerations:

(1) the desire to have multiple security features, (2) the known use and benefits of tactility and optical variability as security features, (3) *Bernecker's* recognition that clear/colorless engraving is useful by itself, (4) recognition that visibility only at a glancing angle would benefit clear engravings with tactile features and vice versa, and (5) the straightforward process of implementing such a feature, as disclosed by *Fry* and evidenced by the '152 patent's lack of any implementation details.

Reply 16–17 (citing Pet. 56–64).

Petitioner argues, relying on the testimony of Dr. Tentzeris, that a skilled artisan would have appreciated the desirability of adding multiple security features to an identification card and would have selected from the features known to persons of ordinary skill in the art. Pet. 56 (citing Ex. 1002 ¶ 154). We credit Dr. Tentzeris's testimony because it is supported by the record. For example, Maurer explains that to prevent counterfeiting, a card core “can be safeguarded by a number of different measures and by employing a number of different techniques.” Ex. 1005, 1:26–29. Maurer also describes implementing multiple security features on an identification card, such as a pattern individual to the card and applied by means of a laser beam in a manner “making it more difficult to forge the identification card,” *id.* at 5:59–60, 6:2–5, and inscription of personal data in the card interior after lamination “thereby protecting it from manipulation or tampering to a far greater extent than with unlaminated card cores, should they fall into the wrong hands,” *id.* at 4:3–7, 4:19–24. Maurer explains that “other features not shown here may also be provided by means of a laser beam without departing from the scope of the invention.” *Id.* at 6:68–7:3.

In light of the understanding of a skilled artisan that it would have been desirable to include multiple security features on a card to enhance security, Petitioner argues that it would have been obvious to combine Bernecker's colorless laser engraving that can be seen only when viewed at a glancing angle with Maurer's transparent relief structure (which Petitioner argues can be felt by touch) both at underlying colorless and blackened (printed) areas, because both engraving features are on the surface of the identification card, thereby combining security features to make a more secure card. *See* Pet. 57–59. Also, according to Petitioner, at certain underlying printed areas, some of the relief features can be compared with any printed information inscribed beneath the engraving or relief structure in a lower layer of the identification card to provide added authenticity. *See* Pet. 57–59. Petitioner argues a skilled artisan would have recognized the benefits that can be achieved by a security feature that both can be viewed only at a glancing angle (as disclosed in Bernecker) and that can be sensed by touch (as disclosed in Maurer), and that it would have been straightforward to implement and would have provided expected functionality. *Id.* at 59.

We find Petitioner's arguments to be persuasive because they are supported by the evidence of record. For the reasons explained above and below, Fry and Maurer each teach clear raised tactile features, with Maurer disclosing a relief on a transparent cover sheet through which printed information is visible as Figure 2 of Maurer shows. *See supra* Section II.C.2.c.ii.c (discussing Maurer's raised tactile feature); *see id.* at Sec. II.C.2.g.ii.a (discussing Maurer's colorless relief); *see also id.* at Sec.

II.C.2.c.ii.b (discussing Fry’s unscorched bead). Maurer generally contemplates “*other features not shown here . . . provided by means of the laser beam.*” Ex. 1005, 7:1–2 (emphasis added). Bernecker provides such “other features,” in the form of colorless OVD features, produced by a laser, as both parties recognize. In addition, similar to Maurer, Bernecker contemplates retaining many known card features, Ex. 1007, 3:49–60, 4:53–54, like those of Maurer.

For the foregoing reasons, Petitioner persuasively shows the combined security would have been obvious in view of Maurer, Bernecker, and Fry. For reasons stated below, Patent Owner’s arguments do not undermine Petitioner’s showing.

Patent Owner’s arguments largely rely on materially the same evidence and arguments it relies upon regarding the combination of Maurer, Bernecker, and Fry for grounds 1, 2, and 4 asserted by Petitioner. PO Resp. 53 (“For the reasons described above with regard to Grounds 1, 2 and 4, Petitioner’s argument for the combination of Maurer, Bernecker and Fry should be rejected”). Patent Owner’s arguments for ground 1 are (1) Maurer does not teach a raised tactile feature, *id.* at 32–35, (2) Maurer does not teach a colorless engraving process, *id.* at 35–37, (3) Bernecker does not teach forming colorless features in register with contrasting features, *id.* at 37–39, (4) Bernecker and Maurer are systematically different references that cannot be combined without undermining their respective purposes, *id.* at 39–43, and (5) Petitioner’s motivation to combine is flawed because combining Maurer’s tactile relief with Bernecker’s optically variable device would result in a credential having fewer security features than the original card

taught in Maurer, *id.* at 49. We addressed Patent Owner’s arguments regarding Maurer’s raised tactile feature in our arguments for claim 3, *supra* Sec. II.C.2.c.ii, and for the reasons discussed therein we do not agree with Patent Owner. We addressed Patent Owner’s arguments for grounds 2 and 4 in our arguments for claims 2, 3, 7, and 8, and 9, *supra* Secs. II.C.2.c., II.C.2.e, and for the reasons discussed therein we did not agree with Patent Owner.

Patent Owner argues that, in addition to the lack of motivation to combine Maurer and Bernecker discussed with regard to grounds 1, 2, and 4, Petitioner’s combination suffers from two additional flaws. PO Resp. 53–54. The two asserted flaws are (1) Maurer does not, as argued by Petitioner, teach a “clear” relief,¹⁵ and (2) a skilled artisan would not have implemented Maurer’s relief by itself, i.e., without the printed information below it. *Id.* at 54–55.

a) Maurer’s Colorless relief

As to whether Maurer teaches a clear, or colorless, relief, this is essentially the same argument Patent Owner makes for claim 1 that Maurer does not teach colorless engraving. *See generally* PO Resp. 35–39, 54–55. Patent Owner argues that Petitioner cannot cite to anything in Maurer that

¹⁵ Patent Owner incorrectly asserts that this asserted flaw is in addition to those discussed for claim 1. PO Resp. 54. Patent Owner addresses its assertion that Maurer fails to teach a clear relief much more fully in its discussion for claim 1. *Id.* at 35–37. Indeed, in its discussion for claim 12, Patent Owner provides only a few conclusory sentences, in contrast with the few-pages of discussion for claim 1. *Id.* at 35–37, 54.

teaches that cover sheet 10 remains clear after it is laser processed. *Id.* at 54. In its discussion of claim 1, Patent Owner asserts that Maurer does not teach a colorless engraving process. *Id.* at 35–37. Patent Owner’s argument is that Petitioner, without providing sufficient explanation, assumes that cover sheet 10, which is transparent (or clear), remains clear after performing the laser process that forms the relief-type structure. *Id.* at 35. Patent Owner argues that there is nothing in Maurer to suggest that the cover sheet does not blacken as a result of the laser process. *Id.* (citing Ex. 2007 ¶ 102). Patent Owner relies on the testimony of Dr. Cairns to support its argument, but as with the Response, rather than explain why blackening occurs Dr. Cairns merely argues that nothing in Maurer indicates that blackening does not occur. *Id.* (citing Ex. 1007 ¶ 102). Patent Owner’s argument would require Petitioner to prove a negative. We do not, as Patent Owner suggests, begin with the assumption that the cover sheet blackens, then look to see whether Petitioner has shown that it does not. Rather, we consider the evidence and arguments as a whole as to what Maurer discloses or would reasonably have taught or suggested to a person of ordinary skill in the art.

We agree with Petitioner that Maurer does not describe any blackening of cover sheet 10 as a result of performing the laser process that forms the relief-type structure. *See* Reply 18. This is in contrast with Maurer’s express disclosure of blackening of a different layer—the core layer—as a result of the same process that results in the relief-type structure. *Id.* (citing Ex. 1005, Fig. 2). Petitioner points out that Figure 2 of Maurer, consistent with the description of “blackening” the card core, Ex. 1005, 6:14–16 (describing “blackening” the card core by burning with a laser),

depicts a blackened region aligned with arrow X on core layer 14. *Id.* In contrast, Figure 2 depicts the relief-type structure indicated by arrow X in cover sheet 10 as transparent, consistent with Maurer’s description that does not mention blackening. *Id.* In addition, Maurer explains that the invention relates to providing information that “can be perceived visually through [the] transparent cover sheet,” indicating the coversheet remains transparent after the information has been inscribed on the core layer. *Id.* (quoting Ex. 1005, 1:5–10). We are persuaded that a skilled artisan would have understood that transparent cover layer 10 remains transparent as a result of the laser process based on Figure 2, and because Maurer discloses that the process blackens core layer 14 but does not mention any blackening of cover layer 10.

As to Dr. Cairns’ testimony, Ex. 1007 ¶ 102, Petitioner points out that Dr. Cairns’ assertion that the melting process in Maurer would have caused blackening is inconsistent with his position that Maurer teaches only gentle melting (to support his position that no vaporization occurs), *id.* ¶ 88, and that the melting is entirely reversible by merely allowing the substrate to cool, *id.* ¶ 45. Reply 19. We find persuasive Petitioner’s argument that Dr. Cairns’ positions are inconsistent, thus rendering his assertions less credible. Dr. Cairns states that the melting process in Maurer would use “far lower amounts of laser energy” than that used to form a microchannel like in Fry, and asserts that the melting process in Maurer would be reversible by merely allowing the substrate to cool. Ex. 1007 ¶¶ 44–45. Maurer describes blackening of the core layer as “thermally and irreversibly” degrading the core. Ex. 1005, 8:63–68. Dr. Cairns does not reconcile how blackening (burning/scorching) a cover sheet would be reversible merely by allowing it

to cool. The inconsistency of these positions casts doubt on the credibility of Dr. Cairns' assertions.

