

NOTE: This disposition is nonprecedential.

**United States Court of Appeals  
for the Federal Circuit**

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**COOLIT SYSTEMS, INC.,**  
*Appellant*

v.

**KATHERINE K. VIDAL, UNDER SECRETARY OF  
COMMERCE FOR INTELLECTUAL PROPERTY  
AND DIRECTOR OF THE UNITED STATES  
PATENT AND TRADEMARK OFFICE,**  
*Intervenor*

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2022-1221

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Appeal from the United States Patent and Trademark Office, Patent Trial and Appeal Board in Nos. IPR2020-00747, IPR2020-00825.

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Decided: March 7, 2024

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REUBEN H. CHEN, Cooley LLP, Palo Alto, CA, argued for appellant. Also represented by HEIDI LYN KEEFE; DUSTIN KNIGHT, Washington, DC; LLOYD L. POLLARD, II, Workman Nydegger, Salt Lake City, UT.

MONICA BARNES LATEEF, Office of the Solicitor, United States Patent and Trademark Office, Alexandria, VA,

argued for intervenor. Also represented by PETER J. AYERS, MAI-TRANG DUC DANG, FARHEENA YASMEEN RASHEED.

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Before LOURIE, BRYSON, and STARK, *Circuit Judges*.

LOURIE, *Circuit Judge*.

CoolIT Systems, Inc. (“CoolIT”) appeals from a final written decision of the United States Patent and Trademark Office (“PTO”) Patent Trial and Appeal Board (“the Board”) holding claims 1–3, 5, 7, and 25 of U.S. Patent 9,057,567 (the “’567 patent”) unpatentable. *Asetek Danmark A/S v. CoolIT Sys., Inc.*, IPR2020-00747, 2021 WL 4861000 (P.T.A.B. Sept. 30, 2021) (“*Decision*”). For the following reasons we *vacate* and *remand*.

#### BACKGROUND

The challenged patent claims priority from two provisional applications, Provisional Application 61/512,379 (the “2011 Provisional”) and Provisional Application 60/954,987 (the “2007 Provisional”). It is directed to a system for fluid heat transfer to cool electronic devices. ’567 patent, Abstract. Representative 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.*

'567 patent, col. 19 ll. 16–46 (emphases added).

The term “matingly engaged” appeared for the first time in the 2011 Provisional. *See* Appellant’s Br. at 5–10. According to CoolIT, such a connection is depicted in Figures 7–12 of the '567 patent, which also first appeared in the 2011 Provisional. *Id.* According to CoolIT, Figures 2–6 of the '567 patent purportedly show an alternative means of connection, *i.e.*, fusing, that was disclosed in the 2007 Provisional. *Id.* In another, now-final *inter partes* review (“IPR”) decision from the same panel as on review here, the Board found that the 2007 Provisional disclosed only a single approach for connecting the housing with the plate and

seal: by fusing. *Asetek Danmark A/S v. CoolIT Sys., Inc.*, IPR2020-00825, 2021 WL 4868406 at \*10 (P.T.A.B. Oct. 12, 2021) (“[T]his language only describes one method of connecting components—overall fusing techniques. It does not follow from this language that the inventor envisioned a second method of connecting components in which compliant surfaces would have been desirable.”).

Asetek Danmark A/S (“Asetek”) petitioned for IPR of the ’567 patent, asserting anticipation based on Bezama<sup>1</sup> and obviousness based on Lyon<sup>2</sup> in combination with Bezama. *Decision* at \*3. Lyon has the same inventor as the ’567 patent and also claims priority from the 2007 Provisional, but *not* from the 2011 Provisional. In its petition, Asetek argued that the challenged claims of the ’567 patent were not entitled to a priority date earlier than the filing of the 2011 Provisional, which CoolIT did not dispute. Intervenor’s Br. at 5 n.6; *see also Decision* at \*3 n.3.

The parties disputed the meaning of the term “matingly engaged.” CoolIT argued that it should be construed as “mechanically joined or fitted together to interlock.” *Id.* at \*6. Asetek initially proposed no construction, but then argued in its reply brief that “matingly engaged” should be construed as “joined or fitted together to make contact,” encompassing “[a]ll methods of joining or fixing two surfaces.” *Id.* CoolIT responded that Asetek’s construction requiring mere contact read “matingly” out of the limitation, as parts that are joined or fitted together would always “make contact” with one another. *Id.* at \*7. CoolIT further argued that, regardless of the construction, neither Lyon nor Bezama disclosed that limitation because its components

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<sup>1</sup> U.S. Patent Application Publication 2010/0012294, published Jan. 21, 2010 (“Bezama”)

<sup>2</sup> U.S. Patent Application Publication 2009/0071625, published Mar. 19, 2009 (“Lyon”).

were fused together or merely abutting, rather than “fitted together.” *Id.* at \*11.

