

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ASETEK DANMARK A/S,
Petitioner,

v.

COOLIT SYSTEMS, INC.,
Patent Owner.

IPR2020-00747
Patent 9,057,567 B2

Before FRANCES L. IPPOLITO, SCOTT C. MOORE, and
BRENT M. DOUGAL, *Administrative Patent Judges*.

MOORE, *Administrative Patent Judge*.

JUDGMENT
Final Written Decision
Determining All Challenged Claims Unpatentable
35 U.S.C. § 318(a)
Denying Patent Owner's Motion to Exclude
37 C.F.R. § 42.64

I. INTRODUCTION

Asetek Danmark A/S (“Petitioner”) filed a petition requesting an *inter partes* review of claims 1, 2, 3, 5, 7, 25, and 28 of U.S. Patent No. 9,057,567 B2 (“the ’567 Patent”). Paper 2 (“Petition” or “Pet.”). CoolIT Systems, Inc. (“Patent Owner”) filed a preliminary response. Paper 5. Pursuant to our authorization, Petitioner filed a reply to Patent Owner’s preliminary response (Paper 6), and Patent Owner filed a sur-reply in support of Patent Owner’s preliminary response (Paper 8). We instituted an *inter partes* review as to all claims and grounds set forth in the Petition. Paper 10 (“Institution Decision”).

After institution, Patent Owner filed a response to the Petition (Paper 19, “Response” or “Resp.”), Petitioner filed a reply to the Response (Paper 24, “Reply”), and Patent Owner filed a sur-reply (Paper 30, “Sur-Reply”). Patent Owner also filed a statutory disclaimer of claim 28, so claim 28 is no longer part of this proceeding. *See* Ex. 3001. In addition, Patent Owner filed a motion to exclude (Paper 31, “Motion to Exclude”), Petitioner filed an opposition to the Motion to Exclude (Paper 33), and Patent Owner filed a reply in support of the Motion to Exclude (Paper 36). An oral hearing was held on June 22, 2021, and a transcript of the hearing is in the record. Paper 41 (“Tr.”).

We have jurisdiction under 35 U.S.C. § 6. This Final Written Decision is issued pursuant to 35 U.S.C. § 318(a). For the reasons that follow, we determine that Petitioner has shown by a preponderance of the evidence that claims 1, 2, 3, 5, 7, and 25 (all of the challenged claims that remain after Patent Owner’s statutory disclaimer) are unpatentable. We also deny Patent Owner’s Motion to Exclude.

A. *Related Matters*

Patent Owner sued Petitioner for infringement of the '567 Patent in *Asetek Danmark A/S v. CoolIT Systems, Inc.*, No. 3:19-cv-00410-EMC (N.D. Cal) (the “district court case”). Pet. 95. Petitioner points out that the '567 Patent is related to issued patents U.S. 8,746,330 B2 and U.S. 9,453,691 B2. *Id.*

The '567 Patent, filed February 18, 2014, as U.S. Application 14/183,443, is a continuation of U.S. Application 14/166,657, which is a continuation of U.S. Application 13/401,618, which is a continuation-in-part of U.S. Application 12/189,476, now U.S. Patent No. 8,746,330 B2 (Ex. 1004, “the '330 Patent”). Ex. 1001, codes (21), (22), (63). Patent Owner points out that the '330 Patent “[has] survived [an] *inter partes* challenge” in IPR2015-01276. Paper 5, 6 n.3.

U.S. Application No. 12/189,476 was published as U.S. Publication No. 2009/0071625 A1. Ex. 1011 (“Lyon”), codes (21), (43). The '567 Patent claims priority to U.S. Provisional Application No. 60/954,987 (Ex. 1005, “the 2007 Provisional”) and U.S. Provisional Application No. 61/512,379 (Ex. 1006, “the 2011 Provisional”). Ex. 1001, code (60); *see also* Pet. 20–21.

On April 10, 2020, Petitioner filed a separate petition requesting *inter partes* review of claims 1, 2, 4, 5, 9, and 13–15 of U.S. Patent No. 10,274,266 B2 (“the '266 Patent”). *See* IPR2020-00825 (“the '825 IPR”), Papers 2, 41. The '266 Patent is a continuation of U.S. Patent No. 9,909,820 B2, which is a continuation of U.S. Patent No. 9,453,691 B2, which is a continuation-in-part of the '330 Patent. '825 IPR, Paper 2, 16. The '825 IPR remains pending.

B. The '567 Patent

The '567 Patent is directed to a fluid heat exchange system for accepting and dissipating thermal energy to cool electronic and other devices. Ex. 1001, 1:17–25.

Figure 1, reproduced below, depicts such a system.

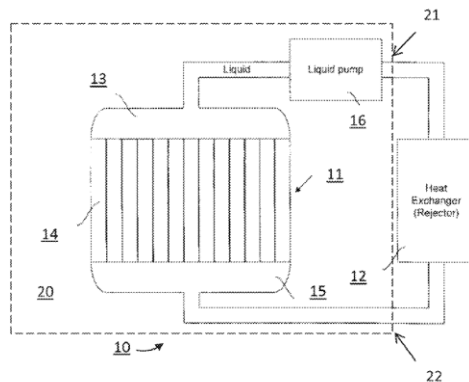


FIG. 1

Figure 1 is a diagram of a fluid circuit configured to transfer heat using a circulating liquid. Ex. 1001, 5:22–23. In Figure 1, liquid circulates through fluid circuit 10 by entering inlet 21, moving through heat exchanger 11, and exiting outlet 22. *Id.* at 6:46–57, 7:31–54. Heat exchanger 11 has manifolds 13, 15 and passages 14. *Id.* at 7:42–47.

Figure 2, reproduced below, depicts an exemplary embodiment of a heat exchanger.

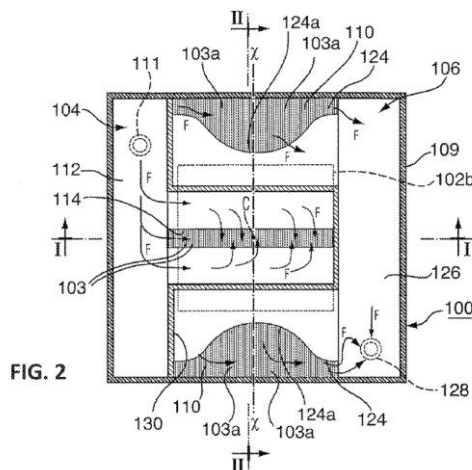


FIG. 2

Figure 2 is a top plan view depicting internal components of heat exchanger 100. Ex. 1001, 5:24–26. Heat exchanger 100 includes housing 109, inlet port 111, fluid inlet passage 104, inlet opening 114, microchannels 103, seal 130, fluid outlet opening 124, fluid outlet passage 106, and outlet port 128. *Id.* at 7:56–62, 9:17–10:56, 12:1–4. Each microchannel 103 is defined by a recessed groove extending transversely between adjacent fins. *Id.* at 2:40–43. Heat exchanging fluid F flows in the directions indicated by the arrows. *Id.* at 11:30–33. Heat exchanging fluid F enters microchannels 103 and splits into two sub flows in opposite directions to pass outwardly from inlet opening 114 towards outlet fluid openings 124. *Id.* at 11:14–11:50.