Patent Owner also asserts that claim 1 of Maurer *requires* that the “visually perceptible” information be “formed in said cover sheet in register with and simultaneously with the information in the card core.” PO Resp. 35. Patent Owner's argument appears to be that this requirement means that Maurer's relief-type structure must be visually perceptible, and that visually perceptible means not colorless. Contrary to Patent Owner's assertion, claim 1 of Maurer does not require that the information in cover sheet 10 be visually perceptible. Reply 19. Claim 1 of Maurer recites that the information is visible in the core layer, and further recites that the information also is formed in the cover sheet. Ex. 1005, 8:58–9:2. However, unlike with the core layer, claim 1 does not specify that the information is visible in the cover sheet. *Id.* Moreover, Petitioner points out that Bernecker describes colorless optically variable features that are visible only when viewed from certain angles, which indicates that “visually perceptible” is not the same thing as colorless. Reply 19–20.

Patent Owner also asserts that Bernecker expressly recognizes that Maurer does not use colorless engraving. PO Resp. 36. Patent Owner relies on what it asserts is discussion in Bernecker of a German patent application corresponding to Maurer. *Id.* (citing Ex. 1006, 2:26–34). Patent Owner argues that Bernecker distinguished its colorless laser processing technique from the process in Maurer. *Id.* The relied upon disclosure in Bernecker states

Laser inscription with its many-sided advantages has long been part of common practice in personalizing identity documents (*DE 29 07 004 C2*, *DE 30 48 736 A1*, *DE 31 51 407 C1*). Since one of the main problems in this field is forgeryproof application of personal data, however, this technology has been discussed and developed exclusively from the point of view of producing clearly readable information contrasting with its surroundings in the form of discolorations of the material.

Id. (quoting Ex. 1006, 2:26–34). Patent Owner argues that Bernecker then expressly distinguishes its colorless laser processing technique with the contrasting laser inscription process in Maurer. *Id.* (citing Ex. 1006 at 2:53–56; Ex. 2007 at ¶ 109). Patent Owner asserts that, “[i]n fact, Bernecker claims that its ‘invention is based on the finding that the surface quality of a plastic film can be altered by means of a suitably controlled laser without producing discolorations in the plastic material.’” *Id.* at 36–37 (citing Ex. 2006, 2:16–19; Ex. 2007 ¶ 103). Petitioner argues, and we agree, that Patent Owner mischaracterizes Bernecker as expressly distinguishing the German application corresponding to Maurer with the colorless engraving technique of Bernecker. Reply 19–20. The paragraph citing the German application states only that laser inscription has long been part of common practice in personalization identify documents. Ex. 1006, 2:26–34. Patent Owner then selectively skips an intervening paragraph describing entirely different patent applications, *id.* at 2:35–52, to contend that in the following paragraph, *id.* at 2:53–56, that Bernecker “expressly distinguishes its colorless laser processing technique” from that of Maurer. Reply 19–20. In

view of the intervening paragraph, Ex. 1006, 2:35–52, and the only express disclosure regarding the German application corresponding to Maurer, *id.* at 2:26–29, we disagree with Patent Owner that Bernecker expressly distinguishes its laser processing technique from Maurer’s.

For the reasons stated above, it has been shown with sufficiency that Maurer discloses, teaches, or suggests a colorless relief.

b) Maurer’s relief by itself, i.e., without the printed information below it

With regard to reasons to combine Maurer, Bernecker, Fry, and Ross, Petitioner asserts that it would have been obvious to implement Maurer’s relief structure by itself in a colorless/contrastless manner, i.e., having an OV quality, as taught by Bernecker. Pet. 60–61. Patent Owner challenges the assertion that it would have been obvious to implement Maurer’s relief without printed information beneath it. PO Resp. 55.

Petitioner points out that Bernecker teaches that the microrelief having an OV quality can be disposed over “particular printed or color-contrasting lasered information,” Pet. 58 (citing Ex. 1006, 3:18–26), but need not be disposed directly over printed information, i.e., may be disposed as a separate information carrier, *id.* at 60 (citing Ex. 1006, 3:27–43). Petitioner’s argument is that a skilled artisan, in view of Bernecker, would have understood that Maurer’s relief having a tactile quality, when combined with Bernecker’s microrelief having an OV quality, would not have needed to be disposed directly over printed material. *Id.* We find this argument persuasive based on the rationale to combine security features discussed above.

Patent Owner's arguments do not undermine Petitioner's showing. Patent Owner's argument is that to implement Maurer's relief structure without information printed directly beneath it would have "strip[ped] [Maurer] of its core teachings," namely that of providing blackening of the core, which Patent Owner asserts was "the fundamental purpose of the invention." PO Resp. 55. Patent Owner's argument is unavailing because, even as Patent Owner acknowledges, this asserted fundamental purpose of Maurer may be implemented separately from Maurer's relief structure, and Maurer's relief-type structure is ancillary to the object of inscribing data on the core of the card. *Id.* Maurer states "[t]he object of the invention is to provide an identification card and a process for the production of the same which makes it possible to inscribe individual features, in particular personal data, in the interior card after lamination of the card blank." Ex. 1005, 4:3–7. Maurer explains "[t]his object is accomplished in accordance with the invention in that the information is provided on the core of the identification card through the transparent cover sheet which has already been laminated onto the card by means of a controlled laser beam. *Id.* at 4:10–14. Accordingly, even without concurrently marking the coversheet while inscribing data on the card core, Maurer satisfies the stated object of the invention, namely to inscribe information on the core layer. Moreover, Patent Owner cites nothing in Maurer or Bernecker would prevent a card from having both Maurer's inscribed feature in one portion of the card, and Maurer and Bernecker's combined security feature in another portion of the card. As Petitioner points out,

the Board has recognized, *In re Gordon*, 733 F.2d 900, 902 (Fed. Cir. 1984) “does not preclude any modification of a reference that might diminish some advantages while leading to others.” *Shimano Inc. v. Globeride, Inc.*, IPR2015-00273, Paper 40 at 12 (P.T.A.B. Jun. 16, 2016); *see also Captionacall, LLC v. Ultratec, Inc.*, IPR2015-00637, Paper 98 at 56 (P.T.A.B. Sept. 7, 2016) (“Patent Owner’s argument, taken to its logical conclusion, would classify virtually every modification to a stated intent of a prior art device as a case for inoperability”). Nor does obviousness require physical combinability. *E.g., Allied Erecting and Dismantling Co., Inc. v. Genesis Attachments, LLC*, 825 F.3d 1373, 1381 (Fed. Cir. 2016); *In re Mouttett*, 686 F.3d 1322, 1332 (Fed. Cir. 2012).

Reply 23. Here, Petitioner does not suggest eliminating a feature of Maurer, which may still be placed elsewhere on the card, but instead argues that it would have been obvious to combine the advantages of Maurer’s relief-type structure with the advantages of Bernecker’s colorless engraving.

c) Arguments from ground 1

We discussed Patent Owner’s assertion that Maurer does not teach a raised tactile feature above, *supra* Sec. II.C.2.c.ii, and for reasons discussed therein, we do not agree with Patent Owner.

We discussed Patent Owner’s assertion that Maurer does not teach a colorless engraving above, *supra* Sec. II.C.2.g.ii.a, and for reasons discussed therein, we do not agree with Patent Owner.

We turn now to Patent Owner’s other assertions: (1) Bernecker does not teach forming colorless features in register with contrasting features above, (2) Bernecker and Maurer are systematically different references that cannot be combined without undermining their respective purposes, and (3)

Petitioner's motivation to combine is flawed because combining Maurer's tactile relief with Bernecker's optically variable device would result in a credential having fewer security features than the original card taught in Maurer.

Regarding the first assertion, Patent Owner argues Petitioner's motivation to combine Maurer with Bernecker should fail because Bernecker does not disclose implementing its OV feature directly over, i.e., in register with, printed information. PO Resp. 37–39 (citing Pet. 19). As an initial matter, the statement criticized by Patent Owner relates to Petitioner's argument that a skilled artisan would have found it obvious for Maurer's relief-type structure to convey personal information. For reasons discussed above for claim 1, Petitioner shows persuasively that Maurer discloses and/or teaches or suggests this feature. *Supra* Sec. II.C.2.b.ii. For this reason alone, Patent Owner's argument fails to undermine Petitioner's showing. Moreover, contrary to Patent Owner's argument, Petitioner's rationale for combining Maurer with Bernecker to implement a relief that conveys personal information does not fail if Bernecker does not disclose implementing its OV feature in register with printed information. In generally describing various teachings of Bernecker, Petitioner states that Bernecker "recognized the value of colorless engravings formed in register with printed information, explaining that they can be compared with printed information underneath." Pet. 18 (citing Ex. 1006, 3:19–25). However, Petitioner's rationale to combine does not depend on this characterization solely, if at all, in the context here. Petitioner also argues that a person of ordinary skill in the art would have found it obvious to implement Maurer's

tactile relief to indicate personal information in view of Bernecker's disclosure that colorless engravings provide information, "whether implemented *by itself (as taught by Bernecker)* or in conjunction with printed information underneath." Pet. 19 (emphasis added). Petitioner, therefore, makes clear the combination is based on Bernecker's disclosure of colorless engravings providing information, and does not depend on Bernecker disclosing information being provided underneath and in register with its engraving. *Id.* ("by itself (as taught by *Bernecker*)").