The Board found CoolIT’s proposed construction of “matingly engaged” to be too narrow and Asetek’s to be too broad. *Decision* at \*7–8. It did not determine the meaning or precise metes and bounds of “matingly engaged,” but “partial[ly] constru[ed]” the term as at least being 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.” *Id.* at \*9 (“This partial construction is sufficient to resolve the issues in dispute.”). The Board acknowledged that both parties agreed that the term encompasses parts that are “joined or fitted together” in some fashion, as the parties agreed that the term “mate” meant “join or fit together,” but disagreed on the term “engage.” *Id.* at \*7. The Board found that the term was not “so broad as to encompass any method of joining or [fitting] surfaces,” but did not reach the question whether or not “matingly engaged” could encompass other forms of engagement besides fitting. *Id.* at \*8. It rejected CoolIT’s use of the word “interlock” because, in part, it believed that CoolIT was arguing without evidentiary support that such construction would require a connection that would take force to break. *Id.* at \*6–8.

Applying its partial construction, the Board found that Lyon disclosed a compliant member that is “matingly engaged” with the bottom side of the housing. *Decision* at \*11. The Board determined that Lyon “teaches or at least suggests” a plate that is “fitted to the recessed region on the bottom of Lyon’s housing.” *Id.* The Board found that it was of no consequence that “the term ‘matingly engaged’ was first added in the 2011 Provisional, and is not used in Lyon,” because Lyon still “teaches or at least suggests mating engagement of the type required by claim 1.” *Id.* at \*12. It also explained that CoolIT’s argument that Lyon’s fusing of its plate/seal to its cover would not constitute mating engagement was “not persuasive” because its decision did

“not rely on Lyon’s teaching that the [parts] may be fused together.” *Id.* The Board therefore found that the challenged claims were unpatentable as obvious based on Lyon in combination with Bezama. *Id.* For that reason, it did not reach the ground of anticipation based on Bezama. *Id.* at \*13.

CoolIT timely appealed. Asetek filed a responsive brief and separately cross-appealed from the final written decision in IPR2020-00825, which was consolidated with this appeal. However, Asetek has since moved to voluntarily dismiss the cross-appeal and withdraw from the case upon privately settling its dispute with CoolIT. Both motions were granted. The PTO intervened and filed its own responsive brief.

We have jurisdiction under 28 U.S.C. § 1295(a)(4)(A).

#### DISCUSSION

CoolIT argues that the Board erred in construing the term “matingly engaged,” and that, under either its proposed construction or the Board’s construction, Lyon fails to satisfy the “matingly engaged” limitation. We address each argument in turn.

#### I

We review a Board’s construction of a claim term, and any supporting determinations made based on the intrinsic record, *de novo*. *Personalized Media Commc’ns, LLC v. Apple Inc.*, 952 F.3d 1336, 1339 (Fed. Cir. 2020). Any factual findings the Board made regarding extrinsic evidence are reviewed for substantial evidence. *Id.*

CoolIT argues that the term “matingly engaged” should be construed as “mechanically joined or fitted together to interlock” (or, alternatively, “mesh” or “otherwise engage”). Appellant’s Br. at 32. Relying first on intrinsic evidence, it asserts that its proposed construction properly accounts for the differences between the 2007 Provisional and the 2011

Provisional, in that the latter allegedly provides an improvement over the former: components that are matingly engaged, rather than fused. *Id.* at 25–33. It further points to the purpose of the invention, and argues that the language of claim 1 requires a specific type of joining or fitting between the compliant member and the housing to force the coolant into the restrictive microchannels, rather than allowing it to flow past them. *Id.* at 23–25. In CoolIT’s view, to work properly, the compliant member of claim 1 must partition features that convey coolant to the microchannels (*e.g.*, an “inlet manifold”) and features that receive coolant from the microchannels (*e.g.*, an “exhaust manifold region”). *Id.* CoolIT also supports its proposed construction with extrinsic evidence: (1) expert testimony, (2) other tribunals’ constructions of “engage,” and (3) dictionary definitions of “engage.” *Id.* at 33–35; *see also* J.A. 3846 (defining “engage” as including “interlocking”); *Lisle Corp. v. A.J. Mfg. Co.*, 398 F.3d 1306, 1314 (Fed. Cir. 2005) (construing “engaged” as “interlocked”).

