

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

SPTS TECHNOLOGIES LTD.,
Petitioner,

v.

PLASMA-THERM LLC,
Patent Owner.

Case IPR2018-00618
Patent 8,785,332 B2

Before ELIZABETH M. ROESEL, AMANDA F. WIEKER, and
KAMRAN JIVANI, *Administrative Patent Judges*.

ROESEL, *Administrative Patent Judge*.

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

SPTS Technologies Limited (“Petitioner”) challenges the patentability of claims 1 and 2 (“the challenged claims”) of U.S. Patent No. 8,785,332 B2 (Ex. 1001, “the ’332 patent”), assigned to Plasma-Therm LLC (“Patent Owner”).

We have jurisdiction under 35 U.S.C. § 6. This final written decision is issued pursuant to 35 U.S.C. § 318(a) and 37 C.F.R. § 42.73.

Because Petitioner’s sole challenge is based on a reference that Petitioner has not shown to be prior art to the challenged claims, we determine Petitioner has not shown that the challenged claims of the ’332 patent are unpatentable.

I. BACKGROUND

A. *Procedural History*

Petitioner filed a Petition seeking *inter partes* review. Paper 1 (“Pet.”). Patent Owner filed a Preliminary Response. Paper 8 (“Prelim. Resp.”). We instituted *inter partes* review of the challenged claims. Paper 10 (“Institution Decision” or “Dec.”).

Patent Owner filed a Response. Paper 14 (“PO Resp.”). Petitioner filed a Reply. Paper 16 (“Pet. Reply”). Patent Owner filed a Sur-Reply. Paper 17 (“PO Sur-Reply”).

With the Petition, Petitioner filed a declaration of John E. Spencer, Ph.D. Ex. 1013. Patent Owner cross-examined Dr. Spencer and filed a transcript of his deposition testimony as Exhibit 2010. With the Reply, Petitioner filed a supplemental declaration of Dr. Spencer. Ex. 1028.

With the Preliminary Response, Patent Owner filed a declaration of Stanley Shanfield, Ph.D. Ex. 2002. With the Patent Owner Response, Patent Owner filed a supplemental declaration of Dr. Shanfield. Ex. 2009.

Petitioner cross-examined Dr. Shanfield, but did not file a transcript of the deposition testimony and did not cite to the transcript in its Reply Brief. See Paper 15 (Notice of Deposition of Dr. Shanfield); Ex. 1029 (one-page exhibit titled “Deposition Transcript of Dr. Shanfield” does not contain the transcript). Accordingly the cross-examination testimony of Dr. Shanfield is not in the record before us and is not part of the evidence considered in rendering this final written decision.

Oral argument was held June 20, 2019. A transcript of the oral argument was entered in the record. Paper 23 (“Tr.”).

B. Related Matters

The parties identify no related litigation matters pursuant to 37 C.F.R. § 42.8(b)(2). Pet. 3; Paper 3, 1 (Patent Owner’s Mandatory Notices).

The parties identify the following proceedings in which Petitioner challenges patents related to the ’332 patent:

Proceeding No.	Patent No.	Reference Hereinafter
IPR2017-01314	8,980,764 B2	“the ’764 patent”
IPR2017-01457	9,202,720 B2	“the ’720 patent”
IPR2017-01674	8,802,545 B2	“the ’545 patent”
IPR2017-01792	9,105,705 B2	“the ’705 patent”
IPR2017-02164	9,070,760 B2	“the ’760 patent”

Pet. 3; Paper 3, 1–2. The ’332 patent (Ex. 1001), the ’764 patent (Ex. 1014), the ’720 patent (Ex. 1015), the ’545 patent (Ex. 1004), the ’705 patent (Ex. 1016), and the ’760 patent (Ex. 1017) each claim priority to U.S. Application No. 13/412,119, filed March 5, 2012, which claims priority to

U.S. Provisional Application No. 61/452,450, filed March 14, 2011. *See* Ex. 1003 (Public PAIR screenshot showing patent family).

C. Petitioner's Asserted Ground of Unpatentability

Petitioner contends that claims 1 and 2 are unpatentable as obvious under 35 U.S.C. § 103(a) over Singh¹ in view of Yamamoto² and/or Kobayashi.³ Pet. 5, 38.

D. The '332 Patent (Ex. 1001)

The '332 patent is titled "Method and apparatus for plasma dicing a semiconductor wafer." Ex. 1001 at (54).

Dicing is a process by which individual semiconductor devices (die or chips) are separated from each other after they have been fabricated on a substrate, such as a silicon wafer. *Id.* at 1:18–21, 2:16–18. Dicing can be carried out by mechanical means, such as breaking along scribe lines or sawing, or by plasma etching. *Id.* at 2:18–25, 2:49–51. According to the '332 patent, plasma dicing has a number of benefits over mechanical dicing, but current plasma etching equipment is not suitable for processing substrates that are "fixtured for dicing." *Id.* at 2:26–46, 2:59–67, 3:5–21. The '332 patent aims to provide a plasma etching method that is "compatible with the established wafer dicing technique of handling a substrate mounted on tape and supported in a frame." *Id.* at 3:47–52.

¹ US 2012/0322239 A1, filed June 15, 2011, and published December 20, 2012, Ex. 1010.

² US 7,896,047 B2, issued March 1, 2011, Ex. 1011.

³ US 2005/0229370 A1, published October 20, 2005, Ex. 1012.

A substrate mounted on tape and supported in a frame is shown in Figure 3, which is reproduced below:

Figure 3

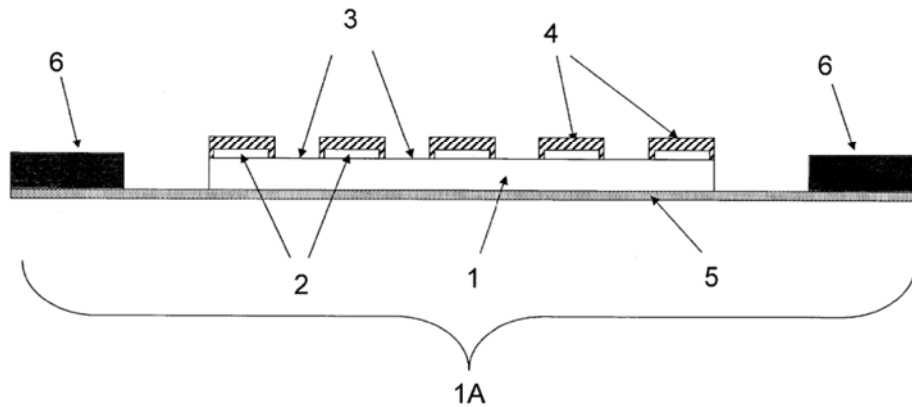


Figure 3 of the '332 patent is a cross-sectional view of work piece 1A (also referred to as substrate/tape/frame assembly 1A), including substrate 1 adhered to tape 5, which in turn is mounted in rigid frame 6. Ex. 1001, 8:22–23, 9:33–35. Substrate 1 has device structures 2 separated by street areas 3. *Id.* at 8:57–61; *see also id.* at Fig. 1 (showing top down view of substrate with device structures separated by streets). Device structures 2 are covered with protective material 4, such as a photoresist, while street areas 3 remain unprotected. *Id.* at 9:1–5.

A vacuum processing chamber for carrying out a plasma dicing method is shown in Figure 6, which is reproduced below:

Figure 6

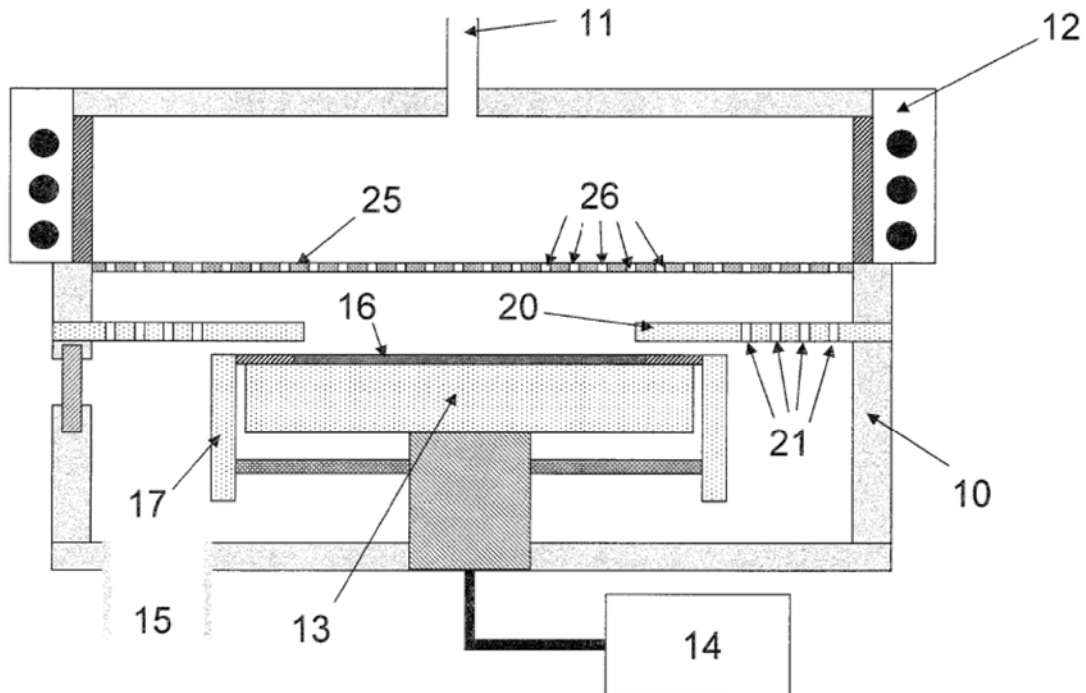


Figure 6 of the '332 patent is a cross-sectional view of vacuum processing chamber 10 equipped with gas inlet 11, high density plasma source 12, work piece support 13, RF power source 14, vacuum pump 15, Electrostatic Chuck ("ESC") 16, lifting mechanism 17, cover ring 20 with a plurality of holes 21, and conductive screen 25 with a plurality of holes 26. Ex. 1001, 8:29–30, 9:61–10:2, 10:35–37, 11:12–20, 12:29–40. During processing, unprotected street areas 3 of substrate 1 are etched away using a reactive plasma etch process to separate devices 2 into individual die. *Id.* at 10:2–5, Fig. 4.

A wafer/frame in a process position is shown in Figure 7, which is reproduced below:

Figure 7

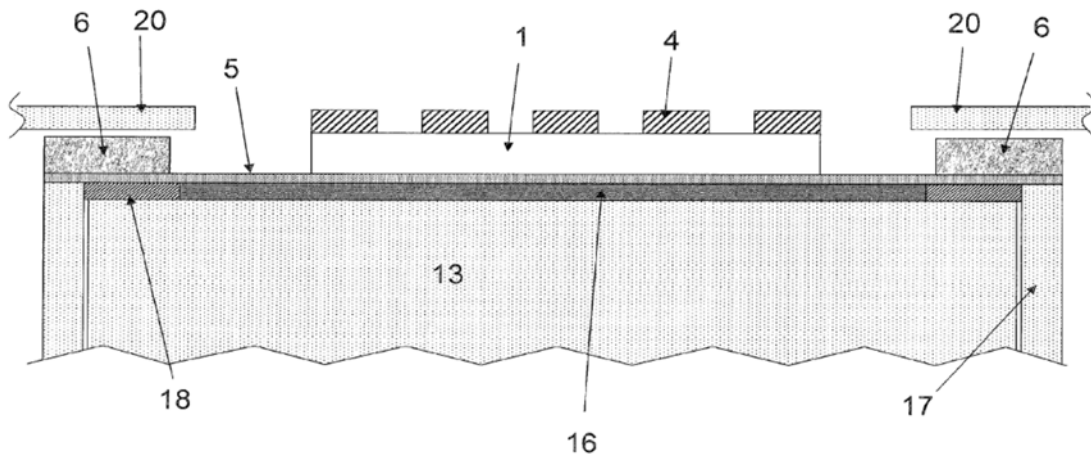


Figure 7 of the '332 patent shows a wafer/frame in a process position in a vacuum processing chamber. Ex. 1001, 8:31–32. Figure 7 shows substrate 1, protective material 4, tape 5, frame 6, work piece support 13, ESC 16, lifting mechanism 17, filler ring 18, and cover ring 20. *Id.* at 10:35–37, 12:63–66 (discussing Figure 8, which also shows these structures).

According to the '332 patent, substrate/tape/frame assembly 1A is transferred under vacuum into the process chamber by a transfer arm (Ex. 1001, 9:55–61, 11:25–28), which is illustrated in Figures 11 and 12 reproduced below:

Figure 11

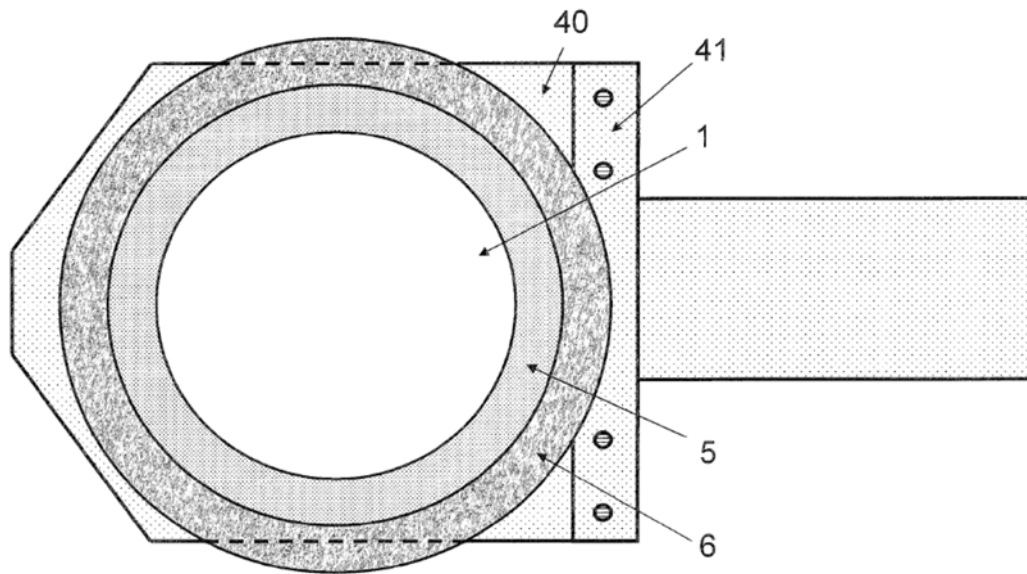
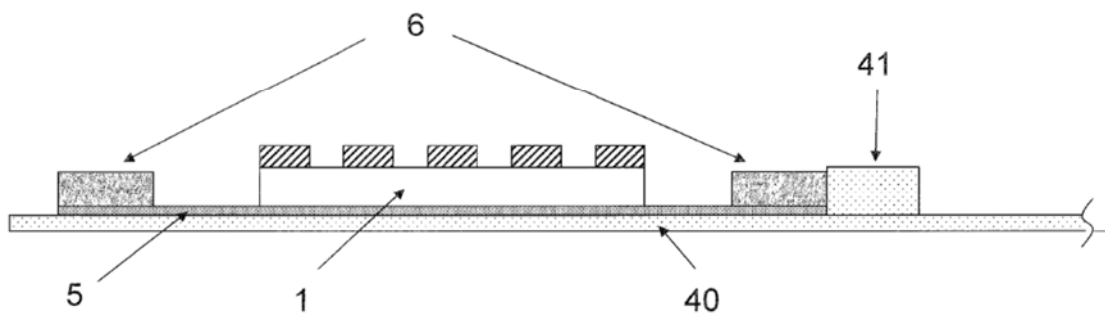


Figure 12



Figures 11 and 12 show a semiconductor substrate mounted to tape and a frame supported by a transfer arm, with a top down view shown in Figure 11 and a cross-sectional view shown in Figure 12. Ex. 1001, 8:40–44.

Figures 11 and 12 show substrate 1, tape 5, frame 6, transfer arm 40, and alignment fixture 41.

According to the '332 patent, when the substrate/tape/frame assembly 1A is transferred into the process chamber, it is placed onto lifting

mechanism 17 (Ex. 1001, 12:4–7), as shown in Figure 13, which is reproduced below:

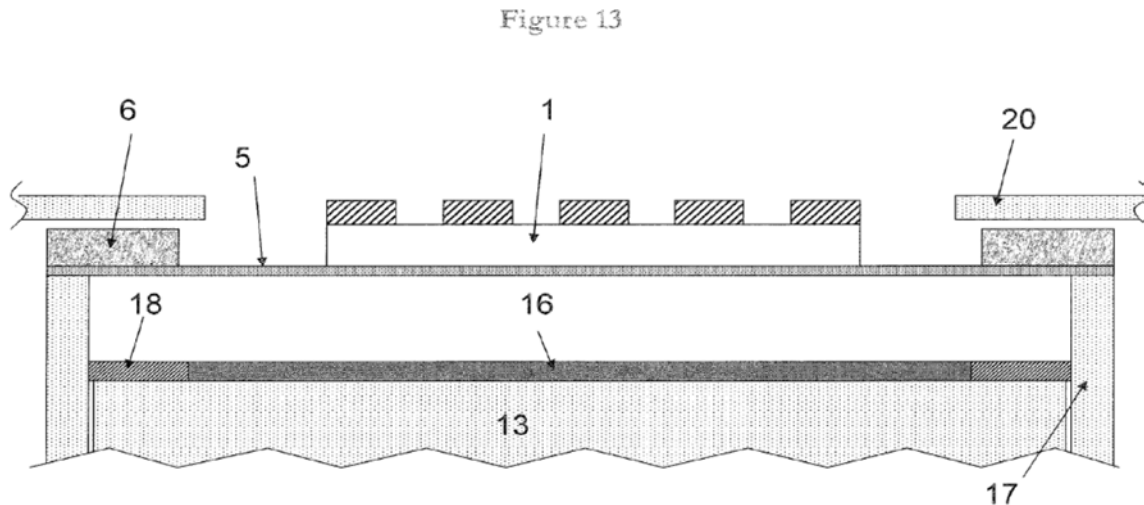


Figure 13 shows a wafer/frame in a transfer position. Ex. 1001, 8:45–46.