Regarding Patent Owner's second assertion, Patent Owner argues Petitioner's obviousness arguments should be rejected because the teachings of each reference defeats the primary goal of the other. PO Resp. 39. Patent Owner argues that Maurer describes creating permanent blackened inscriptions in the core to be an essential feature because it creates data that cannot be altered without destroying the core material. *Id.* at 40. Patent Owner argues that the creation of the relief-type structure that has a tactile feel is ancillary to the main object of Maurer, which is to create verifiable blackened inscriptions deep in the core. *Id.* at 40–41. Patent Owner argues that by contrast Bernecker discourages blackening of the core, stating that it must be avoided, and instead teaches using significantly less laser energy to create translucent or clear features on the outer laminate layer of the card. *Id.* at 41.

Petitioner responds that, contrary to Patent Owner's argument, Maurer does not exclusively teach blackening (of the top/outer layer), and Bernecker does not teach avoiding discoloration of the core at all costs. Reply 22. We find Petitioner's assertion persuasive because, for example, Bernecker's

colorless teachings apply to the laminate layer, not the core as asserted by Patent Owner. *Id.* at 23 (citing Ex. 1006, 4:60–63). Moreover, contrary to Patent Owner’s argument, Bernecker explains that its colorless security feature can be disposed directly above discolored core information. *Id.* (citing Ex. 1006, 3:23–28). In addition, as pointed out by Petitioner, Patent Owner conflates Maurer’s blackening of the core layer with blackening of the laminate layer. *Id.* at 22. Maurer describes blackening the core, but for reasons we discussed above, *supra* Sec. II.C.2.g.ii.a, we are persuaded that Maurer teaches a colorless relief.

As we noted above, Patent Owner’s third assertion is that combining Maurer’s tactile relief with Bernecker’s optically variable feature would result in a credential having fewer security features than the original card taught in Maurer. PO Resp. 43–49. To support this assertion, Patent Owner characterizes what it alleges are the three security features resulting from Maurer’s process, and argues that Petitioner’s modification of Maurer would eliminate two of these features. *Id.* at 44. The three alleged features include inscribing the core after lamination, bonding the laminate to protect the core from tampering, and forming a depression in the laminate that can be felt manually. *Id.* at 44–45.

Patent Owner argues that Petitioner’s proposed combination would eliminate inscribing the core and bonding the core. *Id.* at 46. Patent Owner’s argument is based on its mischaracterization of Petitioner’s argument. Patent Owner states “Petitioner admits that the blackened inscriptions that Maurer describes as the core of its invention would need to be avoided.” *Id.* at 45–46 (citing Pet. 19). Petitioner makes no such admission. Patent

Owner's argument is premised on its incorrect assertion that Petitioner's proposed combination involves forming Maurer's relief by itself without printed information beneath it. Contrary to Patent Owner's argument, Petitioner also contemplates a combination in which the relief has printed information beneath it. Pet. 19. Petitioner describes both Maurer's and Bernecker's techniques, and states that a person of ordinary skill in the art "would have found it obvious that *Maurer's* tactile relief—whether implemented by itself *or in conjunction with printed information underneath*—itself indicates personalized information in view of *Bernecker's* disclosure of colorless engraving." Pet. 19 (emphasis added). *Id.*

Petitioner also points out that "nothing in [Patent Owner]'s combination prevents other portions of the core from being inscribed with information both separately and in conjunction with the combined security feature, as *Bernecker* envisions." Ex. 1006, 3:23–28; Petition, 2–3; Ex. 1017, ¶ 44." Reply 24.

For the reasons stated above, Patent Owner's assertions do not undermine Petitioner's showing.

iii. "wherein the laser-ablating is performed by the laser etching at an angle other than approximately 90 degrees to the top surface of the outer laminate layer"

For the limitation "wherein the laser-ablating is performed by laser-etching at an angle other than approximately 90 degrees to the top surface of the outer laminate layer," Petitioner argues Ross renders this feature obvious. Pet. 70. Petitioner relies on Ross's disclosure of "maneuvering the

laser at a variety of angles to create distinctive patterns” and precisely programming angle intensity of a laser over the surface of an identification document “to provide a difficult if not possible to replicate pattern.” *Id.* (citing Ex. 1012, 6:38–43, 35:19–24). Petitioner persuasively shows that Ross’s disclosure of using *a variety of angles* teaches using angles other than approximately 90 degrees. Petitioner argues a skilled artisan would have been motivated to vary the laser angle to angles other than approximately 90 degrees when implementing the relevant security features taught by Maurer, Bernecker and Fry in order to further enhance security. *Id.* In particular, according to Petitioner, a skilled artisan “would have recognized that by varying the angle of ablation, the combined security feature of *Maurer*, *Bernecker*, and *Fry* would be varied (e.g., to have varying heights to the raised features) to create a ‘difficult if not possible to replicate pattern, unless the user knows the original control software for the laser.’” *Id.* at 70–71 (citing Ex. 1012, 35:19–24); Ex. 1001 ¶ 181.

Patent Owner does not provide any arguments specific to this claim limitation. *See generally* PO Resp. 53–55.

iv. “wherein the article is one or more of: an identification document
...

For reasons discussed above, *supra* Sec. II.C.2.a, Petitioner has shown persuasively, and Patent Owner does not dispute, that Maurer’s multi-layered identification card discloses “wherein the article is one or more of: an identification document,” as recited in claim 12. Pet. 72.

v. *Summary*

Upon review of the record, for the reasons stated above, we determine that Petitioner has shown, by a preponderance of the evidence, that claim 12 of the '152 patent is unpatentable under 35 U.S.C. § 103(a) over the combination of Maurer, Bernecker, Fry, and Ross.

3. *Weight of Dr. Tentzeris's Testimony*

Patent Owner contends "Dr. Tentzeris's testimony is not credible and provides no assistance to the Board's obviousness analysis." PO Resp. 59. According to Patent Owner, "[d]uring his deposition, Dr. Tentzeris demonstrated a complete lack of understanding of the technology." *Id.* Patent Owner urges, therefore, that "Dr. Tentzeris's sworn testimony is not credible or entitled to any weight." *Id.* at 65.

First, Patent Owner alleges that Dr. Tentzeris's experience with lasers does not relate to the field of invention. *Id.* at 59. Petitioner persuasively responds that Patent Owner ignores the portions of Dr. Tentzeris' deposition where he explained both his education relating to the field of invention (*e.g.*, Ex. 2006, 19:1–20:18) and practical experience in actually experimenting within the field (*id.* 20:19–27:12). Reply 26.

Second, Patent Owner contends Dr. Tentzeris "refused to admit that the figures in Maurer are cartoons or imprecise renderings drawn by an artist." *Id.* at 59. But, Patent Owner's citations reveal that Dr. Tentzeris acknowledged that the "dimensions could be different, could be larger or smaller but the fundamental teachings [about elevated features and discoloration] . . . leads to formation of structures similar Fig. 2." *See id.* (quoting Ex. 2006, 161:24–162:24). Patent Owner's similar arguments

about other figures that Patent Owner characterizes as “cartoons” fail to show a lack of credibility. The figures need not be dimensioned perfectly or represent “photographs or scanning electron microscope cross-sections” to lend insight, as discussed above. *See id.* at 60.

Third, Patent Owner contends Dr. Tentzeris “brush[ed] aside” dimensions in Fry and “refused to accept—much less deal with—the import of the plain language of Fry that contradicted his conclusions.” *Id.* at 60–61. As noted above, Fry’s teachings generally evince the mechanisms of laser grooving in plastics, and Dr. Tentzeris, like Dr. Cairns, relied upon those teachings. Dr. Tentzeris credibly supported his testimony by citing to Fry where applicable and aided the panel in understanding the technology, as discussed above.

Fourth, Patent Owner contends Dr. Tentzeris refused to acknowledge that Bernecker “used the term ‘microrelief’ to reference features below the top surface of the card.” *Id.* at 61–63 (citing Ex. 2006, 121:24–123:4, 129:16–132:16). The cited deposition passages does not appear to show a direct question posed about a “microrelief.” *See* Ex. 2006, 121:24–123:4, 129:16–132:16. In any case, as Petitioner points out, Dr. Tentzeris stated that Bernecker discloses “a microrelief” and “notches or depressions on the surface.” Reply 27 (citing Ex. 2006, 122:25–123:4).

Finally, Patent Owner makes a number of other arguments, including that Dr. Tentzeris demonstrated a lack of understanding of the technology, improperly analyzed the prior art and claims, did not identify the claim construction he employed, gave unresponsive testimony, and used notes during his deposition. *See* PO Resp. 62–65. As one specific example,

Patent Owner faults Dr. Tentzeris for “forming no opinion about exact meanings” of “subjective” terms, and instead provided “examples” of “foaming,” “tactile feature,” “tactile effect,” and “OVD.” *See* PO Resp. 62–63 (citing Ex. 2006, 34:4–37:19, 86:25–88:2, 88:16–89:4, 95:15–23, 98:2–17, 135:11–138:8).

A fair reading of Dr. Tentzeris’s deposition testimony shows that he generally responded to Patent Owner’s questions, even though he used notes, and he also provided useful insight to the panel in his declaration testimony. As one example referenced by Patent Owner, during his deposition, Dr. Tentzeris stated as to a “foamed laminate material . . . Fry explained that the process of grooving or scoring thermoplastic results in small bubbles that can be seen during microscopic examination as written in Fry exhibit [24] column 3, lines 63 and 68.” Ex. 2006, 34:19–34. So, Dr. Tentzeris informs that foaming includes “small bubbles” creating during a scoring process. This constitutes a reasonable example of foaming that Patent Owner does not challenge and it also serves to define the meaning of the term—i.e., foaming includes small bubbles. Dr. Tentzeris provided similar responses to shed light on the meaning of the other terms, at the same time, explaining where he found the terms in the prior art. Patent Owner does not contend the examples fail to meet the terms noted. In order to aid the panel’s understanding, Dr. Tentzeris need not provide an “exact meaning” to subjective or other terms, especially terms not in dispute.