Figure 4, reproduced below, shows a sectional view along line II–II of Figure 2. Ex. 1001, 5:28.¹

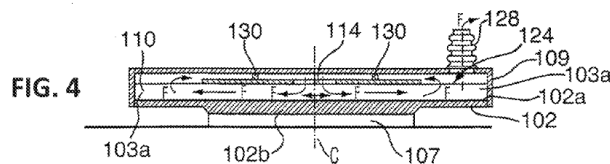
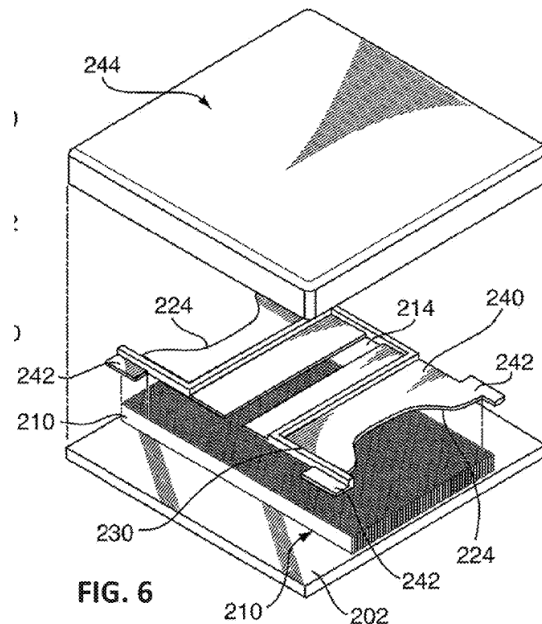


Figure 4 depicts housing 109 including heat spreader plate 102 (which operates as an outer limit of a heat sink), and heat exchanging fluid F flowing in two opposite directions within microchannels 103. Ex. 1001, 7:56–62, 11:14–11:50. Seal 130 separates fluid inlet passage 104 from fluid outlet passage 106 so that fluid F must pass through microchannels 103 and past surface 102a of heat spreader 102. *Id.* at 12:1–4.

¹ The '567 Patent incorrectly refers to line II–II “of FIG. 3” rather than “of FIG. 2.” Ex. 1001, 5:28.

Figure 6, reproduced below, shows an exploded perspective view of an embodiment of a heat exchanger.



Ex. 1001, 5:29–30.² The heat exchanger depicted in Figure 6 has inlet opening 214, plate 240, seal 230, and heat spreader plate 202. *Id.* at 12:26–46. “Seal 230 may be installed as a portion of plate 240 or separately.” *Id.* at 12:22–23.

C. Challenged Claims

Petitioner challenges claims 1, 2, 3, 5, 7, and 25. Petitioner initially also challenged claim 28, but Patent Owner filed a statutory disclaimer disclaiming that claim. Ex. 3001. This disclaimer effectively eliminated claim 28 from the ’567 Patent, leaving the patent as if that claim never existed. *See Sanofi-Aventis U.S., LLC v. Dr. Reddy’s Labs., Inc.*, 933 F.3d 1367, 1373 (Fed. Cir. 2019). Thus, claim 28 is no longer part of this proceeding.

² The ’567 Patent incorrectly identifies Figure 5 as an exploded, perspective view and Figure 6 as a top plan view without a top cap. Ex. 1001, 5:29–32.

Challenged claim 1 is independent, and challenged claims 2, 3, 5, 7, and 25 all depend directly or indirectly from claim 1. Claim 1 is reproduced below.

1. A heat exchange system comprising:

a heat sink having a plurality of juxtaposed fins defining a corresponding plurality of microchannels between adjacent fins, wherein the heat sink defines a recessed groove extending transversely relative to the fins;

a housing member defining a first side and a second side, wherein the second side defines a recessed region;

a compliant member matingly engaged with the second side of the housing member, wherein the compliant member at least partially defines an opening positioned over the groove, wherein the compliant member and the groove together define a portion of an inlet manifold configured to hydraulically couple in parallel each of the microchannels to at least one other of the microchannels, and wherein the housing member further defines a portion of an inlet plenum,

wherein the inlet plenum and the inlet manifold are together configured to convey a fluid in a direction generally transverse to the fins and thereby to distribute the fluid among the plurality of microchannels and to convey the fluid into the plurality of microchannels in a direction generally parallel to the fins,

wherein a portion of the compliant member occupies a portion of the recessed region defined by the second side of the housing member and urges against a corresponding wall of the recessed region while leaving a portion of the recessed region defined by the second side of the housing member unoccupied to define first and second exhaust manifold regions positioned opposite to each other relative to the recessed groove and opening from end regions of the microchannels.

Ex. 1001, 19:16–46.

D. Asserted Grounds

Petitioner asserts the following grounds of unpatentability:

Claims Challenged	35 U.S.C. § ³	Reference(s)/Basis
1, 2, 3, 5, 7, 25	102(b)	Bezama ⁴
1, 2, 3, 5, 7, 25	103(a)	Bezama and Lyon ⁵

Pet. 31–94.

II. PATENTABILITY ANALYSIS

A. Principles of Law

1. Burden

In an *inter partes* review, the burden of proof is on the petitioner to show that the challenged claims are unpatentable, and that burden never shifts to the patentee. *See* 35 U.S.C. § 316(e); *In re Magnum Oil Tools Int’l, Ltd.*, 829 F.3d 1364, 1375 (Fed. Cir. 2016) (citing *Dynamic Drinkware, LLC v. Nat’l Graphics, Inc.*, 800 F.3d 1375, 1378 (Fed. Cir. 2015)).

2. Anticipation

For a claim to be found unpatentable under 35 U.S.C. § 102, each and every element in a claim, arranged as recited in the claim, must be found in a single prior art reference. *Net MoneyIN, Inc. v. VeriSign, Inc.*, 545 F.3d

³ The ’567 Patent claims priority to the 2007 and 2011 Provisionals. *See* Ex. 1001, codes (22), (60). Thus, the pre-AIA versions of 35 U.S.C. §§ 102 and 103 apply. Leahy–Smith America Invents Act, Pub. L. No. 112–29, §3(c), 125 Stat. 284, 293 (2011) (explaining that the pre-AIA version of the Patent Act generally applies to patents with effective filing dates before March 16, 2013).

⁴ U.S. Pat. Appl. Pub. No. 2010/0012294 A1, published Jan. 21, 2010 (Ex. 1010).