Figure 13 shows substrate 1, tape 5, frame 6, work piece support 13, ESC 16, lifting mechanism 17, filler ring 18, and cover ring 20. *Id.* at 12:9–18.

E. Challenged Claims

The '332 patent includes two claims, both of which are challenged in the Petition. The challenged claims are reproduced below, with paragraphs adjusted and identifiers A–Q added in brackets to correspond with Petitioner's identification of the claim elements:

1. [A] A method for plasma dicing a substrate, the method comprising:
 - [B] providing a transfer arm;
 - [C] providing a process chamber having a wall;
 - [D] providing a plasma source adjacent to the wall of the process chamber;

- [E] providing a work piece support within the process chamber;
 - [F] providing a lifting mechanism within the work piece support;
 - [G] placing the substrate onto a support film on a frame to form the work piece,
 - [H] the frame of the work piece having an exposed lower surface,
 - [I] the lifting mechanism only touching a portion of the work piece overlapped by the frame;
 - [J] loading the work piece onto the transfer arm;
 - [K] transferring the work piece into the process chamber onto the lifting mechanism using the transfer arm,
 - [L] the transferring of the work piece into the process chamber being performed under vacuum,
 - [M] the transfer arm maintaining the frame coplanar to the substrate during the transferring step,
 - [N] the transfer arm does not contact the substrate;
 - [O] generating a plasma through the plasma source; and
 - [P] etching the work piece through the generated plasma.
2. [Q] The method according to claim 1 further comprising aligning the work piece in the transfer arm using an alignment fixture.

Ex. 1001, 15:21–16:22; *see* Pet. 38–44 (claim chart).

II. DISCUSSION

A. Claim Construction

In cases where a petition for *inter partes* review was filed before November 13, 2018, claim terms in an unexpired patent are given their broadest reasonable interpretation in light of the specification of the patent in

which they appear. 37 C.F.R. § 42.100(b).⁴ Under that standard, we generally give claim terms their ordinary and customary meaning, as understood by a person of ordinary skill in the art in the context of the entire patent disclosure. *In re Translogic Tech., Inc.*, 504 F.3d 1249, 1257 (Fed. Cir. 2007).

Petitioner proposes constructions for six claim terms. Pet. 32–38. Patent Owner contends that no claim term requires construction. PO Resp. 6–7. We determine that no claim term requires express construction for purposes of resolving the controversy. *Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017) (“[W]e need only construe terms ‘that are in controversy, and only to the extent necessary to resolve the controversy.’”) (quoting *Vivid Techs., Inc. v. Am. Sci. & Eng’g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999)).

B. General Principles of Law

A claim is unpatentable under 35 U.S.C. § 103(a) if “the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains.” *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007). The question of obviousness is resolved on the basis of underlying factual determinations, including (1) the scope and content of the prior art; (2) any differences between the claimed subject matter and the prior art;

⁴ A recent amendment to this rule does not apply here. See Changes to the Claim Construction Standard for Interpreting Claims in Trial Proceedings Before the Patent Trial and Appeal Board, 83 Fed. Reg. 51,340 (Oct. 11, 2018) (amending 37 C.F.R. § 42.100(b) effective November 13, 2018).

(3) the level of skill in the art; and, when introduced, (4) objective evidence of nonobviousness. *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966).

“In an [*inter partes* review], the petitioner has the burden from the onset to show with particularity why the patent it challenges is unpatentable.” *Harmonic Inc. v. Avid Tech., Inc.*, 815 F.3d 1356, 1363 (Fed. Cir. 2016). The burden of persuasion never shifts to Patent Owner. *In re Magnum Oil Tools Int’l, Ltd.*, 829 F.3d 1364, 1376 (Fed. Cir. 2016); *Dynamic Drinkware, LLC v. Nat’l Graphics, Inc.*, 800 F.3d 1375, 1378 (Fed. Cir. 2015).

C. Level of Ordinary Skill in the Art

In the Institution Decision, we adopted Patent Owner’s definition of a person of ordinary skill in the art (“POSITA”). Dec. 13. According to Patent Owner, a POSITA

would have at least a Bachelor’s or Master’s degree in electrical engineering, chemical engineering, materials science, physics or chemistry, or a similar field, and at least three to four years of experience in process development or process engineering related to plasma etching. Alternatively, this person would have a Ph.D. in physics, chemistry, electrical engineering, materials science or a similar field.

Prelim. Resp. 9.

In the Institution Decision, we rejected Petitioner’s description of the field in which a POSITA would have had work experience as inconsistent with scope of technology described in the ’332 patent. Pet. 31; Dec. 12–13. Neither party challenges our determinations regarding the level of ordinary skill in the art, as set forth in the Institution Decision. Accordingly, in this final written decision, we continue to apply Patent Owner’s definition of a POSITA quoted above.

Neither party challenges the qualifications of the declarants or the admissibility of their testimony. After reviewing the qualifications of Drs. Spencer and Shanfield, as set forth in each witness's declaration and curriculum vitae, we find that each of these declarants has sufficient education and experience related to the subject matter of the '332 patent to testify regarding the perspective of a POSITA at the time of the invention. Ex. 1013 ¶¶ 3–5, Appendix A; Ex. 2002 ¶¶ 3–13; Ex. 2003.

D. Effective Filing Date of the '332 Patent

The '332 patent was issued July 22, 2014, from U.S. Application No. 13/764,142, filed February 11, 2013, and claims priority to U.S. Application No. 13/412,119, filed March 5, 2012 (“the '119 parent application”). Ex. 1001, at (21), (22), (45). Under the heading, “Cross References to Related Applications,” the '332 patent states that the '119 parent application was filed based on U.S. Provisional Application No. 61/452,450, filed March 14, 2011 (“the '450 provisional application”). *Id.* at 1:10–14. As issued on July 22, 2014, the title page of the '332 patent lists the '119 parent application, but not the '450 provisional application, under Related U.S. Application Data. *Id.* at (62).

Petitioner contends that the '332 patent has an effective filing date no earlier than February 11, 2013, and on that basis, asserts that Singh (filed June 15, 2011) is prior art under 35 U.S.C. § 102(a) and § 102(e). Pet. 5–16. Patent Owner contends that Singh does not qualify as prior art because the challenged claims of the '332 patent⁵ are entitled to the benefit of the March

⁵ As discussed above, the '332 patent includes two claims, both of which are challenged in the Petition.

14, 2011, filing date of the '450 provisional application. PO Resp. 1–2, 5–21. We agree with Patent Owner and address the parties' arguments below.

1. Waiver of Priority Claim

Petitioner contends that Patent Owner waived any priority claim to the '450 provisional application by failing to include a reference to that application in the Application Data Sheet ("ADS") and by failing to correct the omission in a manner that complied with USPTO requirements. Pet. 6–13.

Before filing its Preliminary Response and with the prior authorization of the Board (Paper 7), Patent Owner filed a Petition for Certificate of Correction to Correct an Unintentionally Delayed Priority Claim pursuant to 37 C.F.R. § 1.78(c) and for Expedited Consideration. Ex. 2001. The Office of Petitions granted the correction petition. Ex. 2004. A corrected filing receipt was issued, correcting Patent Owner's priority claim to include a reference to the '450 provisional application. Ex. 2005. Subsequent to Patent Owner's filing of the Preliminary Response, a Certificate of Correction was issued, correcting the Related U.S. Application Data on the title page of the '332 patent to include the '450 provisional application. Ex. 2008.

In the Institution Decision, we found that the foregoing facts showed that Patent Owner has not waived a claim for benefit of the March 14, 2011, filing date of the '450 provisional application. Dec. 14. In its post-institution briefing, Petitioner does not challenge our finding and no longer relies on waiver as a reason for asserting Singh as prior art to the '332 patent. *See generally* Reply Br. Accordingly, in this final written decision,

we again find that Patent Owner has not waived a claim for benefit of the March 14, 2011, filing date of the '450 provisional application.

2. *Written Description Support*

Petitioner contends that the '450 provisional application and the '119 parent application (hereinafter collectively, “the priority applications”) lack an adequate written description for claim element H, which recites: “the frame of the work piece having an exposed lower surface.” Ex. 1001, 16:8–9; Pet. 14.⁶ Petitioner contends that the drawings of the priority applications consistently show the lower surface of the frame completely covered by a support film, such that no portion of the lower surface is exposed. Pet. 15. More specifically, Petitioner asserts that Figures 3–5, 7–10, 12, and 13 depict the lower surface of frame 6 completely covered by tape 5. *Id.* at 15–16. Petitioner contends that the subject matter communicated by the figures is “directly contrary” to the claim recitation of “an exposed lower surface,” since no portion of the lower surface of frame 6 is shown to be exposed. *Id.* at 16.