Accordingly, we afford Dr. Tentzeris’s testimony its due weight, and determine it to be credible, having considered it in light of Dr. Cairns’

testimony and the prior art and arguments presented as set forth in the Final Decision.

4. Summary

For the foregoing reasons, Petitioner has shown, by a preponderance of the evidence, that the subject matter of (i) claim 1 would have been obvious over Maurer and Bernecker, (ii) claims 2, 3, 7, and 8 would have been obvious over Maurer, Bernecker, and Fry, (iii) claims 5 and 6 would have been obvious over Maurer, Bernecker, and Gunn, (iv) claim 9 would have been obvious over Maurer and Fry, (v) claims 10 and 11 would have been obvious over the combination of Maurer, Fry, and Gunn, and (vi) claim 12 would have been obvious over Maurer, Bernecker, Fry, and Ross.

III. PATENT OWNER'S CONTINGENT MOTION TO AMEND

As discussed above, Petitioner has demonstrated by a preponderance of the evidence that claims 1–3 and 5–12 are unpatentable. Accordingly, the contingency in Patent Owner's Contingent Motion to Amend manifests with regard to these claims. Paper 21 ("Mot." or "Motion"). The Motion seeks to replace the claims of 1–12 found to be unpatentable with substitute claims 13–24, respectively. Mot. Claims App'x i–vi. Because the contingency does not manifest as to claim 4, we do not consider claim 4 or its proposed substitute claim 16.

To support its Motion, Patent Owner relies on the Declaration of Darran R. Cairns, Ph.D., in Support of Patent Owner's Contingent Motion to Amend. Ex. 2008. Patent Owner also relies on the Cairns Declaration (Ex. 2007) it filed with its Patent Owner Response (addressed above and throughout the Final Written Decision).

Petitioner opposes the Motion in its Response in Opposition to Patent Owner's Contingent Motion to Amend. Paper 28 ("Opp." Or "Opposition"). To support its Opposition, Petitioner provides the Declaration of Emmanouil M. Tentzeris Ph.D. in Support of Opposition to Motion to Amend U.S. Patent No. 8,083,152. Ex. 1018.

Replying to the Opposition, Patent Owner filed a Reply in Support of its Contingent Motion to Amend. Paper 29 ("PO Reply" or "Patent Owner's Reply"). Responding to Patent Owner's Reply, Petitioner filed a Sur-Reply to Patent Owner's Motion-to-Amend. Paper 34 ("Pet. Sur-Reply" or "Petitioner's Sur-Reply"). For the reasons below, we deny the Motion.

A. The 37 C.F.R. § 42.121 and 35 U.S.C. § 316(d) Requirements

In an *inter partes* review, substitute claims must be proposed as a part of a motion to amend. 35 U.S.C. § 316(d). 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, 1328 (Fed. Cir. 2017) (en banc). Patent Owner's 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 "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) (last accessed Dec. 5, 2018) ("Guidance").

Under the Guidance,

[i]n light of the *Aqua Products* decision, the Board will not place the burden of persuasion on a patent owner with respect to the patentability of substitute claims presented in a motion to amend. Rather, if a

patent owner files a motion to amend (or has one pending) and that motion meets the requirements of 35 U.S.C. § 316(d) (i.e., proposes a reasonable number of substitute claims, and the substitute claims do not enlarge scope of the original claims of the patent or introduce new matter), the Board will proceed to determine whether the substitute claims are unpatentable by a preponderance of the evidence based on the entirety of the record, including any opposition made by the petitioner. Thus, for example, if the entirety of the evidence of record before the Board is in equipoise as to the unpatentability of one or more substitute claims, the Board will grant the motion to amend with respect to such claims, and the Office will issue a certificate incorporating those claims into the patent at issue.

Guidance 2.

The Guidance also states “a patent owner . . . must meet the requirements for a motion to amend under 37 C.F.R. § 42.121 That is, a motion to amend must set forth written description support . . . in relation to each substitute claim, and respond to grounds of unpatentability involved in the trial.” *Id.*

The Motion meets certain threshold requirements of 37 C.F.R. § 42.121. Particularly, the Motion seeks to add a reasonable number of substitute claims (one-for-one), replacing claims 1–3 and 5–12 with substitute claims 13–15 and 17–24, 37 C.F.R. § 42.121(a)(3), with each substitute claim responding to a ground of unpatentability involved in the trial, *see* Mot. 3, except for as explicitly discussed below regarding broadening amendments, *infra* Sec. III.C. We address other requirements of § 42.121 below.

*B. New Matter, 37 C.F.R. § 42.121, 35 U.S.C. § 316(d),
Claims 17 and 22*

The Guidance indicates Patent Owner’s Motion must meet new matter/written description requirements. *See* Guidance 2; 37 C.F.R. § 42.121(a)(2) (“A motion to amend may be denied where . . . (ii) The amendment seeks to enlarge the scope of the claims of the patent or introduce new subject matter.”); 35 U.S.C. § 316(d)(3) (“An amendment . . . may not enlarge the scope of the claims of the patent or introduce new matter.”).

Petitioner generally argues Patent Owner’s “citation to its expert’s report” and “string citations” to the original patent application fail to provide written description support. *See* Opp. 4–5. Patent Owner’s citations appear reasonable and absent a specific shortcoming alleged by Petitioner, satisfy Patent Owner’s burden of production with respect to new matter/written description support for all of the claims.

Substitute claims 17 and 22 respectively depend from independent claims 13 and 21, and require that “the raised features have a height of $\geq 30\%$ of a thickness of the” outer top layer/at least one layer before said laser processing/at least one layer of material before the laser processing/forming. Mot. Claims App’x ii v. Due to their dependence on substitute claims 13 and 21, respectively, the “raised features” of substitute claims 17 and 22 must further comprise “reflecting surfaces that are not parallel to [the/a] nominal top surface [of the outer top layer/level of the article] such that an optically variably [OV] quality is produced.” *Id.* at i, iv–v.

To address the new matter/written description requirement, Patent Owner asserts that the original '152 patent application (Ex. 1004) incorporates by reference U.S. Patent No. 5,005,872 (Ex. 1014, “the '872 patent”),¹⁶ which states the following relevant to the 30% limitation in the substitute claims:

This transparent cover film with a total thickness of 250 to 350 μ can be expanded by appropriate laser action to a thickness of 350 to 450 μ . Due to the local limitation of the “foaming” area, an increase in volume of about 30% is reflected more or less directly in a corresponding change in thickness.

See Mot. 12 (citing Ex. 1014, 6:11–16; Ex. 2009, 4), 21–22.

Petitioner disagrees that this incorporation by reference of the '872 patent satisfies the new matter/written description requirement of substitute claims 17 and 22. Opp. 4–7.

Petitioner contends the “'872 patent merely discloses that PVC *can be foamed* to increase volume/height by 30%. *See* Ex. 1014, 2:66–3:6, 6:14–16. According to Petitioner, the '872 patent does not convey to a person of

¹⁶ The application for the '152 patent states

For additional background, various laser marking and/or engraving techniques are disclosed, e.g., in U.S. Pat. Nos. 6,022,905, 5,298,922, 5,294,774, 5,215,864 and 4,732,410. In addition, U.S. Pat. Nos. 4,816,372, 4,894,110, 5,005,872, 5,977,514, and 6,179,338 describe various implementations for using a laser to print information. All of these patents are incorporated herein in their entirety.

Ex. 1004, 242; *see also* Ex. 1001, 3:61–67.

ordinary skill in the art that the *particular security feature* of the '152 patent had a specific height. Ex. 1018 ¶ 20.” Opp. 5–6. Petitioner also points out the substitute claims “require optically variable features [e.g., *colorless*].” *Id.* at 6. In contrast, Petitioner notes, “[t]he '872 patent specifies that its raised features include *color* changes that ‘are distinct from their surroundings.’” *Id.* (citing Ex. 1014, 2:67–3:1, 3:63–66) (emphasis added).

In response, Patent Owner contends

[t]he '872 patent—which was specifically selected to be incorporated by reference—demonstrates that the inventors were aware that laser processing of polycarbonate laminate layers, such as PVC, could result in raised features that extend above the top surface level by a height of at least 30% of the thickness of the laminate layer before laser processing. Ex. 1014 at 3:2–6, 6:14–16. The inventors expressly taught that the etched features should be both prominent and optically variable

PO Reply 4.

Initially, this response appears to intermingle PVC (polyvinyl chloride) with polycarbonate, a relatively harmless error with respect to the issue at hand. In any event, the Motion does not supply the requisite written description support for substitute claims 17 and 22. The phrase “ $\geq$ [greater than or equal to] 30% of a thickness” of the outer top layer/at least one layer of material before said laser processing/forming, as recited in the substitute claims at issue here, lacks an upper bound for thickness that the '872 patent does not support. At the cited passage, the '872 patent states “plastic material such as PVC can increase its volume by 30% and more due to the action of a laser beam even without addition of foaming agents, and without a substantial loss of strength in the film in those areas.” Ex. 1014, 2:66–3:6.

