

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

GREEN REVOLUTION COOLING, INC.,
Petitioner,

v.

MIDAS GREEN TECHNOLOGIES, LLC,
Patent Owner.

IPR2025-00196
Patent 10,405,457 B2

Before FREDERICK C. LANEY, BRIAN D. RANGE, and
RYAN H. FLAX, *Administrative Patent Judges*.

FLAX, *Administrative Patent Judge*.

DECISION
Granting Institution of *Inter Partes* Review
35 U.S.C. § 314

I. INTRODUCTION

Midas Green Technologies, LLC (“Patent Owner”) is the owner of U.S. Patent 10,405,457 B2 (Ex. 1001, “the ‘457 patent”). Paper 4, 1 (Patent Owner’s Mandatory Notices). On November 19, 2024, Green Revolution Cooling, Inc. (“Petitioner”) filed a Petition for *inter partes* review challenging the patentability of claims 1–16 of the ‘457 patent (all claims). Paper 2, 1 (“Pet.”). On March 19, 2025, Patent Owner filed a Preliminary Response to the Petition. Paper 6.

Under 37 C.F.R. § 42.4(a), we have authority to determine whether to institute trial in an *inter partes* review. We may institute an *inter partes* review if the information presented in the petition filed under 35 U.S.C. § 311, and any preliminary response filed under § 313, shows that there is a reasonable likelihood that Petitioner would prevail with respect to at least one of the claims challenged in the petition. 35 U.S.C. § 314.

After reviewing the parties’ submissions in view of the preliminary record, we conclude that Petitioner demonstrates a reasonable likelihood it would prevail in showing that at least one challenged claim of the ‘457 patent is unpatentable under the presented grounds. *See* Pet. Furthermore, we do not exercise discretion to deny institution. Therefore, we grant institution of *inter partes* review. Our reasoning is discussed below.

A. REAL PARTIES-IN-INTEREST

Petitioner states “that the real party-in-interest is Green Revolution Cooling, Inc.” Pet. 1. Patent Owner states, “[t]he real party-in-interest for the Patent Owner is Midas Green Technologies, LLC.” Paper 4, 1.

B. RELATED MATTERS

Petitioner states that

The '457 patent is currently the subject of pending litigation involving Petitioner: *Midas Green Technologies, LLC v. Green Revolution Cooling, Inc.*, 6-24-cv-00166 (WDTX), filed on March 29, 2024 (the “WDTX Litigation”).^[1]

Petitioner is also aware of the following additional matters involving the '457 patent:

- *Inter Partes* Review No. IPR2021-01176, filed June 23, 2021 (Institution Denied January 6, 2022, solely on *Fintiv* grounds);^[1]
- *Midas Green Technologies, LLC v. Rhodium Enterprises, Inc. et al.*, 6-22-cv-00050 (WDTX), filed January 13, 2022; and
- *Midas Green Technologies, LLC v. Immersion Systems LLC*, 4-20-cv-00555 (NDTX), filed May 29, 2020 (dismissed in 2022).

Pet. 1–2. Patent Owner identifies these same related matters. Paper 4, 1.

C. THE '457 PATENT AND RELEVANT BACKGROUND

The '457 patent, titled “APPLIANCE IMMERSION COOLING SYSTEM,” issued on September 3, 2019, from U.S. Application 14/355,533, which was filed on December 13, 2013. Ex. 1001, codes (10), (45), (21), (22). The '457 patent indicates priority to two provisional applications, the first-filed being provisional 61/737,200, filed on December 14, 2012. *Id.* at code (60). Petitioner does not contest that the '457 patent's claims are entitled to this priority date. Pet. 6.

The '457 patent indicates its invention relates to:

A[n] appliance immersion tank system comprising: a generally rectangular tank adapted to immerse in a dielectric fluid a plurality of appliances, each in a respective appliance slot distributed vertically along, and extending transverse to, the long axis of the tank; a primary circulation facility adapted to circulate the dielectric fluid through the tank; a secondary fluid circulation facility adapted to extract heat from the dielectric

fluid circulating in the primary circulation facility, and to dissipate to the environment the heat so extracted; and a control facility adapted to coordinate the operation of the primary and secondary fluid circulation facilities as a function of the temperature of the dielectric fluid in the tank. A plenum, positioned adjacent the bottom of the tank, is adapted to dispense the dielectric fluid substantially uniformly upwardly through each appliance slot. A weir, integrated horizontally into a long wall of the tank, is adapted to facilitate substantially uniform recovery of the dielectric fluid flowing through each appliance slot. All active and most passive components of both the primary and secondary fluid circulation facilities, and the control facility are fully redundant, and are adapted automatically to operate in a fail-soft mode.