Patent Owner relies on passages in the '450 provisional application (Ex. 1008) and corresponding passages in the '119 parent application (Ex. 1009) as providing written description support for “the frame of the work piece having an exposed lower surface.” PO Resp. 7–14. These passages include: “[t]he transfer arm may support both the tape and frame

⁶ There is no dispute that the remaining limitations of the challenged claims are adequately supported by the written description of the priority applications.

or the frame alone” (Ex. 1008, 17⁷); “[t]he lift mechanism touches the frame area and provides no point contact to the substrate” (*id.* at 18); and “Figure 13 shows the lift mechanism contacting the frame from the underside” (*id.*). See also Ex. 1009, 22, 24 (substantially the same disclosures). Patent Owner also relies on the deposition testimony of Petitioner’s expert, Dr. Spencer, regarding how a POSITA would have understood the above passages in the priority applications. PO Resp. 8–14 (citing Ex. 2010, 48:21–50:4, 51:8–15, 59:21–61:2).

Petitioner relies on Dr. Spencer’s Supplemental Declaration to argue that “the drawings of the ’450 provisional application do not describe the lower surface of the frame 6 as being exposed” and “the specification ‘also fails to describe the lower surface of the frame 6 as being exposed.’” Pet. Reply 10–11 (citing and quoting Ex. 1028 ¶¶ 9–19). Petitioner and Dr. Spencer address the disclosures of the ’450 provisional application relied upon by Patent Owner and conclude that none provides written description support for “the frame of the work piece having an exposed lower surface.” *Id.* at 11–16; Ex. 1028 ¶¶ 10–19.

Patent Owner argues that Dr. Spencer’s Supplemental Declaration is not credible because it is directly contrary Dr. Spencer’s earlier deposition testimony. PO Sur-Reply 11–15 (citing Ex. 2010, 48:21–50:4, 59:13–61:2).

a. Dr. Spencer’s Supplemental Declaration

We are presented with a threshold issue of how much weight to give paragraphs 10–19 of Dr. Spencer’s Supplemental Declaration. On this

⁷ We cite to Exhibit 1008 by the page numbers added by Petitioner, e.g., “page 1 of 46,” not the page numbers of the original document.

question, we consider: (a) whether Dr. Spencer's Supplemental Declaration contradicts his earlier deposition and declaration testimony; (b) the extent to which Dr. Spencer was questioned during the deposition on the issues addressed in his Supplemental Declaration; (c) whether Dr. Spencer had access to the relevant information during the deposition; and (d) whether Dr. Spencer has provided a satisfactory explanation for any contradiction. We derive these factors from *Quest Integrity USA, LLC v. Cokebusters USA Inc.*, where the Federal Circuit considered the analogous issue of whether a declaration submitted in opposition to a motion for summary judgment should be disregarded under the "sham affidavit doctrine." 924 F.3d 1220, 1232 (Fed. Cir. 2019) (applying regional circuit law); *see also Delaware Valley Floral Group, Inc. v. Shaw Rose Nets, LLC*, 597 F.3d 1374, 1381–82 (Fed. Cir. 2010) (district court did not err in disregarding a declaration that contradicted the declarant's unequivocal and repeated testimony in answer to deposition questions). We address each of these factors below.

(i) Whether Dr. Spencer's testimony is contradictory

We agree with Patent Owner that Dr. Spencer's Supplemental Declaration directly contradicts his deposition testimony. PO Sur-Reply 11. At his deposition, Dr. Spencer testified about the passages of the priority applications relied upon by Patent Owner for written description support. Ex. 2010, 49:18–50:4, 51:8–15, 59:21–61:2. In each instance, Dr. Spencer interpreted the Specification consistent with Patent Owner's contention that it provides adequate written description support for "the frame of the work piece having an exposed lower surface." *Id.* As discussed below, Dr. Spencer contradicts that deposition testimony in paragraphs 10–19 of his Supplemental Declaration.

In paragraph 10 of his Supplemental Declaration, Dr. Spencer discusses the '450 provisional application's disclosure that the "lift mechanism touches the frame area and provides no point contact to the substrate." Ex. 1028 ¶ 10 (emphasis omitted; quoting Ex. 1008, 18).

Dr. Spencer avers:

The POSITA would understand that "frame area" has the same meaning as claim 1 of the '332 patent when it recites "a portion of the work piece overlapped by the frame" (Ex. 1001, col. 16, lines 10–11). Quite obviously, it would be grammatically nonsensical to interpret the phrase "a portion of the work piece overlapped by the frame" to be the frame itself. Likewise, the POSITA would not interpret the "frame area" of the work piece as being the frame itself, particularly in view of the drawings.

Id. The foregoing testimony directly contradicts Dr. Spencer's earlier deposition testimony as follows:

Q. "The lift mechanism touches the frame area and provides no point contact to the substrate." Do you see that sentence?

A. Yes.

Q. And when it says "touches the frame area," do you interpret that the same way that it would – that it could be an exposed underside of the frame?

A. Yes.

Ex. 2010, 60:20–61:2. At his deposition, Dr. Spencer agreed that the "frame area," as discussed in the Specification, "could be an exposed underside of the frame." *Id.* In his Supplemental Declaration, Dr. Spencer contradicts that testimony, averring that a POSITA would not interpret the "frame area" as being the frame itself. Ex. 1028 ¶ 10.

Dr. Spencer's Supplemental Declaration contradicts both his original declaration (Ex. 1013) and his deposition testimony (Ex. 2010) regarding the meaning of "a portion of the work piece overlapped by the frame." In his

Supplemental Declaration, Dr. Spencer asserts that “it would be grammatically nonsensical to interpret the phrase ‘a portion of the work piece overlapped by the frame’ to be the frame itself.” Ex. 1028 ¶ 10. But that “grammatically nonsensical” interpretation is exactly what Dr. Spencer proposed in his original declaration. Ex. 1013 ¶ 83 (construing “a portion of the work piece overlapped by the frame” as “***the frame itself***, or a portion of one side of the support film that is in contact with the frame on the opposite side of that same portion of the support film”) (emphasis added). At his deposition, Dr. Spencer reiterated his declaration testimony and testified that the lifting mechanism “either touches the frame or the tape.” Ex. 2010, 52:7–53:3.

In paragraphs 11 and 12 of his Supplemental Declaration, Dr. Spencer discusses the ’450 provisional application’s disclosure that the “Figure 13 shows the lift mechanism contacting the frame from the underside” Ex. 1028 ¶ 11 (quoting Ex. 1008, 18). Dr. Spencer avers:

Quite obviously, the POSITA would interpret the description following the phrase “Figure 13 shows” as being what is shown in FIG. 13. And what is shown in FIG. 13 is the tape 5 interposed between the lifting mechanism 17 and the frame 6. The POSITA would readily understand that the lifting mechanism 17 “contacts” the frame 6 indirectly through the tape 5. The ’450 provisional application uses the word “contacts” to denote indirect contact. There is no description at all of direct contact between the lifting mechanism 17 and the lower surface of the frame 6. Also, it does not inherently follow that the lower surface of the frame 6 is exposed from the description of the embodiments of the lifting mechanism 17.

Id. ¶ 12. The foregoing testimony directly contradicts Dr. Spencer’s earlier deposition testimony as follows:

Q. And it says, “Figure 13 shows the lift mechanism contacting the frame from the underside.” Do you see that?

A. Yes.

Q. And so would you interpret that the same way that if the lift mechanism is contacting the frame from the underside, that means there must be some part of the frame that is exposed on the underside?

A. Yes.

Ex. 2010, 60:7–15. At his deposition, Dr. Spencer agreed with Patent Owner that the description of Figure 13 means that “there must be some part of the frame that is exposed on the underside.” *Id.* In his Supplemental Declaration, Dr. Spencer contradicts that testimony, averring that there is no description of direct contact between the lifting mechanism and the lower surface of the frame and no description of an exposed lower surface of the frame. Ex. 1028 ¶ 12.

In paragraphs 15–18 of his Supplemental Declaration, Dr. Spencer discusses the ’450 provisional application’s disclosure that the “transfer arm may support both the tape and frame or the frame alone.” Ex. 1028 ¶ 15 (quoting Ex. 1008, 17). Dr. Spencer avers that a POSITA would understand this portion of the ’450 provisional application as describing a configuration in which transfer arm 40 has “a central opening (when looking from above) such that the ‘support’ surface of the transfer arm 40 is only below the substrate/tape areas of the work piece.” *Id.* According to Dr. Spencer, this portion of the ’450 provisional application describes a first embodiment in which the transfer arm supports both the tape and the frame (*id.* ¶ 16) and a second embodiment in which the transfer arm supports the frame alone (*id.* ¶ 17). Dr. Spencer avers:

In both of the alternative embodiments of the transfer arm 40 described by the '450 provisional application, the lower surface of the frame 6 is covered by tape 5. The lower surface of the frame 6 is not exposed in either alternative. And it does not necessarily follow that the lower surface of the frame 6 is exposed from any embodiment of the transfer arm 40 described by the '450 provisional application.