The '872 patent does not quantify “and more.” However, elsewhere, the '872 patent indicates the extent of the “more.” For example, the '872 patent states a

transparent cover film with a total thickness of 250 to 350 μ can be expanded by appropriate laser action to a thickness of 350 or 450 μ . Due to the local limitation of the ‘foaming’ area, an increase in volume of about 30% is reflected more or less directly in a corresponding change in thickness. This expansion (a) by about 100 μ reached by the laser action yields, together with the plateau formation ($\approx$ 0.36 mm) produced by the mechanical embossing, height H of 0.46 mm above the rest of the card surface as required by the standard.

Id. at 6:11–21.

This disclosure describes an amount that a transparent cover film *can* be expanded using *appropriate laser action*. *Id.* The ratio of 350/250 represents a thickness/volume increase of 40%, whereas the ratio of 450/350 represents a thickness/volume increase of 28%. However, the Motion does not identify, nor do we discern, any disclosure of laser action that would result in unbounded expansion, and therefore unbounded raised feature height, of the transparent cover film.

Accordingly, Patent Owner fails to show that the inventors were in possession of the full scope of claims 17 and 22—raised features having a height that meets or exceeds 30% of the original thickness of the layer after laser processing, which claims 17 and 22 cover. *See In re Wertheim*, 541 F.2d 257, 263–64 (CCPA 1976) (The PTO “satisfied its burden” of showing specification with disclosed range of 25%–60% and examples within that

range does not provide descriptive support for new claim limitation of “at least 35%” “[b]y pointing to the fact that claim 1 reads on embodiments outside the scope of the description.”).

For the OV quality recited in substitute claims 13 and 21, Patent Owner relies on the ’152 patent’s disclosure of laser etching to produce a security feature having an OV quality so that the feature cannot be easily seen when viewed straight on, a property that has the added benefit of not allowing it to be photocopied when viewed straight on. Mot. 8–9 (citing Ex. 1009, 9, 10, 19). Because the feature cannot be easily seen when viewed straight on or photocopied, claims 17 and 22 require that the raised OV feature is colorless or contrastless. Patent Owner, however, fails to show that the inventors were in possession of a colorless or contrastless raised feature that is “ $\geq$ [greater than or equal to] 30% of a thickness” of the outer top layer/at least one layer of material before said laser processing/forming, as claims 17 and 22 cover. *See id.*

Petitioner points out that the “’872 patent further specifies that its raised features include color changes that “are distinct from their surroundings” (Ex. 1014 at 2:67-3:1, 3:63-66 (“simultaneous discoloration (blackening)”)), but the amended claims require optically variable features (e.g., substitute claim 13, upon which claim 17 depends).” Opp. 6. Indeed, the ’872 patent discloses that by “appropriately optimizing the material parameters and method parameters (plastic material, layer structure, layer thickness, laser intensity, beam control, etc.),” the disclosed process creates characters in plastic material “which are distinct . . . in terms of their color.” Ex. 1014, 2:68–3:17.

In contrast to the “not visible” requirement for claims 13 and 21, the ’872 patent indicates the raised (plateau) feature will be plastic “characters which are distinct from their surroundings not only in terms of their color but also in terms of their relief height”—i.e., visible in contrast with its surroundings, as Petitioner argues. *See* Ex. 2009, 2:67–3:2; Opp. 6 (citing Ex. 2009, 2:67–3:1). At best, Patent Owner’s alleged written description support derives from combining height features of the darkened plateau embodiment in the ’872 patent with features from OV embodiments in the ’152 patent without any indication in the two specifications that the features can be combined. *Compare* Mot. 8 (citing Ex. 2009, 5, 9, 21 (“In at least one embodiment of the invention, laser etching can produce a security feature having an optically variable (OV) quality”)), *with* Mot. 12 (citing Ex. 1014, 2:66–3:6, 6:11–16) (another embodiment in the ’872 patent)). Given these differences in the various embodiments and a lack of description about combining different features therefrom, Petitioner shows persuasively that the inventors of the ’152 patent were not in possession of the breadth of subject matter covered by claims 17 and 22.

Accordingly, for the reasons noted above, Petitioner shows by a preponderance of the evidence that Patent Owner’s Motion does not satisfy the regulatory and statutory written description requirements for substitute claims 17 and 22, which consequently recite impermissible new matter.

C. Scope, 37 C.F.R. § 42.121(a)(2), 35 U.S.C. § 316(d)
Claims 15 and 20

A motion to amend may be denied where the amendment seeks to enlarge the scope of the claims of the patent. *See* Guidance 2; 37 C.F.R. § 42.121(a)(2)(ii) (“A motion to amend may be denied where . . . (ii) The

amendment seeks to enlarge the scope of the claims of the patent or introduce new subject matter.”); 35 U.S.C. § 316(d)(3) (“An amendment . . . may not enlarge the scope of the claims of the patent or introduce new matter.”); *Lectrosonics, Inc. v Zaxcom, Inc.*, Case IPR2018-01129, 01130 (PTAB February 25, 2019) (Paper 15) (comparing substitute claims to issued claims for broadening analysis) (precedential). In addition, the motion may be denied where the amendment does not respond to a ground of unpatentability involved in the trial. 37 C.F.R. § 42.121(a)(2)(i). A Patent Owner may not seek to broaden a challenged claim in any respect that enlarges the scope of the patent, for example, in the name of responding to an alleged ground of unpatentability. *Lectrosonics*, slip op. at 6. Likewise, a proposed substitute claim may not remove a feature of the claim in a manner that broadens the scope of the challenged claims of the patent. *Id.*

Patent Owner contends the substitute claims do not enlarge the scope of the original claims, but rather narrow the original claims by adding limitations thereto. Mot. 4. Petitioner argues that substitute claims 15 and 20 remove language, thereby broadening them, and that Patent Owner does not satisfy its burden of showing the amendment does not enlarge the scope of the claims. *See* Opp. 3 (“Idemia neither addresses the removed language nor provides any evidence or reasoning to meet its burden of production.”).

By presenting facially narrowing limitations, and not removing language (other than changing claim number dependencies, and replacing “laminate” with outer top layer in substitute claim 13), the Motion meets the burden of production as to the substitute claims.

Regarding substitute claim 15, Petitioner argues that deletion of the recitations “laser-ablating forms a” and “extending above the top surface of the outer layer surrounding the voids,” expands the scope of claim 3 in at least two respects. Opp. 4. First, Petitioner explains the substitute claim no longer requires that the raised features are formed by “laser-ablating.” *Id.* Second, the substitute claim no longer requires that the raised feature *surrounds* the voids. *Id.*

Regarding substitute claim 20, Petitioner argues that in deleting the word “document” and replacing it with the word “article,” the scope of the claim has been broadened, because a skilled artisan would have understood that the term “article” is broader than the term “document.” Opp. 4.

We agree with Petitioner, and Patent Owner does not deny, that Patent Owner does not explain in its Motion how deleting the language identified by Petitioner does not enlarge the scope of the claims. *See, e.g.,* Mot. 4 (asserting that the substitute claims do not enlarge the scope of any original claim, but not explaining the basis of its assertion). In its Reply, Patent Owner contends that Petitioner incorrectly argues the claims are broadened, asserting that “a comparison of the original claim to the proposed substitute claim reveals no broadening.” PO Reply 1.

As to claim 15, we disagree with Patent Owner that a comparison of original claim 3 to proposed substitute claim 15 reveals no broadening. *Id.* Petitioner correctly asserts that claim 15 deletes two requirements regarding the raised feature, namely that the raised feature (1) is formed by laser-ablation, and (2) extends above a top surface of the outer top layer surrounding the voids. Opp. 4; *see also* Mot. Claims App’x i–ii. In so

doing, substitute claim 15 encompasses subject matter not covered by claim 3. Patent Owner then shifts its argument from comparing claims on a claim-by-claim basis to comparing a claim with the entire patent to determine whether broadening has occurred, arguing that claim 15 does not include within its scope any subject matter that would not have infringed the original *patent*. PO Reply 2; *see also id.* n.2 (citing MPEP 1412.03; *Thermalloy, Inc. v. Aavid Eng'g, Inc.*, 121 F.3d 691, 692 (Fed. Cir. 1997); *In re Cuozzo Speed Techs., LLC*, 793 F.3d 1268, 1283 (Fed. Cir. 2015)).

Petitioner argues that the test proposed by Patent Owner is not sufficient, alone, but rather is a separate and distinct requirement from the requirement in an *inter partes* review prohibiting enlarging the scope of claims on a claim-by-claim basis. Pet. Sur-Reply 5 (citing *MRSI Sys., LLC v. Palomar Techs, Inc.*, IPR2016-00043, slip op. at 27–28 (Paper 29) (PTAB Mar. 29, 2017); *Idle Free Sys., Inc. v. Bergstrom, Inc.*, IPR2012-00027, slip op. at 5 (Paper 26) (PTAB June 11, 2013); *Apple Inc. v. Valencell, Inc.*, IPR2017-00317, slip op. at 55 (Paper 46) (PTAB June 1, 2018)).

The language deleted from claim 3 does not appear in claim 1 from which claim 3 depends, and therefore the deletion does not enlarge the scope of what is encompassed by claim 1. Accordingly, the Motion does not broaden the scope of the issued claims. *See* Mot. 4.