The PTO responds that CoolIT’s proposed construction improperly reads a limitation from the specification into the claim, effectively restricting “matingly engaged” to only the interlocking of complementary contoured features to the exclusion of other forms of engagement. Intervenor’s Br. at 24–26. It argues that neither the claims nor the specification uses the word “interlock,” and that the specification makes clear that Figures 7–12 are merely exemplary embodiments. *Id.* at 25–27. It also disputes CoolIT’s contention that the 2007 Provisional only shows fusion, contending that its Figure 3 shows plate 102 and seal 130 fitted within the recessed region of the housing such that they are matingly engaged. *Id.* at 21–22. The PTO argues that there was no clear and unambiguous disavowal or narrowing of claim scope. *Id.* at 26–29. However, notably, the PTO does not propose a construction of “matingly engaged” aside from defending the Board’s partial construction.

It is clear that the term requires more than mere abutment. And as the Board found, “mating engagement” does not encompass “contact between two flat surfaces, or the joining together of two flat surfaces.” *Decision* at \*9. Nor does it “merely require contact or attachment.” *Id.* The Board correctly found that “[c]laim 1 does not encompass” all “type[s] of engagement. It requires a specific type of engagement: mating engagement.” *Id.* But from there, the Board’s analysis went awry.

As an initial matter, the Board’s partial construction largely renders superfluous other portions of the claim. The Board’s partial construction found that “matingly engaged” includes 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.” *Decision* at \*9. However, the claim elsewhere requires “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.” ’567 patent, col. 19 ll. 38–43. Although these are not an exact match, it is the differences that are almost more troubling. For if the compliant member must be fitted within the recessed region, of what significance is the later requirement that a portion of the compliant member occupy a portion of the same recessed region? Even if “fitted within” was interpreted as narrower than “occupy,” the rest of the limitation requires that the portion of the compliant member also “urges against” a portion of the housing. Taken together, those two limitations seem akin to “fitted within.”

The only explanation that the PTO seems to provide for the apparent redundancy is that the “occupies” language defines how the manifold is formed, and not how the compliant member and the housing are fitted together. *See Oral Arg. at 20:28–21:08 available at*



<https://cafc.uscourts.gov/home/oral-argument/listen-to-oral-arguments/>. We disagree.

Both portions of the claim plainly refer to the placement of the same compliant member in relation to the same second side of the housing. And when asked to define “fitted within,” the PTO fared no better, explaining only that the compliant member “has to be fitted within such that the coolant can’t escape out of the inlet and the outlet.” *Id.* at 18:38–45; *see also id.* at 17:49–18:13. As we pointed out at oral argument, that is a functional description and provides little insight. The PTO has thus failed to explain how “fitted within the recessed region,” *Decision* at \*9, is different from “occupies a portion of the recessed region . . . and urges against [a portion of it],” ’567 patent, col. 19 ll. 38–41 (emphasis added). We are therefore persuaded that “matingly engaged” must carry greater meaning than “fitted within.”

As the Board acknowledged, the parties do not appear to dispute that mating engagement requires “joining or fitting together” in some fashion. *Decision* at \*7; *see also* J.A. 3847 (defining “mate” as “to join or fit together”). Indeed, the Board found that “nothing in [Asetek’s expert declarations] adequately justifies a plain and ordinary meaning-based construction that would encompass parts that are not, at the very least, fitted together.” *Decision* at \*8. It also found that the intrinsic evidence was consistent with the expert testimony that “matingly engaged” “refers to parts that are fit together.” *Id.* But notably, the Board’s partial construction does not use the phrase “join or fit together.” *Id.* at \*9. We find that to be error. Although the Board’s partial construction does use the phrase “fitted within,” we find that that phrase does not necessarily have the same meaning. Moreover, at one point the Board uses the phrase “fitted to,” which also carries yet another distinct meaning. *Id.* at \*11 (“Lyon teaches or at least suggests a distribution/collection plate that is *fitted to* the recessed region on the bottom of Lyon’s housing” (emphasis

added)). The construction should include “joined or fitted together.”

But something more must also be included in the construction, for we must give weight to *both* “matingly” and “engaged.” However, we are not persuaded that “interlock” is the answer. Although we acknowledge that the dictionary definitions show that “engage” can mean to “interlock with,” “cause (mechanical parts) to mesh,” or “to come together and interlock (as of machinery parts),” J.A. 3846, we have concerns that that word choice may cause more confusion than clarity.

Indeed, the Board seemed to misapprehend CoolIT’s position on what that term meant. It noted that:

Patent Owner further explains that the term “interlock” in its construction requires a Lego<sup>®</sup>-like connection in which two components having complementary shapes are engaged with one another. 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.

*Decision* at \*6 (citations omitted). However, the transcript of the oral hearing before the Board reveals that counsel for CoolIT had been referring to a specific example of components that were matingly engaged, a highlighter and its cap, when discussing a press fit arrangement, rather than *all* forms of mating engagement, J.A. 1651–53 (“I think in this example it does require force, right.”), and later clarified that point, J.A. 1656–57 (“There has to be at least in some direction force that’s necessary to pull those two pieces apart but not necessarily in all directions.”). And at oral argument, counsel for CoolIT further clarified that it was only asserting that force in *one* direction was required. Oral Arg. at 2:06–2:09 (“I do think that it is, it is interlocking because it cannot move in one particular direction.”).