Ex. 1001, Abstract. Figures 1 and 5 of the '457 patent illustrate such features; we reproduce them, side-by-side, below:

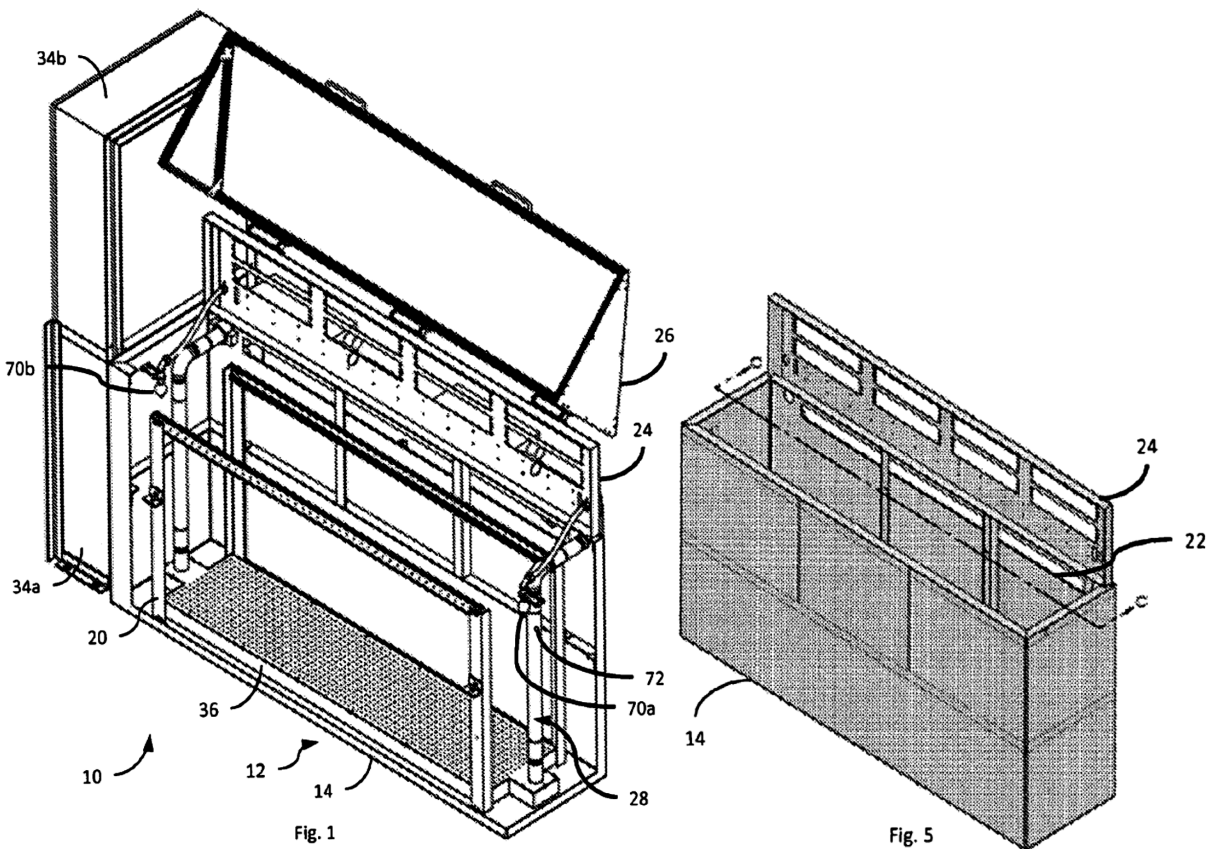


Figure 1 shows, “in partial cut-away form, a front perspective of a tank module of an appliance immersion cooling system,” and Figure 5 shows, “in perspective view, several details of the tank shown in FIG. 1, with special emphasis on the dielectric fluid recovery weir integrated into the long rear wall of the tank.” *Id.* at 2:59–61, 3:1–4. Together, these figures show tank module 10, plenum 36 in the bottom of tank 14, weir 22 along the back wall of tank 14, primary 28 and secondary 30 (not labeled) fluid circulation facilities. *Id.* at 2:36–3:61. Tank 14 has a long axis (not labeled), which is the long dimension of the rectangular shaped volume; slots for appliances (18, not labeled) are to be distributed vertically in tank 14 and transversely along this long axis; the slots 18 are held by rack facility 20. *Id.*