⁵ U.S. Pat. Appl. Pub. No. 2009/0071625 A1, published Mar. 19, 2009 (Ex. 1011).

1359, 1369 (Fed. Cir. 2008); *Karsten Mfg. Corp. v. Cleveland Golf Co.*, 242 F.3d 1376, 1383 (Fed. Cir. 2001). “A reference anticipates a claim if it discloses the claimed invention ‘such that a skilled artisan could take its teachings in combination with his own knowledge of the particular art and be in possession of the invention.’” *In re Graves*, 69 F.3d 1147, 1152 (Fed. Cir. 1995) (internal citation and emphasis omitted).

3. *Obviousness*

A patent claim is unpatentable under 35 U.S.C. § 103(a) if the differences between the claimed subject matter and the prior art are such that the subject matter, as a whole, would have been obvious at the time the invention was made to a person of ordinary skill in the art to which said subject matter pertains. *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007). The question of obviousness is resolved on the basis of underlying factual determinations including: (1) the scope and content of the prior art; (2) any differences between the claimed subject matter and the prior art; (3) the level of ordinary skill in the art; and (4) objective evidence of nonobviousness.⁶ *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966).

In determining obviousness when all elements of a claim are found in various pieces of prior art, “the factfinder must further consider the factual questions of whether a person of ordinary skill in the art would be motivated to combine those references, and whether in making that combination, a person of ordinary skill would have had a reasonable expectation of success.” *Dome Patent L.P. v. Lee*, 799 F.3d 1372, 1380 (Fed. Cir. 2015);

⁶ Patent Owner does not contend that any such objective evidence is present in this case. *See generally* PO Resp. (not alleging that any objective indicia are present); *see also* Ex. 1023 ¶ 176 (“I am not aware of any secondary indicia of non-obviousness tied to the claimed invention.”).

see also WMS Gaming, Inc. v. Int'l Game Tech., 184 F.3d 1339, 1355 (Fed. Cir. 1999) (“When an obviousness determination relies on the combination of two or more references, there must be some suggestion or motivation to combine the references.”). “Both the suggestion and the expectation of success must be founded in the prior art, not in the applicant’s disclosure.” *In re Dow Chemical Co.*, 837 F.2d 469, 473 (Fed. Cir. 1988).

B. Level of Ordinary Skill in the Art

The level of skill in the art is “a prism or lens” through which we view the prior art and the claimed invention. *Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001) (“the level of skill in the art is a prism or lens through which a judge, jury, or the Board views the prior art and the claimed invention”).

Petitioner asserts that a person of ordinary skill in the art at the time of the invention of the ’567 Patent (hereinafter, a “POSITA”) would have had the following education and experience: (i) “completed college level course work in thermodynamics, fluid mechanics, and heat transfer,” and (ii) “two or more years of experience in designing liquid cooling systems for computers, servers, or other electronic devices, or very similar technology, or one with a more advanced degree in the above fields may have had less practical experience.” Pet. 11.

Patent Owner contends that a POSITA “would have earned at least a bachelor’s degree, such as a B.S. (bachelor of science), or equivalent thereof, in mechanical engineering or a closely related field and possessed at least three years of specialized experience in heat transfer devices for thermal management in electronics and computer systems, or in similar systems.” PO Resp. 4. Patent Owner represents, however, that none of its arguments or its declarant’s opinions turn on any differences between the

parties' alternative formulations concerning the level of ordinary skill in the art. *Id.* at 4 n.2.

In its Reply, Petitioner does not respond to Patent Owner's alternative formulation, or identify any issues in this case that might turn on differences between the parties' alternative formulations. *See generally* Reply.

On this record, we adopt Patent Owner's proposed formulation regarding the level of ordinary skill in the art, which we find is consistent with the level of skill reflected in the cited prior art references. *See Okajima*, 261 F.3d at 1355. We note, however, that the differences between the parties' proposed formulations are not material with respect to any disputed issue. All of the findings and conclusions expressed herein would have been the same had we instead applied Petitioner's proposed formulation.

C. *Claim Construction*

We construe claims using the same claim construction standard that would be used to construe the claims in a civil action under 35 U.S.C. § 282(b). 37 C.F.R. § 42.100 (2019). In applying this claim construction standard, we are guided by the principle that the words of a claim "are generally given their ordinary and customary meaning," as understood by a person of ordinary skill in the art in question at the time of the invention. *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312–13 (Fed. Cir. 2005) (*en banc*) (citation omitted). When construing a claim term, "we look principally to the intrinsic evidence of record, examining the claim language itself, the written description, and the prosecution history, if in evidence." *DePuy Spine, Inc. v. Medtronic Sofamor Danek, Inc.*, 469 F.3d 1005, 1014 (Fed. Cir. 2006) (citing *Phillips*, 415 F.3d at 1312–17). There is a "heavy presumption," however, that a claim term carries its ordinary and customary

meaning. *CCS Fitness, Inc. v. Brunswick Corp.*, 288 F.3d 1359, 1366 (Fed. Cir. 2002) (citation omitted).

The parties dispute the meaning of the claim term “a compliant member **matingly engaged** with the second side of the housing member” (emphasis added). Resp. 17; Reply 2.

The claims and specification of the ’567 Patent use the terms “mated” and “matingly” four times. Claim 1 recites a housing member defining a second side “wherein the second side defines a recessed region,” and requires a “compliant member matingly engaged with the second side of the housing member” such that “a portion of the compliant member occupies a portion of the recessed region” and “urges against a corresponding wall of the recessed region . . . to define first and second exhaust manifold regions.” Ex. 1001, 19:21–44. Thus the compliant member and the housing member’s second side of claim 1 are “matingly engaged” by fitting at least a portion of the compliant member to the inside of the second side’s recessed region.

The “Summary” section of the ’567 Patent similarly discloses a body that “defines a second recessed region,” and describes “matingly engag[ing]” a manifold body with the second recessed region “such that the manifold body so occupies a portion of the second recessed region as to define an exhaust manifold.” Ex. 1001, 3:51–60. The specification discloses an additional embodiment in which “insert 334 is mated with the housing 330” such that contours on the insert are joined with recessed regions in the housing to define fluid conduits. *Id.* at 14:35–45. The specification further explains that the body of insert 334 “can matingly engage with one or more features of the housing 330” via “a plurality of spaced apart members” that are “positioned in corresponding portions of the second recessed region.” *Id.* at 14:54–62. In each of these embodiments,

the terms “matingly engage” and “mated” refer to fitting one component at least partially inside of a recess within a second component. Having summarized the intrinsic evidence, we now address the parties’ proposed constructions.