As to claim 20, we disagree with Patent Owner that the amendment replacing the term “document” with the term “article” does not broaden the claim. PO Reply 2. Petitioner argues, and we agree, that the term “article” is broader than the term “document.” Petitioner relies on Dr. Tentzeris’s declaration, which correctly points out that the claim itself necessitates that

the term “article” is broader because the claim recites that “the article” is “one or more of: an identification document, a credit card, a phone card, a prepaid card, a smart card, a contact card, a contactless card, a RFID card, an electronic component, a package, a container, a recording media, a label, a tool, a medical device, a consumer product, a toy product, and a tag.”

Ex. 1018 ¶ 18; Ex. 1001, 12:6–11. Because the term “article” encompasses items that are not documents, e.g., a package, a container, a medical device, a consumer product, and a toy product, the term “article” is broader than the term “document.”

Patent Owner also argues that replacing the term “document” with “article” is proper because it “fixes a potential antecedent basis issue,” because the term “document” is not introduced previously in the claim. PO Reply 2; *see also Lectrosonics* at 5–6 (“[a]dditional modifications that address potential 35 U.S.C. § 101 or § 112 issues, for example are not precluded by rule or statute. Thus once a proposed claim includes amendments to address a prior art ground in the trial, a patent owner may also include limitations to address potential § 101 or § 112 issues, if necessary”). This argument has merit.

Moreover, by deleting the narrow term “document” and replacing it with a broader term “article,” this claim recites a narrower negative limitation—i.e., “without ablating the article core”—so claim 20 disallows ablating any of the listed article cores. In contrast, original claim 8 allows ablating any of the listed articles that do not include a “document,” for example, “a smart card.”

Based on the foregoing discussion, the Motion does not involve impermissible broadening and satisfies rule and statutory obligations. 37 C.F.R. §§ 42.121(a)(2)(i)–(ii); 35 U.S.C. § 316(d).

D. Analysis of the Alleged Obviousness of the Substitute Claims

Patent Owner does not bear the burden of showing the substitute claims would have been obvious. *See Aqua Prods.*, 872 F.3d at 1327; Guidance 2. For the reasons explained below, Petitioner has shown by a preponderance of the evidence that the proposed substitute claims would have been obvious.

1. The substitute claims

Petitioner persuasively addresses the particular limitations of each substitute claim. Opp. 10–22. Petitioner characterizes the substitute claims as falling into two groups:

First, Idemia amends claims 13-16, 18-21, 23, and 24 to require a single security feature that includes both a (1) raised feature (tactile/raised relief) and (2) a visual feature tied to that raised feature (optical variability). . . Second, Idemia amends claims 17 and 22 to require raised features of a particular height, relying on a prior art patent incorporated by reference.

Id. at 10.

More specifically, the proposed claim amendments add the following recitations.

With the exception of substitute claim 24, all independent substitute claims, claims 13, 19, 20, and 21, are amended to recite a raised or tactile

feature comprising reflecting surfaces that are not parallel to a nominal top surface of a specified layer such that *an optically variable (“OV”) quality* is produced. For example, substitute claim 13 adds “wherein the raised features further comprise reflecting surfaces that are not parallel to the nominal top surface of the outer top layer such that an optically variable quality is produced.” Mot., Claims App’x i. The remaining independent substitute claims (except claim 24), claims 19, 20 and 21, each add a corresponding limitation. *Id.* at iii–iv. Substitute claim 24 does not use the term “optically variable quality,” or recite that its ridges must be not parallel to a particular surface. *Id.* at v–vi. However, claim 24 recites that the ridges are “substantially non visible when viewed straight on.” *Id.* Patent Owner equates the quality of being substantially nonvisible when viewed straight with an optically variable quality, asserting that “[i]n all the claims, this raised feature must also have an optically variable quality (*e.g.*, not visible when viewed straight on, resists photocopying).” Mot. 24. This is consistent with the ’152 patent, which states “laser etching can produce a security feature having an optically variable (OV) quality. Laser etching can be produced so that it cannot be easily seen when viewed straight on.” Ex. 1001, 7:3–7.

Substitute claims 13 and 19 are amended to recite that the raised features comprise foamed laminate material that extends above a nominal top surface of the outer top layer/laminate layer. *Id.* at Claims App’x i, iii.

Substitute claim 13 is further amended to replace “said voids providing a feature that can be felt by touch” with “said voids providing a void feature that can be felt by touch.” *Id.* at i.

Substitute claim 15 is amended to specify that *the raised features* provide a *tactile effect*. *Id.* at ii. Substitute claim 24 is amended to specify that the *ridges* that *can be felt by touch*. *Id.* at vi. Patent Owner states that substitute claims 20, 21, 22, and 23 require the *raised feature* to have or provide the *tactile effect*. Mot. 24. Substitute claim 20 does not recite a raised feature, but rather the amendment recites a tactile feature that extends above a specified surface. *Id.* at Claims App'x iv. Substitute claim 21 recites raised features that provide a tactile effect, but this is in the original claim, claim 9, and is not part of any amendment. *Id.* at v. Substitute claims 22 and 23 depend directly from substitute claim 21. *Id.* at v.

Substitute claims 17 and 22 are amended to recite that the raised features have *a height $\geq 30\%$* of the thickness of an outer top layer, or at least one layer, respectively, before processing. *Id.* at ii, v. Patent Owner agrees with this characterization. Mot. 25.

Substitute claims 21 and 22 are illustrative:

21. (Substitute for claim 9, if found unpatentable) An article comprising

at least one layer of material,

the top surface of the article including a laser-formed void pattern creating an indicia, the article characterized by raised features that are also laser-formed, the raised features comprising reflecting surfaces that are not parallel to a nominal top surface level of the article such that an optically variable quality is produced, said raised features comprising foamed material, the raised features extending above a nominal top surface level of the article to provide a tactile effect that aids in verifying the authenticity of the article; and,

wherein the article is one or more of: an identification document, a credit card, a phone card, a prepaid card, a smart card, a contact card, a contactless card, a RFID card, an electronic component, a package, a container, a recording media, a label, a tool, a medical device, a consumer product, a toy product, and a tag.

22. (Substitute for claim 10, if found unpatentable). The article of claim ~~[[9]]~~ 21, wherein at least one layer of material comprises a polycarbonate, and wherein the raised features have a height of $\geq 30\%$ of a thickness of the at least one layer of material before the laser-forming.

Mot., Claims App'x iv–v (underlining representing additions to the claims, double brackets representing deletions).

Petitioner relies on the same prior art to show substitute claims 13–15 and 17–24 would have been obvious as it does with regard to claims 1–3 and 5–12. Opp. 10. For features that are not part of an amendment, but rather are part of the original claims, Petitioner and Patent Owner rely on the same arguments as for the original claims. We do not re-iterate our above discussion, *supra* Sec. II.C, as to these features. *See generally* Mot. 24–25; Opp. 12–20; PO Reply 6–11; Pet. Reply 7–11, Pet. 16–72; PO Resp. 1–5, 9–64; Reply 2–29. For the reasons discussed above for claims 1–3 and 5–12, a persuasive showing of obviousness has been made as to these features, and Patent Owner's arguments do not undermine such showing.

Below, we discuss the amendments.

2. Raised feature having an OVD quality; foamed laminate material

Petitioner characterizes the feature “the raised features comprising reflecting surfaces that are not parallel to a nominal top surface level of the article such that an optically variable quality is produced,” as recited in

substitute claim 13, and the corresponding features recited in substitute claims 19, 20 and 22, and claim 24's recitation "the pattern comprising ridges extending above a nominal top surface of the outer laminate layer and being substantially non visible when viewed straight on," as a "combined security feature" having both "(1) a tactile/raised relief and (2) an optically variable feature tied to the relief that is visible only at a glancing angle." Opp. 10–11. Even though the combined security feature is introduced in substitute claims 13, 19, 20, 22, and 24, Petitioner argues the combined security feature in the Petition with regard to claim 12. Pet. 60–64. In its papers relating to the Motion, Petitioner re-iterates its arguments from the Petition and Reply.

Petitioner asserts that the combined security feature, formed from implementing Maurer's relief structure using Bernecker's teachings of implementing it in a colorless/contrastless manner, would have been obvious to one of ordinary skill in the art for the reasons outlined in the Petition.

Opp. 11. The reasons for combining the teachings of the references include

(a) the desire to have multiple security features, (b) the known use and benefits of tactility and optical variability for security, (c) *Bernecker's* recognition that clear/colorless engraving is useful by itself, (d) recognition that visibility only at a glancing angle would benefit clear engravings with tactile features and vice versa, and (e) the straightforward process of implementing such a feature.

Id. (citing Pet. 56–64; Ex. 1002, ¶¶154–82; Ex. 1018, ¶¶22–37.). Petitioner asserts further that "[i]t would have been routine and straightforward for a POSITA to implement the combined security feature, and it would have

been clear that such a feature would provide the expected functionality to yield predictable results.” *Id.* citing Pet. 61-62; Ex. 1002, ¶¶ 160–62; Ex. 1018, ¶¶ 32–33. We discuss these reasons in our discussion for claim 12. *Supra* Sec. II.C.2.g.ii. For reasons we discuss in this subsection and above with regard to claim 12, Petitioner provides a reasoned rationale to combine the collective teachings of Maurer, Bernecker, and Fry for implementing the combined security feature, and has made a persuasive showing.