That is consistent with CoolIT's position, both before us and the Board, that a tongue-and-groove connection would constitute mated engagement. *See* Appellant's Br. at 44; *Decision* at \*7–8.

But even with that misunderstanding resolved, CoolIT and the PTO still disagree over what the term “interlock” means. CoolIT seems to assert that complementary contoured shapes are not required. Oral Arg. at 6:35–42 (“There are ways to interlock that don't require complementary contoured [sic] shapes, like the highlighter example.”). Whereas the PTO asserts that they are. *Id.* at 28:05–10 (“The way I understand [interlock] is that you have contoured pieces, complementary contoured pieces, like Legos.”); *id.* at 28:32–35 (“I literally think there needs to be contoured complementary pieces that lock together.”). The term “interlock” would therefore provide little guidance as to what “matingly engaged” means.

In view of the record before us, we conclude that the correct construction of “matingly engaged” should be “mechanically joined or fitted together.” Although that exact phrasing was not urged by either party or the Board, we find that it accurately captures the meaning of the term and various arguments of the parties.

For example, at one point in its decision, the Board contemplated a “dictionary-based construction” of “mechanically joined or fitted together by overlapping or fitting together,” which is similar to what we have settled on here. *Decision* at \*8. The Board found that that construction would “encompass[] parts that are fit together as well as parts that are joined by overlapping” without requiring “a tongue-in-groove or Lego®-like connection accomplished via complementary, contoured shapes.” *Id.* Notably, we review the Board's evaluation of extrinsic evidence, like dictionaries, for substantial evidence. *Personalized Media*, 952 F. 3d at 1339. Substantial evidence, indeed, supports the Board's interpretation of the dictionaries. But, as the

Board acknowledged, that dictionary-based construction is “somewhat-redundant” in its phrasing, and it ultimately did not use that construction. *Decision* at \*8. “Mechanically joined or fitted together” is consistent with the dictionary definitions (and the Board’s interpretation of them) but eliminates the redundancy of the Board’s contemplated construction. It also encompasses parts that are “joined by overlapping,” as well as parts that are “interlocking” or with “complementary shapes,” but is not limited to such.

The construction is not unlimited, however, and does give weight to the term “engaged.” For example, the use of “mechanically” properly excludes connection via chemical bonds. CoolIT has stressed that “matingly engaged” is not the same thing as either (a) sealing, such as through glue, solder, or another intermediary filler which separates the components, or (b) welding, which joins two components to make them one. Appellant’s Reply Br. at 23; Oral Arg. at 10:06–46. Instead, CoolIT alleges, those were examples of chemically, rather than mechanically, joining components together, as exemplified by the inability to later decouple the components. *Id.*

We agree that those examples are not within the scope of “matingly engaged” as it is used in the claims. The PTO does not appear to dispute the exclusion of those scenarios. *See* Oral Arg. at 30:07–20 (“Under the partial construction that is before us today, ‘fitted together,’ [sic] I think sealing would probably be too far.”); *id.* at 30:20–23 (agreeing that “sealing” would not be “fitted together”). The patent also distinguishes between mating engagement and sealing, as it describes the connection between the compliant member and second side of the housing as “sealingly engaged” in independent claim 28, rather than “matingly engaged” as in independent claim 1. *Compare* ’567 patent, col. 22 ll. 11–12 (“a compliant member sealingly engaged with the second side of the housing member”) *with id.* col. 19 ll. 23–24 (“a compliant member matingly engaged with the second side of the housing member”). We believe that the

inclusion of “mechanically” in our construction of “matingly engaged” therefore properly excludes those scenarios (*e.g.*, sealing and welding).<sup>3</sup>

We therefore reverse the Board’s partial construction of “matingly engaged” and hold that is properly construed as “mechanically joined or fitted together.”

## II

The Board has not considered whether or not Lyon discloses “a compliant member matingly engaged with the second side of the housing member” under our construction of “matingly engaged.” Nor did it reach Asetek’s second asserted ground and consider whether or not Bezema alone disclosed that feature. We therefore remand to the Board for consideration of those issues, as necessary, in accordance with our opinion.

## CONCLUSION

For the foregoing reasons, the decision of the Board is *vacated* and *remanded*.

## VACATED AND REMANDED

## COSTS

No costs.

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<sup>3</sup> We do not reach the issue as to whether “fusing” is or is not the same as sealing or welding and/or qualifies as mating engagement under the correct construction of “matingly engaged.” We believe that requires factual determinations more appropriate for the Board to consider on remand if necessary.