Id. ¶ 18; *see also id.* ¶¶ 15, 16 (illustrating alternative embodiments with modified and annotated versions of Figure 12 of the '450 provisional application).

The foregoing testimony directly contradicts Dr. Spencer's earlier deposition testimony as follows:

Q. But in understanding that application, the '450 that we're reading from now, you would understand it when it's supporting the frame alone, that there's an exposed surface of the frame; is that correct?

A. Yes. There is some portion of the frame which does not have tape on it.

Q. On the lower surface?

A. Right.

Ex. 2010, 51:8–15; *see also id.* at 50:22–51:3 (Dr. Spencer reads aloud the portion of the '450 provisional application that discloses, “[t]he transfer arm may support both the tape and frame or the frame alone . . .”).

Q. And so when it says it supports the frame alone, I believe you testified that when -- by saying “the frame alone,” that means there must be some part of the frame on the underside that's exposed? It's not covered by tape; correct?

A. Correct.

Id. at 59:21–60:1; *see also id.* at 48:18–50:4 (Dr. Spencer: “It has to have the exposed lower surface . . . That's the only conclusion that makes sense there.”). At his deposition, Dr. Spencer agreed with Patent Owner that the

'450 provisional application describes an embodiment in which the frame has an exposed lower surface, i.e., a surface that is not covered by tape. *Id.* at 51:8-15, 59:21–60:1. In his Supplemental Declaration, Dr. Spencer contradicts that testimony, averring that “[t]he lower surface of the frame 6 is not exposed in either alternative” described in the '450 provisional application. Ex. 1028 ¶ 18.

(ii) Extent of questioning at the deposition

We agree with Patent Owner that Dr. Spencer “testified multiple times in response to differently-worded questions that the provisional application disclosed an exposed lower frame surface.” PO Sur-Reply 12. The deposition testimony relied upon by Patent Owner was “not a one-time slip of the tongue.” *Id.* at 15.

As demonstrated by the above-quoted excerpts from the deposition transcript, Dr. Spencer was questioned extensively about whether the '450 provisional application describes a frame having an exposed lower surface. Ex. 2010, 51:8–15, 59:21–60:1, 60:7–15, 60:20–61:2. Dr. Spencer was also questioned about whether the '119 parent application describes a frame having an exposed lower surface. *Id.* at 48:21–50:4. Dr. Spencer testified that, to make sense of the '119 parent application’s disclosure that “[t]he transfer arm may support . . . the frame alone,” the frame “has to have [an] exposed lower surface.” *Id.* at 49:18–23 (discussing Exhibit 1009, page 22).

In addition, Dr. Spencer was questioned about whether a frame having an exposed lower surface is disclosed by Sekiya⁸ and Singh, two of the

⁸ US 6,465, 158, issued October 15, 2002, Ex. 1024. See Ex. 1013 ¶ 32 (discussing Sekiya).

references discussed in his declaration. Ex. 2010, 17:9–17, 19:1–21:24. Dr. Spencer agreed with Patent Owner that, in Sekiya Figure 1, the bottom side of the frame would have exposed areas because the tape would not cover the entire lower surface area of the frame. *Id.* at 17:9–17 (discussing Sekiya Figure 1, as reproduced in Dr. Spencer’s Declaration, Ex. 1013 ¶ 32). Dr. Spencer testified that Singh does not expressly describe the lower surface of the frame being exposed. *Id.* at 19:1–9. According to Dr. Spencer, there are three possibilities: the tape is smaller than the frame, the tape is larger than the frame, or the tape is an exact fit with the frame. *Id.* at 19:18–20:8. Dr. Spencer testified that, if he were designing Singh’s work piece, there would be a lower surface of the frame that would be exposed. *Id.* at 21:9–24.

Dr. Spencer was also questioned about dicing frames in the 2011 time frame. Ex. 2010, 23:8–24:16. Dr. Spencer testified that, for frames that have notches, “you would not cover the notch” with tape, and “you don’t want to make a specialized cut” of the tape to fit the notches of the frame. *Id.* at 24:3–12. Dr. Spencer agreed, “since you don’t want to make a specialized cut, there would be a lower surface of the frame that would be exposed.” *Id.* at 24:13–16.

In short, Dr. Spencer was questioned thoroughly and extensively about whether the priority applications disclose the frame of the work piece having an exposed lower surface and whether such a work piece was generally known in the art at the relevant time.

(iii) Access to relevant information during the deposition

It is undisputed that Dr. Spencer had access to the ’450 provisional application, including the drawings, while he was being questioned about the

passages relied upon by Patent Owner for written description support. Tr. 12:12–21; *see also* Ex. 2010, 39:11–15 (the ’119 parent application, Ex. 1009, was marked as a deposition exhibit); *id.* at 50:5–9 (the ’450 provisional application, Ex. 1008, was marked as a deposition exhibit). In each instance, Dr. Spencer testified that he had reviewed the exhibit in preparing his declaration. *Id.* at 39:16–18, 50:11–14.

(iv) Satisfactory explanation for the contradiction

Relying on Dr. Spencer’s Supplemental Declaration, Petitioner argues that “portions of [Dr. Spencer’s] deposition testimony were in error” and that Dr. Spencer “became confused by the line of questioning” regarding contact between the transfer arm or lift mechanism and the lower surface of the frame. Pet. Reply 20 (citing Ex. 1028 ¶¶ 30–31). Petitioner does not specifically identify the portions of Dr. Spencer’s deposition testimony that Petitioner contends are “in error.” *Id.* Nor does Petitioner explain how or why Dr. Spencer allegedly became “confused.” Petitioner waived the reading and signing of the deposition transcript and did not arrange for Dr. Spencer to prepare an errata sheet. *See* Tr. 13:21–14:17.

For his part, Dr. Spencer offers two explanations for the allegedly erroneous deposition testimony. Ex. 1028 ¶¶ 30, 31. We address each of Dr. Spencer’s explanations in turn. First, Dr. Spencer asserts that he was asked about passages in the ’450 provisional application “usually without context and [without] being asked to simultaneously look at the drawings being referenced by those passages.” *Id.* ¶ 30.

We find Dr. Spencer’s first explanation unsatisfactory for the reasons argued by Patent Owner. PO Sur-Reply 14–15. Dr. Spencer’s *post hoc* explanation is belied by the deposition transcript, which shows that

Dr. Spencer understood the questions in the context of the patent drawings and explained his opinion with reference to the drawings. Ex. 2010, 46:5–50:4; PO Sur-Reply 14–15. Patent Owner asked Dr. Spencer to refer to both Figure 11 of the ’119 parent application and a text passage referring to that figure. *Id.* at 46:5–23, 48:18–49:4. Dr. Spencer expressly referenced the drawing when answering Patent Owner’s questions. *Id.* at 49:18–50:4. Specifically, Dr. Spencer testified that he understood the ’119 parent application as disclosing an exposed lower surface of the frame, even though that feature is not shown in the drawings. *Id.* In Dr. Spencer’s own words, “[i]t has to have the exposed lower surface.” *Id.* at 49:21–22. “That’s the only conclusion that makes sense there” even though “it’s not shown in the figure.” *Id.* at 50:1–3. Patent Owner then asked Dr. Spencer about a corresponding passage in the ’450 application. *Id.* at 50:5–51:7. Dr. Spencer testified that “[t]here is some portion of [the lower surface of] the frame which does not have tape on it.” *Id.* at 51:8–15. Dr. Spencer’s deposition testimony refutes his assertion that he was asked to testify about passages in the ’450 provisional application outside the context of the drawings or their textual descriptions. Ex. 1028 ¶ 30.

Dr. Spencer does not identify any instance where he would have answered Patent Owner’s question differently if he had reviewed a drawing before answering the question. Furthermore, on redirect examination, Petitioner referred Dr. Spencer to Figures 12 and 13 of the ’450 provisional application and the text describing those figures and asked a series of questions about the drawings and the meaning of the word “support” in the ’450 provisional application. Ex. 2010, 62:23–68:6. Dr. Spencer answered Petitioner’s questions without giving any hint that he had been confused or

had testified incorrectly when answering Patent Owner's questions. *Id.* The fact that Dr. Spencer did not recognize any error in his deposition testimony after being shown Figures 12 and 13 during redirect examination casts doubt on Dr. Spencer's Supplemental Declaration, which relies on these same figures as justification for contradicting his testimony four months after the deposition. Ex. 1028 ¶¶ 11–15.