The '457 patent has sixteen claims, of which claims 1, 6, and 11 are independent claims; claim 1 is representative and is reproduced below:

1. An appliance immersion cooling system comprising:
 - a tank adapted to immerse in a dielectric fluid a plurality of electrical appliances, each in a respective appliance slot distributed vertically along, and extending transverse to, a long wall of the tank, the tank comprising:
 - a weir, integrated horizontally into the long wall of the tank adjacent all appliance slots, having an overflow lip adapted to facilitate substantially uniform recovery of the dielectric fluid flowing through each appliance slot; and;
 - a dielectric fluid recovery reservoir positioned vertically beneath the overflow lip of the weir and adapted to receive the dielectric fluid as it flows over the weir;
 - a primary circulation facility adapted to circulate the dielectric fluid through the tank, comprising:

a plenum, positioned adjacent the bottom of the tank,
adapted to dispense the dielectric fluid substantially
uniformly upwardly through each appliance slot;

a secondary fluid circulation facility adapted to extract
heat from the dielectric fluid circulating in the primary
circulation facility, and to dissipate to the environment the heat
so extracted; and

a control facility adapted to coordinate the operation of
the primary and secondary fluid circulation facilities as a
function of the temperature of the dielectric fluid in the tank.

Ex. 1001, 9:33–12:20 (claims).

D. PETITIONER’S ASSERTED GROUNDS FOR UNPATENTABILITY

Petitioner asserts two grounds for unpatentability of the challenged
claims, as follows:

Ground	Claims Challenged	35 U.S.C. § ¹	Reference(s)/Basis
1	1–16	103	Best-2008, ² Osada ³
2	1–16	103	Best-2008, Osada, Best-2012 ⁴

Pet. 3. In support of these grounds for unpatentability, Petitioner submits,
inter alia, the Declaration of Werner J.S. Dahm, PhD (Ex. 1003). At this

¹ The priority date of the ’457 patent is conceded (*see, e.g.*, Pet. 6) to be
December 14, 2012, which is before the relevant AIA revisions to the Patent
Act took effect on March 16, 2013. 35 U.S.C. § 100 (note); *see* Ex. 1001,
codes (22), (60). Pre-AIA § 103(a) applies.

² Christiaan Scott Best and Mark Garnett, US 2001/0132579 A1, pub. June
9, 2011 (Ex. 1004, “Best-2008”).

³ Osamu Osada et al., JP 2001-181898A, pub. July 3, 2001 (Ex. 1005,
“Osada”).

⁴ Christiaan Scott Best, US 2014/0211412 A1, Pub. July 31, 2014 (Ex. 1006,
“Best-2012”).

point, Patent Owner has not nor was required to submit a similar witness declaration as evidence.

II. DISCUSSION

A. DISCRETIONARY DENIAL UNDER 35 U.S.C. § 314(a)

Under 35 U.S.C. § 314(a), the Director has discretion to deny institution of an *inter partes* review. *Cuozzo Speed Techs., LLC v. Lee*, 136 S. Ct. 2131, 2140 (2016) (“[T]he agency’s decision to deny a petition is a matter committed to the Patent Office’s discretion.”); *SAS Inst. v. Iancu*, 138 S. Ct. 1348, 1356 (2018) (“[Section] 314(a) invests the Director with discretion on the question *whether* to institute review.”); *Harmonic Inc. v. Avid Tech., Inc.*, 815 F.3d 1356, 1367 (Fed. Cir. 2016) (“[T]he PTO is permitted, but never compelled, to institute an IPR proceeding.”).

In this proceeding, Patent Owner argues that we should exercise discretion to deny institution under 35 U.S.C. § 314(a) in view of the WDTX Litigation because the factors identified in *Apple Inc. v. Fintiv, Inc.*, IPR2020-00019, Paper 11 (PTAB Mar. 20, 2020) (precedential) (“*Fintiv*”), weigh in favor of denying institution. Prelim. Resp. 57–65. *Fintiv* identifies the following factors to consider when a patent owner raises an argument for discretionary denial due to the advanced state of a parallel proceeding:⁵

1. whether the court granted a stay or evidence exists that one may be granted if a proceeding is instituted;

⁵ In considering the *Fintiv* factors, we no longer apply the guidance set forth in the memorandum titled “Interim Procedure for Discretionary Denials in AIA Post-Grant Proceedings with Parallel District Court Litigation,” issued on June 21, 2022, by former Director Kathi Vidal of the United States Patent and Trademark Office, because it was rescinded by the United States Patent and Trademark Office on February 28, 2025.