Patent Owner proposes that we construe the term “matingly engaged” to require that the compliant member and the second side of the housing member be “mechanically joined or fitted together to interlock.” Resp. 17 (citing Ex. 2027 ¶ 47). Patent Owner further explains that the term “interlock” in its construction requires a Lego®-like connection in which two components having complementary shapes are engaged with one another. Resp. 18 (citing Ex. 2027 ¶¶ 49–50). During the oral hearing, Patent Owner clarified that its construction also requires that the components with complementary shapes be engaged with one another in such a manner that it would take force to separate them. Tr. 38:14–40:5.

In support of its construction, Patent Owner points to dictionary definitions that define “mate” as “join or fit together,” and “engage” as “to interlock with,” “to cause (mechanical parts) to mesh,” or “to come together and interlock (as of machinery parts).” Resp. 17 (citing Ex. 2030, 3, 4⁷). Patent Owner also points to an embodiment in the specification in which a compliant member (i.e., insert 334) is matingly engaged with a member (i.e., housing 330) via complementary, contoured features on both components that fit within each other. See Resp. 18–20 (citing Ex. 1001, 12:57–59, 13:14–34, 13:45–53; 14:54–67, Figs. 10–12; Ex. 2027 ¶¶ 51–53). Patent Owner further argues that the concept of mating engagement was initially

⁷ Patent Owner cited to the page numbers of the original dictionary rather than to the exhibit page numbers. Cites in this Decision refer to the exhibit page numbers.

introduced in the 2011 Provisional along with the above-described embodiment, and that the 2007 Provisional and other embodiments in the '567 Patent do not teach an insert matingly engaged to a housing. *Id.* at 20–22 (citing Ex. 2027 ¶¶ 53–55).⁸

Petitioner did not initially propose a construction of “matingly engaged,” but argues in its Reply that “matingly engaged” means “joined or fitted together to make contact.” Reply 13 (citing Ex. 1027 ¶ 2). Under Petitioner’s broader construction, “matingly engaged” would encompass “[a]ll methods of joining or fixing two surfaces.” Ex. 1027 ¶ 3.

Petitioner argues that Patent Owner’s proposed construction improperly excludes some forms of mating engagement. Reply 3. According to Petitioner, Patent Owner relied excessively on extrinsic dictionary definitions to arrive at a construction narrower than is supported by the intrinsic record. *Id.* at 7. Petitioner cites several cases in which the Federal Circuit has construed “engage” more broadly than Patent Owner now proposes. *See id.* at 8. Petitioner also cites a dictionary that defines “interlock” as “engage with each other by overlapping or fitting together.” *Id.* at 8 n. 2. Petitioner additionally contends that the specification contains a separate example of mating engagement that does not require complementary, contoured features. *Id.* at 9 (citing Ex. 1001, 3:53–58). Petitioner further contends that the Bhatti reference, which was cited during prosecution, describes two components as being in “mating engagement”

⁸ As we noted in our Decision on Institution, the 2007 Provisional does not disclose at least the “recessed groove extending transversely relative to the fins” limitation of claim 1. Paper 10, 17–18. Accordingly, the July 27, 2011, filing date of the 2011 Provisional is the earliest-possible priority date to which the challenged claims could be entitled. *See id.*

even though those components do not have complementary, contoured shapes. Reply 10–11 (citing Ex. 1022, Fig. 3, ¶¶ 16, 19).

Petitioner also argues that nothing in the language of claim 1 recites or requires “interlocking of complementary contoured features.” *Id.* at 4–5 (citing Ex. 1021, 14:19–15:2), 14 (citing Ex. 1027 ¶¶ 2–4). Petitioner similarly contends that nothing in the specification amounts to a disclaimer sufficient to limit the scope of claim 1 to the embodiment cited by Patent Owner, and the fact that the term “matingly engaged” was not added until the 2011 Provisional does not imply that the scope of claim 1 is limited to specific embodiments disclosed in the 2011 Provisional. *Id.* at 4–7.

In its Sur-Reply, Patent Owner argues that Petitioner’s proposed construction reads the term “matingly” out of the claims because two components will always “make contact” when joined or fitted together. Sur-Reply 1. Patent Owner also contends that claim 1’s requirement that a portion of the compliant member “occupies a portion of the recessed region” indicates that claim 1 requires complementary, contoured features of the type disclosed in the specification. *Id.* at 2. Patent Owner further argues that the mating engagement of the Bhatti reference is accomplished via bolts that pass through the connected surfaces. *Id.* at 2–3.

We now analyze the parties’ arguments. In so doing, we note that both parties agree that the term “matingly engaged” encompasses parts that are “joined or fitted together” in some fashion. The parties’ dispute focuses on whether “matingly engaged” is a narrow term that requires interlocking (as Patent Owner asserts), or whether this term instead broadly encompasses all methods of joining or fitting two surfaces (as Petitioner asserts).

We first turn to Patent Owner’s proposed construction. For the reasons discussed below, we determine that Patent Owner’s proposed

construction, “mechanically joined or fitted together to interlock” (*see* Resp. 17), is too narrow.

Patent Owner begins its claim construction argument by asserting, based on Paragraph 47 of the Pokharna declaration, that its proposed construction is the plain and ordinary meaning “matingly engaged” would have had to one of ordinary skill in the art. *See* Resp. 17. Dr. Pokharna cites to the deposition of Petitioner’s declarant, Dr. Tilton, to support his opinion that Patent Owner’s proposed construction is the plain and ordinary meaning of this claim term. *See* Ex. 2027 ¶ 47 (citing Ex. 2029, 124:5–10). But in the cited testimony, Dr. Tilton never testifies that “matingly engaged” requires interlocking. Ex. 2029, 124:5–10. Accordingly, Patent Owner has not adequately supported its initial assertion that its construction is the plain and ordinary meaning of “matingly engaged.”

Patent Owner and Dr. Pokharna next assert that Patent Owner’s construction is consistent with the intrinsic and extrinsic evidence. *See* Resp. 17; Ex. 2027 ¶ 47. In particular, as discussed above, Patent Owner argues that its construction of “matingly engaged” is supported by, and consistent with, embodiments in the specification and the 2011 Provisional that describe mating engagement accomplished via complementary, contoured features. *See* Resp. 18–20 (citing Ex. 1001, 12:57–59, 13:14–34, 13:45–53, 14:54–67, Figs. 10–12; Ex 2027 ¶¶ 51–53), 20–22 (citing Ex. 2027 ¶¶ 53–55). We agree with Petitioner, however, that these embodiments are non-limiting examples. *See, e.g.*, Ex. 1001, 19:7–10 (“Thus, . . . it should be recognized that the above-described embodiments are only examples and should not be taken as limiting in scope.”); Ex. 1006, 29:13–14 (“Thus, the claimed inventions are not intended to be limited to the embodiments shown herein.”). Patent Owner has not pointed to a

lexicographic definition or clear and unmistakable disclaimer of claim scope sufficient to limit the scope of the claims to these specific embodiments. Accordingly, the intrinsic evidence cited by Patent Owner does not justify limiting the claim term “matingly engaged” so as to require interlocking, much less interlocking accomplished via complementary, contoured surfaces.