Second, Dr. Spencer asserts that his deposition testimony resulted from a “confusing line of questioning” and from Patent Owner's use of the words “touch” and “support” to mean “directly touch” and “directly support.” Ex. 1028 ¶ 31. Dr. Spencer states he adopted these definitions when answering Patent Owner's questions “in the pressure of deposition,” but he now appreciates that the '450 provisional application “clearly and consistently uses the word ‘touch’ to mean ‘indirectly touch’ and the word ‘support’ to mean ‘indirectly support.’” *Id.*

We find Dr. Spencer's second explanation unsatisfactory for the reasons argued by Patent Owner. PO Sur-Reply 13–14. Although he asserts he was confused, Dr. Spencer does not identify any particular instance where he adopted an incorrect definition of “touch” or “support” when answering Patent Owner's deposition questions. *See* Ex. 1028 ¶ 31. Patent Owner and Dr. Spencer disagree whether the following deposition testimony shows confusion about the meaning of “touch”:

Q. If the tape covers the entire lower surface of the frame, can I touch the frame?

A. Directly? If the tape covers the entire surface, you are not touching the frame directly.

Q. Correct.

A. Okay.

Q. But if I'm able to touch the frame, then there must be at least a portion of the lower surface of the frame that is not covered with tape; is that correct?

A. Yes.

Ex. 2010, 45:20–46:4; *see* Ex. 1028 ¶¶ 30, 31 (asserting his “answer here was clearly in error and the direct result of the confusing line of questioning”); PO Sur-Reply 13–14 (arguing the above testimony “demonstrates he was not somehow confused as to whether the word ‘touch’ included direct and/or indirect touching”). We agree with Patent Owner that the foregoing testimony does not show confusion about the meaning of “touch.” We find other instances both before and after the alleged confusion where Dr. Spencer used the word “touch” to mean “directly touch” and was not prompted by Patent Owner’s questions to adopt that definition.

Ex. 2010, 22:10–11, 57:10–19.

(v) Conclusion regarding appropriate weight

After considering the parties’ arguments and the factors discussed above, we determine that paragraphs 10–19 of Dr. Spencer’s Supplemental Declaration should be given very little weight.

b. Whether Petitioner Has Met Its Burden of Persuasion

“[A] patent application is entitled to the benefit of the filing date of an earlier filed application only if the disclosure of the earlier application provides support for the claims of the later application, as required by 35 U.S.C. § 112.” *PowerOasis, Inc. v. T-Mobile USA, Inc.*, 522 F.3d 1299, 1306 (Fed. Cir. 2008) (quoting *In re Chu*, 66 F.3d 292, 297 (Fed. Cir. 1995)). “To satisfy the written description requirement the disclosure of the prior application must ‘convey with reasonable clarity to those skilled in the

art that, as of the filing date sought, [the inventor] was in possession of the invention.”” *PowerOasis*, 522 F.3d at 1306 (quoting *Vas–Cath Inc. v. Mahurkar*, 935 F.2d 1555, 1563–64 (Fed. Cir. 1991)). Compliance with the written description requirement is a question of fact. *PowerOasis*, 522 F.3d at 1307.

In an *inter partes* review, Petitioner has the initial burden of going forward with evidence of unpatentability based on one or more prior art references. *Magnum Oil*, 829 F.3d at 1376; *Dynamic Drinkware*, 800 F.3d at 1379. Patent Owner then has the burden of going forward with evidence that the challenged claim is entitled, under 35 U.S.C. § 119(e)(1) or § 120, to the benefit of a filing date prior to the alleged prior art. *Magnum Oil*, 829 F.3d at 1376; *Dynamic Drinkware*, 800 F.3d at 1379. This requires Patent Owner to show “not only the existence of the earlier application, but why the written description in the earlier application supports the claim.” *Dynamic Drinkware*, 800 F.3d at 1379. If the Patent Owner satisfies that burden, the burden of going forward shifts back to Petitioner to persuade the Board that the challenged patent is not entitled to the benefit of the earlier filing date. *Id.*

In this case, there is no dispute that the claim feature “the frame of the work piece having an exposed lower surface” is not shown in the drawings of the priority applications. PO Resp. 17; Pet. 15 (“[T]he drawings provided with the earlier-filed applications consistently show the lower surface of the frame being completely covered by a support film.”). That does not end the inquiry, however, because “[t]he written description does not require that every claimed element be illustrated in the figures, particularly in predictable arts and where the element not depicted is conventional and not ‘necessary

for the understanding of the subject matter sought to be patented.” *Hologic, Inc. v. Smith & Nephew, Inc.*, 884 F.3d 1357, 1362 (Fed. Cir. 2018) (quoting 35 U.S.C. § 113).

It is also undisputed that it was conventional in the art to leave a portion of the lower surface of the frame exposed, i.e., not covered with tape, when forming a work piece. Tr. 19:1–4 (Petitioner concedes “an exposed lower surface of the frame” is “conventional” and “may even be typical”); Pet. Reply 6 (quoting and not contesting Dr. Shanfield’s testimony (Ex. 2009 ¶ 11) that it “is ‘common in the art’ to create a work piece by covering the bottom of the substrate with tape but to leave a lower portion of the frame uncovered”); PO Resp. 2, 15 (citing Ex. 2002 ¶ 54; Ex. 2010, 23:8–24:16); Pet. 65–66. We are mindful, however, that “[i]t is not sufficient for purposes of the written description requirement of § 112 that the disclosure, when combined with the knowledge in the art, would lead one to speculate as to the modifications that the inventor might have envisioned, but failed to disclose.” *D Three Enterprises, LLC v. SunModo Corp.*, 890 F.3d 1042, 1050 (Fed. Cir. 2018) (quoting *Lockwood v. Am. Airlines, Inc.*, 107 F.3d 1565, 1572 (Fed. Cir. 1997)); *see also Los Angeles Biomedical Research Inst. at Harbor-UCLA Med. Ctr. v. Eli Lilly & Co.*, 849 F.3d 1049, 1057 (Fed. Cir. 2017) (“A disclosure in a parent application is not sufficient if it ‘merely renders the later-claimed invention obvious . . . ; the disclosure must describe the claimed invention with all its limitations.’” (quoting *Tronzo v. Biomet, Inc.*, 156 F.3d 1154, 1158 (Fed. Cir. 1998))).

In the Institution Decision, we asked the parties to address the above-cited case law and a series of six factual questions. Dec. 18–19. We now

use those six questions as a framework for analyzing whether Petitioner has met its burden of persuasion.

(i) In the description, “[t]he lift mechanism touches the frame area and provides no point contact to the substrate” (Ex. 1008, 18), does “the frame area” refer to an exposed lower surface of the frame or to the frame covered with tape?

Relying on Dr. Spencer’s deposition testimony, Patent Owner contends that a POSITA would understand “frame area,” as used in the above-quoted passage from the ’450 provisional application, as referring to an exposed lower surface of the frame. PO Resp. 8 (citing Ex. 2010, 60:7–61:2).

Petitioner contends that “the POSITA would understand that ‘frame area’ has the same meaning as claim 1 of the ’332 patent when it recites ‘a portion of the work piece overlapped by the frame’” and that “it would be grammatically nonsensical to interpret the phrase ‘a portion of the work piece overlapped by the frame’ to be the frame itself.” Pet. Reply 11 (quoting Ex. 1001, 16:10–11; Ex. 1028, ¶ 10).

Viewing the evidence as a whole, we find that a POSITA would have understood that “the frame area” (Ex. 1008, 18) could include an exposed lower surface of the frame. Our finding is supported by the following testimony of Petitioner’s expert, Dr. Spencer:

Q. “The lift mechanism touches the frame area and provides no point contact to the substrate.” Do you see that sentence?

A. Yes.

Q. And when it says “touches the frame area,” do you interpret that the same way that it would – that it could be an exposed underside of the frame?

A. Yes.

Ex. 2010, 60:20–61:2.

Our finding is further supported by Dr. Spencer’s original declaration, where he construed “a portion of the work piece overlapped by the frame” as “***the frame itself***, or a portion of one side of the support film that is in contact with the frame on the opposite side of that same portion of the support film.” Ex. 1013 ¶ 83 (emphasis added).⁹ That testimony is particularly relevant in view of Dr. Spencer’s concession that “[t]he POSITA would understand that ‘frame area’ has the same meaning as claim 1 of the ‘332 patent when it recites ‘a portion of the work piece overlapped by the frame.’” Ex. 1028 ¶ 10 (citing Ex. 1001, 16:10–11). If “frame area” can be “the frame itself,” as Dr. Spencer concedes, then the ’450 provisional application’s statement that “[t]he lift mechanism touches the frame area” implies that at least part of the frame may be touched by the lift mechanism and may not covered by tape.

Our finding is further supported by the testimony of Patent Owner’s expert, Dr. Shanfield, who interprets the above-quoted passage from the ’450 provisional application together with another passage that describes Figure 13. Ex. 2002 ¶¶ 53, 54 (quoting Ex. 1008, 18). According to Dr. Shanfield, these passages mean that “part of the lift mechanism must

⁹ For the reasons discussed above, we give very little weight to the assertion in Dr. Spencer’s Supplemental Declaration that this interpretation is “grammatically nonsensical.” Ex. 1028 ¶ 10.

directly contact the frame” and “when the lift mechanism is inactive, at least part of the bottom surface of the frame is exposed.” *Id.*

(ii) Does the description, “Figure 13 shows the lift mechanism contacting the frame from the underside” (Ex. 1008, 18), when read in conjunction with Figure 13, reasonably convey to a POSITA that the inventors contemplated that a lower surface of the frame may be exposed, i.e., not covered by tape?