2. proximity of the court’s trial date to the Board’s projected statutory deadline for a final written decision;
3. investment in the parallel proceeding by the court and the parties;
4. overlap between issues raised in the petition and in the parallel proceeding;
5. whether the petitioner and the defendant in the parallel proceeding are the same party; and
6. other circumstances that impact the Board’s exercise of discretion, including the merits.

Fintiv 5–6.⁶ In evaluating these factors, we take “a holistic view of whether efficiency and integrity of the system are best served by denying or instituting review.” *Id.* at 6.

⁶ In a March 26, 2025, Memorandum on the *Fintiv* Interim Process, the Acting Director identifies the following “relevant considerations,” which are not expressly enumerated in *Fintiv* itself: (1) whether the PTAB or another forum has already adjudicated the validity or patentability of the challenged patent claims; (2) whether there have been changes in the law or new judicial precedent issued since issuance of the claims that may affect patentability; (3) the strength of the unpatentability challenge; (4) the extent of the petition’s reliance on expert testimony; settled expectations of the parties, such as the length of time the claims have been in force; (5) compelling economic, public health, or national security interests; and (6) any other considerations bearing on the Director’s discretion. See Memorandum dated March 26, 2025 (“Process Memorandum”) (*available at* www.uspto.gov/sites/default/files/documents/InterimProcesses-PTABWorkloadMgmt-20250326.pdf). As indicated in the Board’s informative FAQs, *available at* www.uspto.gov/patents/ptab/faqs/interim-processes-workload-management, “[t]he panel will not address any new factors outlined in the Process Memorandum, nor consider a request for rehearing based on those new factors.”

1. Factor 1: whether the court granted a stay or evidence exists that one may be granted if a proceeding is instituted here

Patent Owner argues that a motion by Petitioner to stay the related district court proceeding has been denied. Prelim. Resp. 58 (citing Ex. 2003). We find no mention of a motion for or denial of a stay in *this cited evidence*, as Exhibit 2003 is a series of emails directed to a claim construction hearing and resolution of a discovery dispute in the district court case. *See* Ex. 2003. Patent Owner further argues that the district court judge presiding over the related proceeding in the Western District of Texas is unlikely to grant a stay of the proceeding in view of his record on such matters. Prelim. Resp. 58–59 (citing Ex. 2020 (statistics)).

Petitioner argues that this factor “is neutral because Petitioner has not yet,” as of the filing of the Petition on November 19, 2024, “moved for a stay.” Pet. 10.

Looking further into the evidence (further than that cited by either party for *this* factor), specifically to a Docket Report filed as Exhibit 2005, we find that Petitioner did file a motion for a stay in the district court on December 13, 2024 (docket entry 33), and that docket entry 57 indicates that the motion to stay was, in fact, denied by an informal “Text Order,” which stated “that a stay is not appropriate at this juncture and notes that [the] IPR has not yet been instituted for the 10,405,457 patent.” Ex. 2005, 10. This evidence shows a stay has been denied and also suggests that the district court is likely to at least consider granting a stay if it becomes “appropriate,” i.e., if this *inter partes* review is instituted.

The Board has explained, “[a] judge determines whether to grant a stay based on the facts of each specific case as presented in the briefs by the parties,” and the Board has also declined “to infer, based on actions taken in

a different case with different facts, how the District Court would rule should a stay be requested by the parties in the parallel case.” *Apple Inc. v. Fintiv, Inc.*, IPR2020-00019, Paper 15, 12 (PTAB May 13, 2020) (informative) (“*Fintiv IP*”). We decline to guess as to how the court in the related litigation will decide any future request for a stay. But, the evidence does suggest that, if this *inter partes* review is instituted, the district court will at least consider a request for a stay.

Fintiv states that, if a district court has denied “a motion for stay without prejudice and indicated to the parties that it will consider a renewed motion or reconsider a motion to stay if a PTAB trial is instituted,” as appears to be the present circumstances, then this “suggests the district court may be willing to avoid duplicative efforts and await the PTAB’s final resolution of the patentability issues raised in the petition before proceeding with the parallel litigation.” *Fintiv*, Paper 11 at 6–7. It further states: “[t]his fact has usually weighed against exercising authority to deny institution under *NHK*.” *Id.* at 7 (footnote omitted) (proximity of a court’s trial date and investment in the litigation, considered under Factors 2 and 3, remain important considerations).