We now consider Patent Owner’s extrinsic dictionary definition evidence, mindful of the Federal Circuit’s admonition that “heavy reliance on the dictionary divorced from the intrinsic evidence risks transforming the meaning of the claim term to the artisan into the meaning of the term in the abstract, out of its particular context.” *Phillips*, 415 F.3d at 1321. Patent Owner’s proposed construction of “matingly engaged” (“mechanically joined or fitted to interlock”) appears to be consistent with dictionary definitions of “mate” and “engage” cited by Dr. Pokharna. *See* Ex. 2027 ¶ 48 (citing Ex. 2030, 3, 4). But after setting forth its proposed construction, Patent Owner attempts to further construe its own proposed construction by arguing that the term “interlock” requires a tongue-in-groove or Lego®-like connection accomplished by complementary, contoured shapes. *See* Resp. 18. Patent Owner bases its interpretation of “interlock” on Paragraphs 49 and 50 of the Pokharna Declaration (*see id.*), but these paragraphs are unpersuasive because they are conclusory and unsupported by adequate reasoning or evidence. *See* Ex. 2027 ¶¶ 49–50. Patent Owner also has not directed us to any support for its assertion that “interlock” would further require connection that would take force to break. *See* Tr. 38:14–40:5.

The only evidence in the record as to the meaning of “interlock” is a dictionary definition cited by Petitioner, which defines “interlock” as “engage with each other by overlapping or fitting together.” *See* Reply, 8

n.2 (citing Ex. 1024). Incorporating this definition into Patent Owner’s proposed construction of “matingly engaged” yields the following, dictionary-based construction: “mechanically joined or fitted together by overlapping or fitting together.” This somewhat-redundant construction is broader than what Patent Owner proposed (e.g., it encompasses parts that are fit together as well as parts that are joined by overlapping), and does not require a tongue-in-groove or Lego®-like connection accomplished via complementary, contoured shapes.

For the foregoing reasons, we are not persuaded that the claim term “matingly engaged” should be narrowly construed so as to require a tongue-in-groove or Lego®-like connection, complementary, contoured surfaces, or a connection that would require force to disconnect.

We now turn to Petitioner’s arguments. On the record before us, we determine that Petitioner’s proposed construction is too broad.

As discussed above, the Petition did not set forth an explicit construction of “matingly engaged.” But Petitioner’s declarant, Dr. Tilton, was asked during his deposition what definition he applied when formulating the opinions cited in the Petition. Ex. 2029, 124:5–7. Dr. Tilton responded as follows: “‘Matingly engaged’ is sort of a plain—in ordinary English, the parts are—they mate. They’re engaged. They’re fit together.” *Id.* at 124:8–10.

Approximately four months after Dr. Tilton’s deposition, Petitioner filed the Reply setting forth its present construction, “joined or fitted together to make contact.” Reply 13. Just as Patent Owner did, Petitioner asserts that its construction was initially derived from the plain and ordinary meaning that “matingly engaged” would have had to one of ordinary skill in the art. *See id.* To support this assertion, Petitioner cites the deposition

testimony quoted above, and Dr. Tilton’s supplemental declaration. *See* Reply 13 (citing Ex. 2029, 123:24–124:10; Ex. 1027 ¶¶ 2–4).

It is readily apparent, however, that Petitioner’s new construction, which encompasses “all methods of joining or fixing two surfaces” (*see* Ex. 1027 ¶ 3), is broader than the construction Dr. Tilton testified he used in connection with the Petition, which requires that two parts be fit together (*see* Ex. 2029, 124:8–10). Accordingly, Dr. Tilton’s deposition testimony does not adequately support Petitioner’s attempt to argue that the plain and ordinary meaning of “matingly connected” is so broad as to encompass any method of joining or fixing surfaces. In addition, nothing in Dr. Tilton’s supplemental declaration adequately justifies a plain and ordinary meaning-based construction that would encompass parts that are not, at the very least, fitted together. *See* Ex. 1027 ¶¶ 2–4. Dr. Tilton does not address the inconsistency between Petitioner’s present proposal and his initial construction of “matingly engaged,” much less offer persuasive arguments or evidence to support Petitioner’s new, broader construction. *See id.* Instead, Dr. Tilton merely asserts (in a cursory manner, and without citations) that Petitioner’s new proposed construction is generally consistent with claim 1, and attacks Patent Owner’s construction as unduly narrow. *See id.* This consistency argument is not persuasive because Dr. Tilton never disputes that his initial, narrower construction is also consistent with the specification and the language of claim 1. *See id.*

The intrinsic evidence cited in the Reply is consistent with Dr. Tilton’s initial testimony that “matingly engaged” refers to parts that are fit together, and thus does not adequately support Petitioner’s arguments for a broader construction. For example, Petitioner’s Reply cites an embodiment in the ’567 Patent in which a manifold body and a second recessed region

are matingly engaged such that “the manifold body so occupies a portion of the second recessed region [so] as to define an exhaust manifold that generally overlies a respective portion of each of the microchannels.” Reply 9 (citing Ex. 1001, 3:53–58). Dr. Tilton testifies that in such an embodiment, the manifold body would necessarily have been “joined or fitted to contact” the recessed region. Ex. 1027 ¶ 2. Because the manifold body in this embodiment occupies a portion of the second recessed region, and is necessarily joined or fitted to the recess in order to form an exhaust manifold, a POSITA would have understood that these two components were fitted together.

Petitioner’s contention that Bhatti describes a mating engagement between two flat surfaces, thus supporting its broad claim construction proposal, also is not persuasive. See Reply 11–13. As Patent Owner correctly points out, Bhatti’s “mating engagement” is not merely the joining of two flat surfaces, but is instead accomplished via bolt holes that receive connecting bolts. See Sur-Reply 2–3; Ex. 1022 ¶ 19. Accordingly, we are not persuaded that Bhatti supports Petitioner’s position that the term “mating engagement” encompasses contact between two flat surfaces, or the joining together of two flat surfaces.

The Federal Circuit and district court cases cited by Petitioner that construe the term “engage” to merely require contact or attachment (see Reply 8) are not inconsistent with a construction requiring that two parts to be fitted together. Claim 1 does not encompass any type of engagement. It requires a specific type of engagement: mating engagement. Petitioner does not cite any cases that construe this narrower term. See *id.*

For the foregoing reasons, the evidence of record does not support Petitioner’s attempt in its Reply to broaden Dr. Tilton’s initial construction

of “matingly engaged” so as to encompass “all methods of joining or fixing two surfaces.” *See* Ex. 1027 ¶ 3.