Patent Owner contends that the above-quoted disclosure from the ’450 provisional application means that “there must be some part of the frame that is exposed on the underside.” PO Resp. 10 (quoting Ex. 2010, 60:7–15).

Relying on Dr. Spencer’s Supplemental Declaration testimony, Petitioner contends “the POSITA would readily understand that [in Figure 13 of the ’450 provisional application] the lifting mechanism 17 ‘contacts’ the frame 6 **indirectly** through the tape 5, and that the ’450 provisional application uses the word ‘contacts’ to denote indirect contact.” Pet. Reply 12 (citing Ex. 1028 ¶ 12) (emphasis in original).

For the reasons discussed in Section II.D.2.a above, we give little weight to paragraph 12 of Dr. Spencer’s Supplemental Declaration. We give greater weight to Dr. Spencer’s deposition testimony relied upon by Patent Owner. Ex. 2010, 60:7–15. In view of that testimony and the record as a whole, we find that the above-quoted passage from the ’450 provisional application (Ex. 1008, 18) reasonably conveys to a POSITA that the inventors contemplated that a lower surface of the frame may be exposed, i.e., not covered by tape.

(iii) In the description, “[t]he transfer arm may support both the tape and frame or the frame alone” (Ex. 1008, 17), does “the frame alone” refer to an exposed lower surface of the frame or to an outer diameter of the frame (see id. at 18:21)?

Relying on Dr. Spencer’s deposition testimony, Patent Owner contends that “when the transfer arm ‘support[s] the frame alone,’ there must be an exposed surface of the frame.” PO Resp. 10–11 (citing Ex. 2010, 48:21–50:4, 51:8–15, 59:21–60:1). Patent Owner relies on Figures 11 and 12 of the ’450 provisional application to argue that the transfer arm supports the work piece from beneath the frame, not by its outer diameter, as posited in the Board’s question. *Id.* at 11–12. According to Patent Owner, “[i]n the embodiment where the transfer arm 40 supports the frame *alone*, the transfer arm 40 must be touching the frame on its lower surface, since the frame alone is being supported and not the tape and frame.” *Id.* at 14.

Relying on Dr. Spencer’s Supplemental Declaration testimony, Petitioner argues that, in the above-quoted passage from the ’450 provisional application, “the word ‘support’ is being used in the same manner as it is used in the description of FIGS. 11 and 12, and that the alternative embodiments are directed to the transfer arm 40 supporting both the tape and frame areas of the work piece, or only the frame area of the work piece.” Pet. Reply 14 (citing Ex. 1008, 17; Ex. 1028 ¶ 15). Petitioner modifies Figure 12 to show two alternative embodiments. *Id.* at 14–15. According to Petitioner, in the first alternative, “the support surface of the transfer arm 40 supports both the tape 5 and the frame 6,” and in the second alternative, “the support surface of the transfer arm 40 supports the frame alone.” *Id.* (citing Ex. 1028 ¶¶ 15, 16).

Again, for the reasons discussed in Section II.D.2.a above, we credit Dr. Spencer's deposition testimony over the conflicting testimony in his Supplemental Declaration. Regarding the meaning of "frame alone" in the above-quoted passage from the '450 provisional application, we rely on the following deposition testimony of Dr. Spencer:

Q. And there would have to be an exposed lower surface to make sense of page 22, the paragraph you are reading?

A. Well, it has to have two things. It has to have the exposed lower surface, and the arm has to have a relief there so that it is not touching the tape.

Q. And that's how you would understand it when you are reading page 22?

A. That's the only conclusion that makes sense there. But it's not shown in the figure, but I understand that the figure isn't necessarily definitive with regard to the invention.

Ex. 2010, 49:18–50:4 (referring to Ex. 1009, 22 ("The transfer arm (40) may support both the tape (5) and the frame (6) or the frame (6) alone")).

We find the above-quoted deposition testimony particularly compelling because Dr. Spencer addresses both the text and the drawings of the priority applications. Although Petitioner argues that the text of the Specification must be read in conjunction with the drawings (Tr. 16:11–17:7), Petitioner's expert does just that and concedes "the only conclusion that makes sense" is that the frame "has to have" an exposed lower surface. Ex. 2010, 49:18–50:4.

We also credit the following deposition testimony of Dr. Spencer:

Q. But in understanding that application, the '450 that we're reading from now, you would understand it when it's supporting the frame alone, that there's an exposed surface of the frame; is that correct?

A. Yes. There is some portion of the frame which does not have tape on it.

Q. On the lower surface?

A. Right.

Id. at 51:8–15.

Q. And so when it says it supports the frame alone, I believe you testified that when -- by saying “the frame alone,” that means there must be some part of the frame on the underside that’s exposed? It’s not covered by tape; correct?

A. Correct.

Id. at 59:21–60:1. Dr. Spencer’s deposition testimony supports a finding that “the frame alone” in the ’450 provisional application (Ex. 1008, 17) refers to an exposed lower surface of the frame.

(iv) Does the description, “[a]s is shown in Figure 3, the thinned substrate is then adhered to a thin tape (5) which in turn is mounted to a rigid frame (6)” (Ex. 1008, 14), refer to a conventional technique for joining a tape to a frame?

Petitioner does not contest Patent Owner’s assertion that the process for joining a tape to a frame described in the ’450 provisional application is a conventional technique. Pet. Reply 6 (citing Ex. 2009 ¶ 11); PO Resp. 14 (citing Ex. 2010, 41:24–42:20; 61:9–62:16); PO Resp. 16 (citing Ex. 2009 ¶ 15). It is also undisputed that, at the relevant time, conventional techniques for joining a tape to a frame resulted in the tape covering less than the entire lower surface of the frame, which resulted the frame having an exposed lower surface. Tr. 19:1–4 (Petitioner’s argument); Pet. Reply 6; PO Resp. 14–17; Pet. 65–66; Ex. 1013 ¶¶ 125–127; Ex. 2002 ¶¶ 54, 55; Ex. 2009 ¶¶ 11–15; Ex. 2010, 23:8–24:16.

Dr. Shanfield explains that conventional techniques for attaching tape to a dicing frame resulted in a portion of the lower surface of the frame being exposed. Ex. 2002 ¶¶ 54, 55; Ex. 2009 ¶¶ 11–15. We give substantial weight to this testimony, which is undisputed by Petitioner and relevant to show how a POSITA would have understood the disclosures of the priority applications. Pet. Reply 6; Ex. 2010, 23:8–24:16. *See Hologic*, 884 F.3d at 1364 (in determining the adequacy of the written description, it is appropriate to consider “what the specification reasonably conveys to the skilled artisan who has knowledge of the prior art”). Petitioner asserts, for example, that “an automated conventional technique” for joining a support film to a dicing frame results a lower surface of the frame being exposed in part. Pet. 65–66 (citing Ex. 1011, 11:15–40, Figs. 10, 11, 13; Ex. 1012 ¶ 5, Figs. 1A, 1B; Ex. 1013 ¶¶ 127–129).

Dr. Shanfield’s explanation is reinforced by Dr. Spencer’s testimony that, in one example of a conventional dicing frame used during plasma dicing, the frame has flat edges and notches such that, when tape is applied to the bottom of the frame and then cut, the tape would not cover the entire lower surface and there would be exposed areas on the bottom of the frame. Ex. 1013 ¶ 32 (reproducing Sekiya Figure 1); Ex. 2010, 13:13–20, 16:1–6, 17:9–17 (discussing Sekiya Figure 1). Dr. Spencer agreed that, in the 2011 time period, frames having notches would have an exposed lower surface frame because “you don’t want to make a specialized cut” of the tape to fit the notches of the frame. Ex. 2010, 23:8–24:16. Similarly, Dr. Shanfield explains that circular frames having a flat side portion have an exposed lower surface of the frame because the tape is cut circularly with the tape boundary inside the outer edge of the frame. Ex. 2009 ¶ 13.

(v) Does Yamamoto (Ex. 1011, Figs. 10, 11, 11:15–40) and/or Kobayashi (Ex. 1012, Figs. 1A, 1B, ¶ 5) disclose a conventional technique for joining a tape to a frame?

Both Patent Owner and Petitioner assert that Yamamoto and Kobayashi disclose conventional techniques for joining tape to a frame. PO Resp. 14 (citing Ex. 1013 ¶ 127); Pet. 40–41, 65–66. It is also undisputed that the techniques disclosed in Yamamoto and Kobayashi both result in a lower surface of the frame being exposed, i.e., not covered by tape. PO Resp. 14; Pet. 40–41, 65–66. Yamamoto and Kobayashi thus support a finding that the claim feature, “the frame of the work piece having an exposed lower surface,” was conventional at the time the ’450 provisional application was filed.

(vi) Is the above-quoted description in the ’450 application (Ex. 1008, 14) consistent with a process for joining a tape to a frame, as disclosed in Yamamoto or Kobayashi, as it pertains to the order of the steps of adhering the substrate to the tape and mounting the tape to the frame?