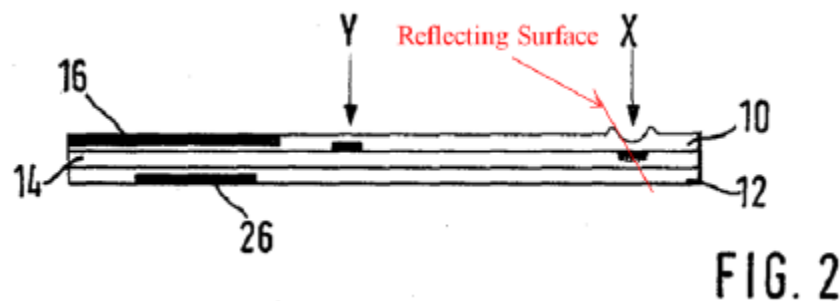
As to the foamed material recitations in substitute claims 13, 19 and 21, Petitioner asserts the combined security feature implemented using the implementation details of Fry would have included foamed laminate material. *Id.* at 12–13 (citing Ex. 1018 ¶ 54; Ex. 1007, 3:36–68, 4:60–64, 4:32–34). Petitioner asserts “[t]he combined security feature would have been obvious based on the combined teachings of *Maurer*, *Bernecker*, and *Fry* regardless of which reference is the ‘primary reference.’” *Id.* (citing Pet. 62-63; Ex. 1002, ¶¶ 163–66; Ex. 1018, ¶¶ 34–37). Petitioner’s arguments are the same as for claim 9 (which corresponds to substitute claim 21), which recites raised features comprising a foamed material. *See, e.g.*, Pet. 47–48, 50–51. For the reasons stated in our discussion for claim 9, Petitioner has made a persuasive showing as to the foamed material recitation. *Supra* Sec. II.C.2.e.iii.

As to how the combined security feature would have been implemented, Petitioner argues it would have been implemented in a contrastless manner, as taught by Bernecker, to give rise to areas with “different light scattering properties” (Ex. 1006, 2:16–20, 53–56) resulting in a combined security feature that is not visible when viewed straight on.

Id. ¶58. Moreover, because the combined security feature includes raised features, it would include reflecting surfaces that are not parallel to the top surface of the card.

Id. ¶¶56–57.

Id. at 13. To illustrate that the raised feature in Maurer, i.e., the raised portion of the relief-type structure, includes reflecting surfaces above the top surface that is not parallel to the top surface, Petitioner relies on Figure 2, *id.* (citing Ex. 1018 ¶¶ 56–57), reproduced below with Petitioner’s annotations in red.



Ex. 1005, Fig. 2 (with Petitioner’s annotations in red). Figure shows a cross-section of Maurer’s identification card, including core layer 14 disposed between cover sheets 10 and 12, and arrow X designating a relief-type structure. *Id.* We find Petitioner’s argument to be persuasive. The figure depicts a raised feature with a surface, which Petitioner designates as “Reflecting Surface,” that is not parallel to cover sheet 10. *Id.* Petitioner relies on the testimony of Dr. Tentzeris to show that the surface of the combined feature (based on Maurer and Bernecker) reflects light. *Id.* (citing Ex. 1018 ¶¶ 56–57). We credit Dr. Tentzeris, who explains that a skilled artisan would have understood that the raised features would include reflecting surfaces, because Bernecker’s teaching of colorless engravings

that give rise to areas with “different light scattering properties” Ex. 1018 ¶¶ 56–57 (citing Ex. 1006, 2:16–20, 2:53–56).

For the reasons discussed in this subsection and above for claims 9 and 12, Petitioner has shown persuasively that the combined teachings of Maurer, Bernecker, and Fry render it obvious to implement “the raised features comprising reflecting surfaces that are not parallel to a nominal top surface level of the article such that an optically variable quality is produced,” as recited in substitute claim 13, and the corresponding features recited in substitute claims 19, 20 and 22, and claim 24’s recitation “the pattern comprising ridges extending above a nominal top surface of the outer laminate layer and being substantially non visible when viewed straight on.”

In the Motion, Patent Owner recycles its arguments from the papers regarding patentability of claims 1–20. Mot. 24–25. Patent Owner’s arguments are (1) Maurer relief-type structure is not a “transparent tactile relief,” (2) Maurer’s relief does not extend above the top surface of the identification card, and (3) combining Bernecker with Maurer would not result in a combined security feature, but rather would destroy Maurer’s security feature and result in a different security feature:

First, there is no “transparent tactile relief” taught in Maurer. POR Cairns Decl.¹⁷ ¶¶102–103. Therefore, a skilled artisan would not have been motivated to use such a feature. POR Cairns Decl. ¶120. Second, the “relief” taught in Maurer does not extend above the top surface of

¹⁷ “POR Cairns Decl.” appears to refer to the Declaration of Darran R. Cairns, Ph.D., in Support of Patent Owner’s Response, (Ex. 2007). The Motion indicates it is in reference to Ex. 2010, but this is an error because Ex. 2010 is not Dr. Cairns’s declaration, but rather refers to an article.

the document, much less a raised feature having the combination of attributes required by the substitute claims. POR Cairns Decl. ¶¶84–86, 104. Further, the claimed combination would not simply require adding an additional security feature to Maurer, but to destroy two of the security features touted in Maurer to replace them with a single other feature (from Bernecker). POR Cairns Decl. ¶¶121–124. There is no rational basis for concluding that one skilled in the art would have thought to do so. POR Cairns Decl. ¶124.

Mot. 24–25.

In Patent Owner’s Reply, Patent Owner reiterates its arguments in the Patent Owner Response that Maurer teaches neither a *raised tactile* feature nor a *colorless* engraving technique or *colorless* security feature. PO Reply 8 (citing Ex. 2007 ¶¶ 85–104, 118); *see also* PO Resp. 3 (“Not one of the key assertions underlying Petitioner’s obviousness challenge is accurate: (1) Maurer does *not* teach a raised tactile feature, (2) Maurer does *not* teach a colorless laser engraving technique or a colorless security feature”). Patent Owner also re-iterates its argument that Bernecker does not teach forming colorless engraved features *in register with* a contrasting feature, as asserted by Petitioner. *Id.* (citing Ex. 2007 ¶¶ 109, 118); *see* PO Resp. 3 (“Not one of the key assertions underlying Petitioner’s obviousness challenge is accurate . . . (3) Bernecker does *not* teach forming colorless laser engraved features aligned (or in register) with contrasting features.”).

Patent Owner also reiterates its argument that Bernecker and Maurer are fundamentally different references that cannot be combined without undermining their respective purposes because Maurer teaches creation of *blackened* inscriptions whereas Bernecker teaches *avoiding discloloration*,

and because Maurer teaches the use of laser energy to alter the core of a laminated card, whereas Bernecker teaches that the core should be left undisturbed and that laser processing should affect only the outer laminate layer of the card. *Id.* (citing Ex. 2007 ¶¶ 67–76, 101–103, 106); *see also* PO Resp 40–41 (arguing Maurer teaches application of intense laser energy to create permanent, visible burned inscriptions deep in the core of the card, whereas Bernecker states that burning/blackening of the card must be avoided, and teaches using significantly less energy to create translucent features on the outer laminate layer of a card).

Patent Owner also reiterates its argument from the Patent Owner Response that Petitioner’s reliance on the combination of Bernecker and Fry lack evidentiary support because Fry is in a divergent field of endeavor. PO Reply 8; *see also* PO Resp. 50 (Arguing Petitioner does not offer a motivation to combine Fry with Maurer and Bernecker, “especially in light of Fry’s divergent field of endeavor”). Patent Owner re-iterates its arguments that Fry’s techniques were designed for scoring plastics to form a weakened line, not for inscribing a thin laminate layer with a contrasting or contrastless laser process, as taught by Maurer or Bernecker. PO Reply 8–9; *see also* PO Resp. 50 (making the same argument about scoring to form a weakened line). Finally, Patent Owner re-iterates its arguments that the dimensions involved in Fry would have been useless to a skilled artisan designing laser processing techniques for identification documents, and that Fry discloses a scorched bead contrary to Petitioner’s suggestion that Fry’s process would have created a raised feature that “lacks discoloration.” PO

Reply 9 (citing Ex. 2007 ¶¶ 110–113, 115, 132–133); *see also* PO Resp. 50 (making same arguments as in Patent Owner’s Reply).

In connection with the Motion and Patent Owner Reply, Patent Owner does not specifically address the recitation regarding reflecting surfaces that are not parallel to the top surface of the card or the recitation regarding a foamed laminate material.

Patent Owner relies on the same declaration of Dr. Cairns upon which it relies to support the Patent Owner Response.

We addressed Patent Owner’s arguments above in our discussion of the patentability of claims 1–3 and 5–12, and for the reasons stated therein, these arguments do not undermine Petitioner’s showing.

3. Tactile effect/ridges can be felt by touch

Petitioner argues that the combination of Maurer, Bernecker, and Fry would have rendered obvious the following limitations: “wherein the raised features provide a tactile effect,” as recited in substitute claim 15; “wherein the ridges can be felt by touch,” as recited in substitute claim 24; and “the tactile feature extends above a nominal top surface,” as recited in substitute claim 20. Opp. 14 (citing Ex. 1018 ¶ 66); *id.* at 19 (citing Ex. 1018 ¶¶ 123–33), *id.* at 16 (citing Ex. 1018 ¶¶ 90–106). Petitioner relies on its arguments, discussed above, *supra* Sec. III.E.2, that the combination of Maurer, Bernecker, and Fry would have rendered obvious a combined security feature that includes a tactile/raised relief. *Id.* (citing Opp. Sec. VII.A); *id.* at 19 (citing Opp. Sec. VII.A); *id.* at 16 (citing Opp. Sec. VII.A). As we discussed above, *supra* Sec. III.E.2, Petitioner argues in Section VII.A of the Opposition that the combination of Maurer, Becker, and Fry

would have rendered obvious a combined security feature having a tactile/raised relief. Petitioner, therefore, relies upon the same arguments as in the papers relating to patentability of claims 1–3 and 5–12, which we found to make a persuasive showing, to address these limitations added by amendment to substitute claims 15 and 24.