Considering the intrinsic evidence summarized above, and the evidence and arguments presented by the parties, we determine that the claim limitation “a compliant member matingly engaged with the second side of the housing member” is satisfied when at least a portion of the recited compliant member is fitted within the recessed region defined by the second side of the housing member. This partial construction is sufficient to resolve the issues in dispute.

On this record, we decline to address the issue of whether “matingly engaged” could also encompass other types of engagement, and we also decline to construe any other claim terms.⁹ *See Vivid Techs., Inc. v. Am. Sci. & Eng’g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999) (holding that “only those terms need be construed that are in controversy, and only to the extent necessary to resolve the controversy”); *see also Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017) (citing *Vivid Techs.* in the context of an *inter partes* review).

D. Obviousness over Bezama and Lyon

1. Overview of Lyon (Ex. 1011)

Lyon is entitled “Fluid Heat Exchanger.” Ex. 1011, Title. Lyon is a publication of U.S. Application No. 12/189,476 which matured as the ’330 Patent. *Id.* at code (60). As Lyon is related to the ’567 Patent, Lyon’s heat exchanger has similar components as that of the ’567 Patent.

⁹ Though Petitioner initially proposed constructions for three additional claim terms (*see* Pet. 12), the parties now agree that the Board need not construe these claim terms to decide the issues before us (*see* Resp. 24, 26, 27; Reply 2 n.1).

Figure 1, reproduced below, shows an exemplary embodiment of a heat exchanger.

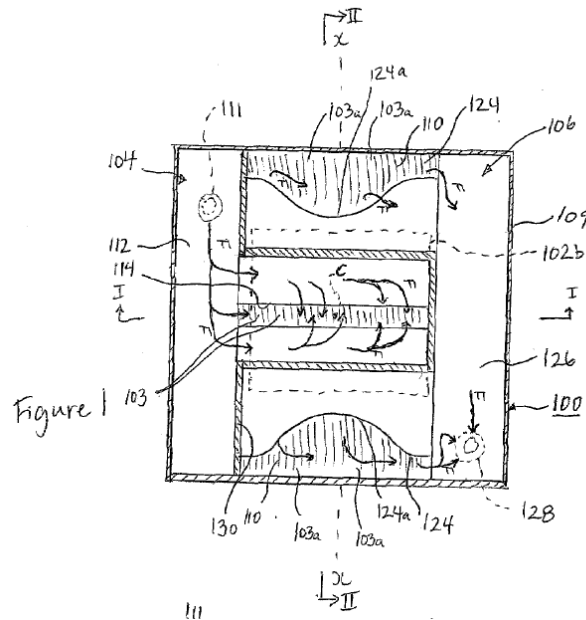


Figure 1 is a top plan view of internal components of heat exchanger 100. Ex. 1011 ¶¶ 9, 15. Heat exchanger 100 includes housing 109, inlet port 111, fluid inlet passage 104, inlet opening 114, microchannels 103, seal 130, fluid outlet opening 124, fluid outlet passage 106, and outlet port 128. *Id.* ¶¶ 15, 17, 21, 28, 37. Each microchannel 103 is defined by a recessed groove extending transversely between adjacent fins. *Id.* ¶ 18. Heat exchanging fluid F flows in the directions indicated by the arrows. *Id.* ¶ 35. Heat exchanging fluid F enters microchannels 103 and splits into two sub flows in opposite directions to pass outwardly from the inlet opening 114 toward outlet fluid opening 124. *Id.* ¶¶ 34–35. Seal 130 separates fluid inlet passage 104 and fluid outlet passage 106 so that fluid must pass through microchannels 103. *Id.* ¶ 37.

Figure 5, reproduced below, shows a heat exchanger according to another embodiment.

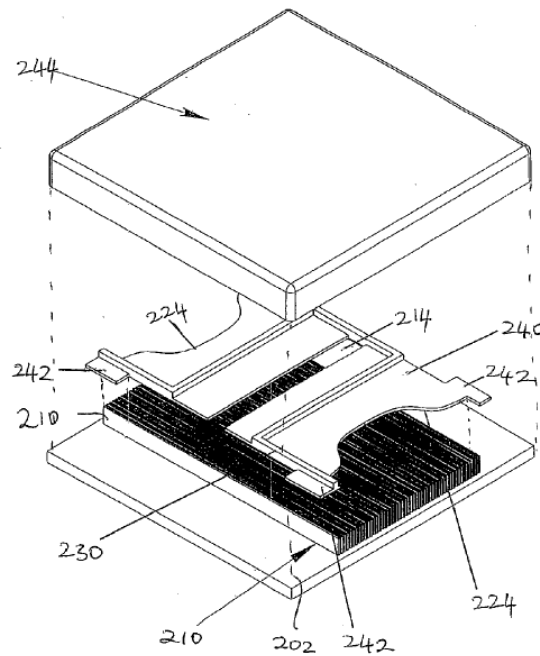


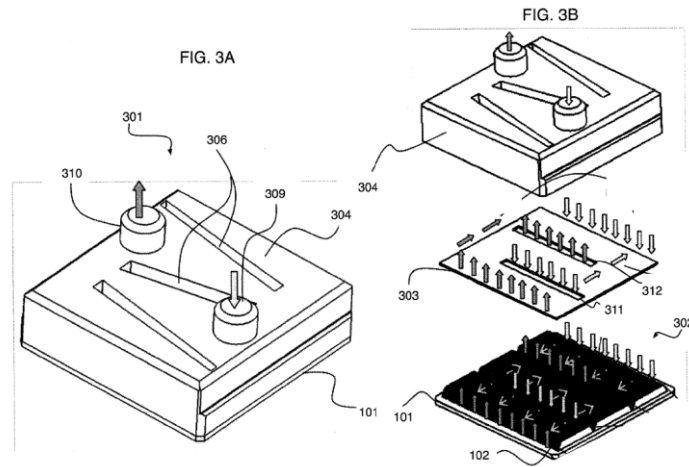
Figure 5

Figure 5 is an exploded, perspective view of a heat exchanger. Ex. 1011 ¶ 13.¹⁰ The depicted heat exchanger includes top cap 244 with side walls that extend downward, plate 240, seal 230, walls 210, and heat spreader plate 202. *Id.* ¶¶ 38, 40–42. “Seal 230 may be installed as a portion of plate 240 or separately.” *Id.* ¶ 41. Plate 240 “has portions removed to create inlet and outlet openings.” *Id.* ¶ 40.

2. Overview of Bezama (Ex. 1010)

Bezama is entitled “Structure and Apparatus for Cooling Integrated Circuits Using Co[p]per Microchannels.” Ex. 1010, code (54). Figures 3A and 3B, reproduced below, describe such an apparatus.

¹⁰ Lyon incorrectly identifies Figure 4 as an exploded, perspective view and Figure 5 as a top plan view without a top cap. Ex. 1011 ¶¶ 12–13.