Patent Owner acknowledges that neither Yamamoto nor Kobayashi discloses the same order of the steps as described in the ’450 provisional application. PO Resp. 17. Patent Owner asserts:

But regardless of the order in which the frame, tape, and wafer are joined to create a work piece, the experts for both parties agree that cutting the tape in a way that leaves a portion of the underside of the frame exposed (as disclosed in Kobayashi and Yamamoto) was conventional, such that this particular feature need not be explicitly shown in the drawings of the ’450 provisional application to provide adequate written description support.

Id. at 17–18 (citing *Hologic*, 884 F.3d at 1362–63).

Petitioner does not address the Board’s question regarding the order of steps. *See generally* Pet. Reply. As discussed above, Petitioner does not contest Patent Owner’s assertion that the process for joining a tape to a frame described in the ’450 provisional application is a conventional technique. Pet. Reply 6; PO Resp. 14.

On this record, the difference between the order of steps disclosed in the ’450 provisional application, as compared with the order of steps disclosed in Kobayashi and Yamamoto, is not material to our finding that the ’450 provisional application discloses a conventional technique for joining a tape to a frame.

*(vii) Summary and conclusion regarding whether
Petitioner has met its burden of persuasion*

We find that the priority applications convey with reasonable clarity to a POSITA that the invention possessed by the inventors includes “the frame of the work piece having an exposed lower surface,” as recited in claim 1. Ex. 1001, 16:8–9. Our finding is supported by the following disclosures of the ’450 application and the corresponding disclosures of the ’119 parent application. Ex. 1008, 14 (“As is shown in Figure 3, the thinned substrate is then adhered to a thin tape (5) which in turn is mounted to a rigid frame (6).”); *id.* at 17 (“The transfer arm may support both the tape and frame or the frame alone.”); *id.* at 18 (“The lift mechanism touches the frame area and provides no point contact to the substrate.”); *id.* (“Figure 13 shows the lift mechanism contacting the frame from the underside.”); Ex. 1009, 18, 22, 24. Our finding is supported by the testimony of both parties’ experts concerning how a POSITA would have understood the disclosures of the priority applications. Ex. 2002 ¶¶ 53, 54; Ex. 2010, 41:24–42:20, 49:18–

50:4, 51:8–15, 59:21–61:2. Our finding is supported by Petitioner’s contentions and the testimony of both parties’ experts concerning conventional techniques for joining a tape to a frame known to a POSITA at the time the ’450 provisional application was filed. Pet. 65–66; Ex. 1013 ¶¶ 32, 125–127; Ex. 2002 ¶¶ 54, 55; Ex. 2009 ¶¶ 11–15; Ex. 2010, 13:13–20, 16:1–6, 17:9–17, 23:8–24:16. Our finding is also supported by Dr. Spencer’s declaration testimony concerning the meaning of “a portion of the work piece overlapped by the frame” (Ex. 1013 ¶¶ 82, 83) and his admission that “the frame area” in the ’450 provisional application has the same meaning (Ex. 1028 ¶ 10).

It is true that the drawings of the priority applications do not show the frame of the work piece as having an exposed lower surface. Nor do they show the frame as having flat edges or notches such that conventional methods for cutting the tape would leave portions exposed, i.e., not covered by tape. Nevertheless, in view of the record as a whole, including the parties’ and experts’ agreement that the frame of the work piece having an exposed lower surface is conventional, we are persuaded that the priority applications reasonably convey to a POSITA that this feature is part of the invention possessed by the inventors. Tr. 19:1–4; Pet. Reply 6; PO Resp. 14–17; Pet. 65–66; Ex. 1013 ¶¶ 125–127; Ex. 2002 ¶¶ 54, 55; Ex. 2009 ¶¶ 11–15; Ex. 2010, 23:8–24:16. *See Hologic*, 884 F.3d at 1362 (“The written description does not require that every claimed element be illustrated in the figures, particularly in predictable arts and where the element not depicted is conventional and not ‘necessary for the understanding of the subject matter sought to be patented.’” (quoting 35 U.S.C. § 113)).

We agree with Patent Owner that *D Three Enterprises* and *Eli Lilly* are distinguishable and that *Hologic* is more analogous to the facts of this case. PO Resp. 18–21.

In *D Three*, the priority application disclosed assemblies having a particularly shaped attachment bracket, but the patent claimed such assemblies more broadly. *See D Three*, 890 F.3d at 1045. The Federal Circuit agreed that the priority application did not adequately support the claims because the priority application “in no way contemplates the use of other types of attachment brackets . . . or describes any other types of attachment brackets that could be used.” *Id.* at 1050. In contrast, the evidence we credit in this case shows that the priority applications would have been understood by a POSITA as disclosing that the underside of the frame of the work piece can be exposed. *See, e.g.*, Ex. 1008, 17, 18; Ex. 1009, 22, 24; Ex. 2010, 49:18–50:4, 51:8–15, 59:21–61:2.

In *Eli Lilly*, the priority application did not disclose a dosage of “up to 1.5/mg/kg/day,” as recited in the challenged claim. *See Eli Lilly*, 849 F.3d at 1054, 1057. The patent owner argued that the claimed dosage could be calculated based on a rat study disclosed in the priority application. The Federal Circuit rejected that argument, finding that patent owner’s calculation depended on several undisclosed assumptions about the knowledge of a POSITA, including the calculation method. *Id.* at 1057. Unlike *Eli Lilly*, there is no dispute in this case about the knowledge of a POSITA as it pertains to the frame of the work piece having an exposed lower surface. The experts agree that this feature results from conventional techniques for attaching a tape to a frame. Ex. 1013 ¶¶ 32, 125–127;

Ex. 2002 ¶¶ 54, 55; Ex. 2009 ¶¶ 11–15; Ex. 2010, 13:13–20, 16:1–6, 17:9–17, 23:8–24:16.

The Federal Circuit’s decision in *Hologic* is instructive here. As in *Hologic*, the field of the invention of the ’332 patent is a predictable art. See Pet. Reply 24 (“[T]here are two, predictable, solutions for the lower surface of the frame: cover it completely with the tape, or provide an exposed lower surface.”); PO Sur-Reply 5; Ex. 2010, 19:18-20:8. *Hologic*, 884 F.3d at 1361 (“[T]he field of this invention is a predictable art, such that a lower level of detail is required to satisfy the written description requirement than for unpredictable arts.”). Furthermore, as in *Hologic*, it is undisputed that the claim feature Petitioner contends is missing from the written description was well known in the art. Tr. 19:1–4; Pet. Reply 6; PO Resp. 14–17; Pet. 65–66. *Hologic*, 884 F.3d at 1362 (parties did not dispute that various types of the claim element—a “light guide”—were well-known in the art and that disclosed feature—a “fibre optic bundle”—is a type of light guide). Still further, as in *Hologic*, the claim feature Petitioner contends lacks a written description is not explicitly shown in the patent drawings. PO Resp. 17; Pet. 15. See *Hologic*, 884 F.3d at 1362–63 (priority application reasonably conveyed to a POSITA that the inventor had possession of a light guide, even though a light guide was not shown in the drawings). As such, we find the reasoning set forth in *Hologic* to be most applicable to the case before us.

For all of the foregoing reasons, Petitioner has not met its burden of persuasion to show that the challenged claims of the ’332 patent are not entitled to the benefit of a filing date that predates the Singh reference.

E. Petitioner's Obviousness Ground

Petitioner's sole obviousness ground relies on Singh as prior art for teaching most of the claim elements. Pet. 5, 38–68. For the reasons discussed above, we determine Petitioner has not shown that Singh is prior art to the '332 patent. Accordingly, we do not reach the remainder of the parties' contentions regarding obviousness. See Tr. 10:5–10 (characterizing the issue of whether Singh is prior art as a “threshold issue”); *id.* at 23:18–19 (Patent Owner: “Petitioner's entire obviousness argument fails, and we don't even reach the motivation to combine if Singh is not prior art.”); *id.* at 44:6–12 (Patent Owner agreeing that the panel does not need to reach the issue of sufficiency of the motivation to combine, if Singh is not prior art).

III. CONCLUSION

Petitioner has not shown by a preponderance of the evidence that the challenged claims of the '332 patent are unpatentable.

IV. ORDER

Accordingly, in consideration of the foregoing, it is hereby:

ORDERED that, on the record before us, Petitioner has not shown by a preponderance of the evidence that claims 1 and 2 of the '332 patent are unpatentable; and

FURTHER ORDERED that, because this is a final written decision, the 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.

IPR2018-00618
Patent 8,785,332 B2

PETITIONER:

Adam C. Volentine
Kenneth D. Springer
VOLENTINE & WHITT PLLC
avolentine@volentine.com
kspringer@volentine.com

PATENT OWNER:

Harvey S. Kauget
Ryan M. Corbett
Jeffrey H. Kamenetsky
BURR & FORMAN LLP
hkauget@burr.com
rcorbett@burr.com
jkamenetsky@burr.com