Patent Owner succinctly argues that “Petitioner depends solely on Maurer for the raised tactile feature. But Maurer does not disclose such a feature.” PO Reply 9 (citing Ex. 2007 ¶¶ 85–100). Rather than explain why Maurer fails to disclose a raised tactile feature, Patent Owner relies on the same declaration of Dr. Cairns upon which it relies to support the Patent Owner Response, and does not provide any additional arguments or evidence. *Id.* (citing Ex. 2007 ¶¶ 85–100); *see, e.g.*, PO Resp. 14 (citing Ex. 2007 ¶¶ 86–97 to support argument that the process in Maurer stand in stark contrast to the process that would be required to form a raised tactile feature).

Having reviewed the parties’ evidence and arguments, for the reasons discussed in this subsection and for the reasons discussed above, *supra* Sec. III.E.2, and above for claim 3 (reciting a “raised feature” that “provides a tactile effect”), *supra* Sec. II.C.2.c.ii., Petitioner has made a persuasive showing as to a raised feature providing a tactile effect, as recited in substitute claim 15, and a ridge that can be felt by touch, as recited in substitute claim 24, and Patent Owner’s arguments do not undermine Petitioner’s showing.

4. *Height $\geq 30\%$ of the thickness of a top or outer layer before processing*

As we noted above, substitute claim 17 is amended to recite “wherein the raised features have a height of $\geq 30\%$ of a thickness of the outer top layer before said laser processing,” and substitute claim 22 is amended to recite “wherein the raised features have height of $\geq 30\%$ of a thickness of the at least one layer of material before the laser-forming.” Mot. Claims App’x ii, v. Petitioner asserts that this feature would have been obvious to a person of ordinary skill in the art, relying on the same reference, the ’872 patent, upon which Patent Owner relies to show written description support for this feature. Opp. 21–22.

Petitioner argues that insofar as the Board agrees that the ’872 patent demonstrates possession, it would also have rendered obvious this feature. *Id.* at 21 (citing Ex. 1018 ¶¶ 142–43; *Kapsch Trafficcom IVHS Inc. v. Neology, Inc.*, IPR2016-01763, slip op. at 47 (Paper 60) (PTAB. Mar. 20, 2018)).

Petitioner also argues that a skilled artisan would have been motivated to use known methods, such as Fry’s teachings, to implement the combined security feature for the reasons discussed in Section VII.A of Petitioner’s Opposition. *Id.* at 22. We find Petitioner’s arguments persuasive because Fry teaches that its process involves foaming, teaching the formation of bubbles, *id.* (citing Ex. 1007, 4:60–64, 4:32–34), and the ’872 patent teaches that foaming can increase height and/or volume by 30% or more. *Id.* (citing Ex. 1014, 2:66–3:6, 6:14–17). We credit Dr. Tentzeris’s testimony that, in view of the ’872 patent’s teachings, a person of ordinary skill in the art

would have found it obvious to implement Fry’s foaming to a sufficient degree to provide for tactility, because a relief having the increased height would improve tactility—a feature important to Maurer. *Id.* (citing Ex. 1005, 4:25–30; Ex. 1018, ¶¶ 142–43). As Dr. Tentzeris points out, the height described in the ’872 patent would facilitate the “manual inspection” envisioned in Maurer, which we find supports his view that a person of ordinary skill in the art would have been motivated to provide large enough features to enable greater tactility. Ex. 1018 ¶ 142. We are persuaded, therefore, that applying Fry’s foaming technique to achieve the height described in the ’872 patent would have been an obvious variation to Maurer’s raised relief, and would have been at least obvious to try. *Id.*

For the foregoing reasons, Petitioner has made a persuasive showing for this claim limitation.

Patent Owner replies that Petitioner’s argument that a prior art disclosure that satisfies the written description requirement of 35 U.S.C. § 112 necessarily renders a claim obvious under 35 U.S.C. § 103 has no legal basis. PO Reply 10.

With regard to whether Petitioner has demonstrated obviousness, Patent Owner argues Petitioner has not made the requisite showing. PO Resp. 10–11. Patent Owner distinguishes between the laser processing technique described in the ’872 patent, which it argues was used to create embossed characters—not to create the novel security features claimed in the ’152 patent. PO Reply 10 (citing Ex. 1014, 2:50–58). Patent Owner also relies on the argument it failed to acknowledge or address in its discussion of written description support, namely that the ’872 patent’s characters are

discolored, *id.* (citing Ex. 1014, 2:67–3:2, 3:63–68), which Patent Owner argues is entirely consistent with the ’872 patent’s purpose of creating embossed, visible characters depicting data related to the card owner, *id.* (citing Ex. 1014, 1:21–26), but “entirely inconsistent with the ‘clear’ security features required by the proposed substitute claims.” PO Reply 10.

Patent Owner argues that Petitioner relies solely on Maurer for its argument that one skilled in the art would have been motivated to create “higher” raised features satisfying the 30% requirement to enable greater tactility, PO Reply 10–11 (citing Opp. 22; Ex. 1018 ¶ 143), but that Maurer attributes the ability to be “felt manually” solely to the depression formed by melting the laminate layer directly above the burned-in indicia, *id.* at 11 (citing Ex. 2007 ¶¶ 73–86, 100). According to Patent Owner, nothing in Maurer teaches creating raised features for purposes of manual inspection. *Id.* (citing Ex. 2007 ¶¶ 73–86, 100). Patent Owner concludes that the ’872 patent therefore provides no basis for concluding the claimed subject matter would have been obvious at the time the inventors the ’152 patent filed their patent application. *Id.*

Patent Owner’s arguments misapprehend Petitioner’s position. Patent Owner distinguishes the process in the ’872 patent from a process that results in clear or colorless raised features. *Id.* at 10–11. However, Petitioner does not combine the process in the ’872 patent with the other asserted prior art references. Rather, Petitioner relies on the same combination (which we found persuasive) as it does with regard to substitute claim 24 to show that the combination of Maurer, Bernecker, and Fry disclose, teach or suggests the combined security feature having a raised

feature that extends above the surface of the identification card. Opp. 22 (citing Opp. Sec. VII.A). For example, Petitioner relies on Fry for the teaching of foaming to provide a raised feature. *Id.* Because the three combined references do not specify the exact height of the raised feature, Petitioner cites to the '872 patent for the teaching of a height and/or volume increase of 30% or more, arguing that a skilled artisan reading the '872 patent would have found it obvious to implement Fry's foaming technique (not the '872's foaming technique) to a sufficient degree to achieve tactility as taught in Maurer and specifically to a height that satisfies the 30% threshold. *Id.*

Also, Patent Owner's argument that Petitioner relies solely on Maurer for its argument that one skilled in the art would have been motivated to create "higher" raised features satisfying the 30% requirement to enable greater tactility is incorrect. PO Reply 10–11 (citing Opp. 22; Ex. 1018 ¶ 143). As we discussed above, Petitioner relies on the combination of Maurer's raised feature and Fry's foaming technique, further in light of the '872 patent's disclosure of a specific height. Opp. 21–22.

Finally, Patent Owner's argument that Maurer discloses only depressed features, PO Reply 11, is recycled from its arguments in the papers regarding patentability of the challenged claims, *see e.g.*, our above discussion of claim 3 regarding the argument that Maurer does not depict raised features, but only depressions. *Supra* Sec. II.C.2.c.ii.c. For reasons discussed above, *supra id.*, such arguments do not undermine Petitioner's showing.

5. Summary, Alleged Obviousness

For the reasons stated above, Petitioner has shown by a preponderance of the evidence that substitute claims 13–15 and 17–24 are unpatentable under 35 U.S.C. § 103(a) over the asserted combinations of prior art.

F. Summary, Contingent Motion to Amend

Substitute claims 17 and 22 constitute new matter and fail to satisfy the written description requirements of 37 C.F.R. § 42.121(a)(2) and 35 U.S.C. § 316(d)(3). Substitute claims 13–15 and 19–21 would have been obvious over the combination of Maurer, Bernecker, and Fry; substitute claims 18 and 23 would have been obvious over the combination of Maurer, Bernecker, Fry, and Gunn; substitute claim 24 would have been obvious over the combination of Maurer, Bernecker, Fry, and Ross; and substitute claims 17 and 22 would have been obvious over the combination of Maurer, Bernecker, Fry, and the '872 patent.

Accordingly, we deny the Contingent Motion to Amend.

IV. CONCLUSION

Petitioner shows by a preponderance of the evidence that claims 1–3 and 5–12 of the '152 patent are unpatentable. Substitute claims 17 and 22 of the Contingent Motion to Amend do not satisfy the requirements of 37 C.F.R. § 42.121. Petitioner shows by a preponderance of the evidence that substitute claims 13–15 and 17–24 of the Contingent Motion to Amend are unpatentable.

V. ORDER

ORDERED that claims 1–3 and 5–12 of the '152 patent are unpatentable;

FURTHER ORDERED that pursuant to 35 U.S.C. § 318(b), upon expiration of the time for appeal of this Final Written Decision, or the termination of any such appeal, a certificate shall issue cancelling claims 1–3 and 5–12 of the '152 patent;

FURTHER ORDERED that Patent Owner's Motion to Amend is *denied*; and

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

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