Figures 3A and 3B are perspective views of an assembly according to an exemplary embodiment. Ex. 1010 ¶ 13. Assembly 301 includes a cover/manifold portion 304 having inlet port 309, outlet port 310, and recesses 306. *Id.* ¶ 26. Assembly 301 also includes separator sheet 303 and fin portion 302. *Id.* ¶¶ 26, 28.

Bezama discloses that the fins of the fin portion may be tapered to create a groove or grooves running transverse to the direction of the fins. *See* Ex. 1010 Fig. 1, ¶ 24. Bezama also teaches that such grooves advantageously “reduce the pressure drop, improve the flow uniformity, and allow the fluid to be more readily directed into and removed from the microchannels” between the fins. *Id.* ¶ 24. Bezama further teaches that separator sheet 303 “can be composed of a compliant flexible plastic or polymer material” in order to minimize leaks. *Id.* ¶ 28.

3. Analysis

a) Claim 1

Petitioner contends that Lyon teaches or suggests all limitations of claim 1, except for “a recessed groove extending transversely relative to the fins,” and a “compliant” member. *See* Pet. 66–77 (citing Ex. 1003 ¶¶ 116–

139); *see also* Pet. 62 (citing Ex. 1003 ¶ 110) (“Lyon teaches every limitation of the challenged claims, except a compliant material on top of the microchannel fins . . . and a recessed, transverse ‘groove’ on the microchannel fins.”). Petitioner relies on Bezama to supply both of these claim elements, and sets forth rationales for why one of ordinary skill in the art would have had reason to combine these teachings of Bezama with Lyon so as to arrive at the claimed invention. *See* Pet. 67–68 (citing Ex. 1003 ¶¶ 121–124) (contending that Bezama discloses a recessed transverse groove, and that a POSITA would have known that incorporating such a groove into Lyon’s microchannel walls would have improved fluid flow characteristics); 71–73 (citing Ex. 1003 ¶¶ 128–132) (contending that Bezama discloses that the separator sheet overlying the fins can be made of a compliant material, and that a POSITA would have known that incorporating such a material into Lyon’s Plate 240 would have minimized coolant bypass between the fins and the plate).

Patent Owner makes a single patentability argument for claim 1—it contends that neither Lyon nor Bezama discloses a compliant member that is “matingly engaged” with the second side of the housing member. *See* Resp. 44–49.

We find that Petitioner’s contentions regarding the undisputed limitations of claim 1, and the proffered rationales for combining the teachings of Lyon and Bezama, are persuasive and adequately supported. *See* Pet. 59–77; Ex. 1003 ¶¶ 107–139; *see also* Paper 11, 8 (“Patent Owner is cautioned that any arguments not raised in the response may be deemed waived.”) We now turn to the single disputed limitation of claim 1.

Petitioner contends that the bottom side of Lyon’s housing (which includes sidewalls) is the second side of a housing member that “defines a

recessed region.” See Pet. 68–69 (Ex. 1003 ¶ 125). According to Petitioner, a POSITA would have recognized that Lyon’s distribution/collection plate (which optionally includes seal 130) is “matingly engaged” with the recessed region on the bottom side of Lyon’s housing “to prevent coolant bypass between the inlet and outlet sides through gaps between the plate and the housing.” Pet. 70 (citing Ex. 1003 ¶ 127; Ex. 1011 ¶¶ 37, 40–42).

Petitioner’s contentions are persuasive because they are consistent with the disclosure of Lyon. As Petitioner notes, Lyon explicitly teaches that the seal (reference numeral 130 in Figures 1–3; 230 in Figures 4 and 5) can be a portion of Lyon’s distribution/collection plate (not numbered in Figures 1–3; reference numeral 240 in figures 4 and 5). Pet. 70–71 (citing Ex. 1011 ¶ 41).¹¹ It is apparent from Lyon’s figures that when the distribution/collection plate is placed within the recessed region on the bottom of Lyon’s housing, the seal (optionally part of the distribution/collection plate) fits together with both the underside of the housing (see Ex. 1011, Figs. 2, 3) and the sidewalls of the housing (see *id.* at Figs. 1, 4) in order to separate fluid inlet passage 104 from fluid outlet passage 106 “so that fluid must pass through the microporous channels 103 past head spreader plate surface 102a” (*id.* ¶ 37). Because Lyon’s distribution/collection plate is placed within the recessed region on the bottom side of Lyon’s housing, and optionally includes a seal configured to fit with both the bottom and sidewalls of Lyon’s housing so as to prevent the passage of fluid, Lyon teaches or at least suggests a distribution/collection plate that is fitted to the recessed region on the bottom of Lyon’s housing.

¹¹ Petitioner asserts that Figures 1–3 and Figures 4 and 5 depict the same seal. See Pet. 71 (citing Ex. 1003 ¶ 127).

Accordingly, we are persuaded that Lyon and Bezama teach or suggest a compliant¹² distribution/collection plate (i.e., a compliant member) that is “matingly engaged” with the bottom side of Lyon’s housing (i.e., the second side of the housing member).

Patent Owner argues that Lyon does not disclose a “compliant” member. Resp. 45. This argument is not availing because Petitioner relies on Bezama to supply the required compliant material. Pet. 71–73 (citing Ex. 1003 ¶¶ 128–132). Patent Owner does not dispute that Bezama teaches a compliant material, or that a POSITA would have been motivated to modify Lyon’s distribution/collection plate to incorporate such a compliant material. See Resp. 45–49.

Patent Owner next argues that the term “matingly engaged” was first added in the 2011 Provisional, and is not used in Lyon. Resp. 46. But while Lyon never uses the term “mating engagement,” Petitioner has made a persuasive showing that Lyon teaches or at least suggests mating engagement of the type required by claim 1.¹³ That Lyon uses different terminology has little relevance.

Patent Owner also argues that in all embodiments depicted in Figures 1–5, Lyon’s seal “merely abuts” the housing. Resp. 46 (citing Ex. 2027 ¶ 89). But, as discussed above, Figures 2 and 3 of Lyon depict the seal as being in contact with the underside of the housing, Figures 1 and 4 depict the

¹² Patent Owner does not dispute that a person of ordinary skill in the art would have had reason to incorporate Bezama’s compliant material into Lyon’s distributor/collector plate. See Pet. 71–73 (citing Ex. 1003 ¶¶ 128–132); Resp. 44–49.

¹³ Lyon qualifies as prior art because it was published in 2009 (see Ex. 1011, code (43)), which is before the earliest-possible priority date of the challenged claims (see *supra* n.8).

seal as being in contact with the sidewalls of the housing, and Paragraph 37 makes clear that the seal, the underside, and the sidewalls are fitted closely together so as to prevent fluid from passing between those components. See Ex. 1011, Figs. 1–4, ¶ 37. These portions of Lyon describe more than mere abutment; they describe a seal (optionally part of the distribution/collection plate) that is fitted to the recessed region on the bottom of Lyon’s housing.

Patent Owner additionally argues that Lyon does not teach or suggest a compliant insert and a housing that are “mechanically joined or fitted together to interlock.” Resp. 47–48. This argument is not persuasive because we have rejected Patent Owner’s contention that the claim limitation “matingly engaged” requires interlocking, as Patent Owner construes that term.

Patent Owner further argues that Bezama does not cure the previously-discussed deficiencies in Lyon because Bezama does not disclose mating engagement. Resp. 48. This argument is not persuasive because Patent Owner has not shown that any such deficiencies exist, and because Petitioner does not rely on Bezama with respect to the “matingly engaged” limitation.

In its Sur-Reply, Patent Owner argues that fusing Lyon’s distribution plate/seal to Lyon’s cover would not constitute mating engagement. Sur-Reply 5. This argument is not persuasive as to the patentability of claim 1 because this Decision does not rely on Lyon’s teaching that the distribution/collection plate and cover may be fused together.

For the foregoing reasons, we find that Lyon and Bezama teach or suggest all limitations of claim 1, and that Petitioner has set forth adequate rationales for combining the teachings of these references in a manner that

would satisfy claim 1. Petitioner has demonstrated by a preponderance of the evidence that claim 1 is unpatentable under 35 U.S.C. § 103.

b) Claims 2, 3, 5, 7, and 25

Petitioner also identifies portions of Lyon and Bezama that allegedly teach or suggest each limitation recited in claims 2, 3, 5, 7, and 25, and that these contentions are supported by testimony from Dr. Tilton. *See* Pet. 78–84; Ex. 1003 ¶¶ 140–151. Petitioner additionally identifies rationales for why a person of ordinary skill in the art would have had reason to combine the teachings of Lyon and Bezama to arrive at the inventions recited in those claims. *See id.*

Patent Owner does not dispute these contentions or set forth any separate arguments for the patentability of claims 2, 3, 5, 7, and 25, but instead relies solely on its arguments with respect to claim 1. *See* Resp. 49. Patent Owner’s arguments regarding claim 1 are not persuasive for the reasons set forth above.

On this record, we find that Lyon and Bezama teach or suggest all limitations of claims 2, 3, 5, 7, and 25, and that Petitioner has set forth adequate rationales for combining the teachings of these references in a manner that would satisfy each of these claims. Petitioner has demonstrated by a preponderance of the evidence that claims 2, 3, 5, 7, and 25 are unpatentable under 35 U.S.C. § 103 as obvious over Lyon and Bezama.

E. Anticipation by Bezama

Because all challenged claims are unpatentable as obvious over Lyon and Bezama, we decline to consider the merits of Petitioner’s contention that the challenged claims are anticipated by Bezama. *See SAS Inst. Inc. v. Iancu*, 138 S. Ct. 1348, 1359 (2018) (holding a petitioner “is entitled to a final written decision addressing all of the claims it has challenged”); *Boston*

Sci. Scimed, Inc. v. Cook Grp. Inc., 809 F. App'x 984, 990 (Fed. Cir. Apr. 30, 2020) (non-precedential) (recognizing that the “Board need not address issues that are not necessary to the resolution of the proceeding” and, thus, the Board has “discretion to decline to decide additional instituted grounds once the petitioner has prevailed on all its challenged claims”).

III. PATENT OWNER'S MOTION TO EXCLUDE

Patent Owner seeks to exclude Exhibit 1028 (the excerpted deposition transcript of Dr. Pokharna) on the ground that the Board's rules required Petitioner to file a complete transcript, and the Board's rules prevented Patent Owner from filing a complete transcript on its own. Paper 31, 1. Patent Owner represents that it is willing to withdraw its motion to exclude if the board grants authorization to expunge the excerpted transcript and replace it with the complete transcript of Dr. Pokharna's deposition. *Id.* at 2.

Petitioner argues in opposition that Patent Owner was not prejudiced because it was served with the full deposition transcript within 10 days of raising its objection. Paper 33, 1. Petitioner nevertheless also filed the complete transcript of Dr. Pokharna's deposition as Exhibit 1030. *Id.*

Patent Owner argues in reply that the record is still defective because Petitioner filed the complete deposition transcript as Exhibit 1030 rather than replacing Exhibit 1028 with a complete transcript, and because the Reply still cites to Exhibit 1028. Paper 36, 1–2. Patent Owner asks that the Board either exclude Exhibit 1028, or take judicial notice of a copy of Dr. Pokharna's full deposition transcript that was filed in a related proceeding. *Id.* at 2.

It is undisputed that Petitioner filed a copy of Dr. Pokharna's complete deposition transcript, as Patent Owner initially requested. At most, Patent Owner's remaining complaints raise a minor, technical violation of

the Board's rules that did not result in any significant prejudice.

Accordingly, we decline to expunge Exhibit 1028, and we permit Petitioner to rely on citations to this exhibit. 37 C.F.R. § 42.5(b).

Because Dr. Pokharna's full deposition transcript is now of record in this proceeding (see Ex. 1030), there is no need to take judicial notice of the same transcript from a different proceeding, and we decline to do so.

For the above reasons, Patent Owner's Motion to Exclude is *denied*.

IV. CONCLUSION

For the foregoing reasons, we determine that Petitioner has shown by a preponderance of the evidence that challenged claims 1, 2, 3, 5, 7, and 25 are all unpatentable.¹⁴ We also deny Patent Owner's Motion to Exclude.

In summary, regarding the challenged claims:

Claim(s) Challenged	35 U.S.C. §	Reference(s)	Claims Shown Unpatentable	Claims Not Shown Unpatentable
1, 2, 3, 5, 7, 25	102	Bezama ¹⁵		
1, 2, 3, 5, 7, 25	103	Bezama, Lyon	1, 2, 3, 5, 7, 25	
Overall Outcome			1, 2, 3, 5, 7, 25	

¹⁴ Should Patent Owner wish to pursue amendment of the challenged claims in a reissue or reexamination proceeding subsequent to the issuance of this decision, we draw Patent Owner's attention to the April 2019 *Notice Regarding Options for Amendments by Patent Owner Through Reissue or Reexamination During a Pending AIA Trial Proceeding*. See 84 Fed. Reg. 16,654 (Apr. 22, 2019). If Patent Owner chooses to file a reissue application or a request for reexamination of the challenged patent, we remind Patent Owner of its continuing obligation to notify the Board of any such related matters in updated mandatory notices. See 37 C.F.R. § 42.8(a)(3), (b)(2).

¹⁵ For the reasons discussed above, we do not reach this ground.

V. ORDER

In consideration of the foregoing, it is hereby:

ORDERED that claims 1, 2, 3, 5, 7, and 25 of U.S. Patent 9,057,567 B2 have been shown to be unpatentable;

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

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

IPR2020-00747
Patent 9,057,567 B2

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