Accordingly, on this record, factor 1 weighs marginally against discretionary denial.

2. Factor 2: proximity of the court’s trial date to the Board’s projected statutory deadline for a final written decision

Patent Owner argues that there is a scheduled February 2, 2026, trial date in the related district court proceeding (where the complaint was filed on March 29, 2024), which is about four months before a reasonably expected statutory deadline for our final written decision in this proceeding. Prelim. Resp. 59–60 (citing Ex. 1014, 5). Moreover, Patent Owner argues,

even if it might be expected that the district court trial may not commence on the scheduled date, the statistics specific to the presiding district court judge indicate a median time to trial of 25 months from the filing of a complaint, which would suggest a trial in April 2026; still two months prior to our expected statutory deadline for a final written decision. *Id.* at 60–61 (citing Ex. 2001 (statistics indicating about 25 months to trial); Ex. 2002 (statistics indicating about 26 months to trial); Ex. 2005).

Petitioner acknowledges the scheduled February 2, 2026, trial date, but argues it is likely to be postponed in view of the evidence indicating the median time to trial in the Western District of Texas district courts is 853 days (or about 28 months, which would put the trial in July 2026, by our calculations). Pet. 11 (citing Ex. 1011; Ex. 1014; Ex. 1015).

Under this factor, “[i]f the court’s trial date is earlier than the projected statutory deadline, the Board generally has weighed this fact in favor of exercising authority to deny institution.” *Fintiv*, Paper 11 at 9. Here, trial is currently scheduled for February 2, 2026, which is before a final written decision could be expected in this proceeding. Ex. 1014, 5. We “may consider any evidence that the parties make of record that bears on the proximity of the district court’s trial date . . . , including *median time-to-trial statistics for civil actions in the district court* in which the parallel litigation resides.” Guidance on USPTO’s rescission of “Interim Procedure for Discretionary Denials in AIA Post-Grant Proceedings with Parallel District Court Litigation,” issued on March 24, 2025, by Chief Administrative Patent Judge Scott R. Boalick of the United States Patent and

Trademark Office, 3 (emphasis added) (“Guidance Memo”).⁷ Patent Owner identifies that its time-to-trial statistics represent data concerning the court presiding over the parallel proceeding, and Petitioner’s statistics more generally relate to the entire district; on this, we agree with Patent Owner that its evidence is slightly more persuasive in view of Chief Judge Boalick’s guidance.

We determine that evidence of a scheduled trial date and evidence suggesting a projected trial date no later than April (or May) 2026, based on a median time-to-trial for civil trials before this particular district court, each of which is before the *projected* June 2026 statutory deadline for a final written decision in this proceeding, support that the district court may complete its trial before we render a final decision on patentability here.

Accordingly, this factor weighs in favor of our exercising discretion to deny institution.

3. Factor 3: investment in the parallel proceeding by the court and the parties

Patent Owner contends that there has been significant investment by the Court and parties in the related district court proceeding in the form of infringement and invalidity contentions, claim construction briefing and a hearing, including Court-issued preliminary claim constructions, briefing for and an order on a motion to stay, and ongoing fact discovery. Prelim. Resp. 61–63 (citing Ex. 1014; Exs. 2003–2019).

⁷ Available at www.uspto.gov/sites/default/files/documents/guidance_memo_on_interim_procedure_recission_20250324.pdf.

In contrast, Petitioner argues that, as of the filing of the Petition, “[t]he district court case is in the early stages. Fact and expert discovery are not open and *Markman* briefing has not begun.” Pet. 11–12.

Petitioner’s argument is, based on the current stage of the proceeding, not correct. *See, e.g.*, Ex. 2005.

Again, Patent Owner asserts evidence of an order denying a motion to stay, but the cited evidence does not support the assertion *at the specific parts cited*. *See* Ex. 2005, 8–9 (docket entries 33, 40, and 47 showing a motion to stay was filed and opposed, but not showing an order thereon). As noted above, we have looked further into the cited exhibit and found docket entry 57, which does identify that the Petitioner’s/Defendant’s motion to stay was, in fact, denied by “text order.” Ex. 2005, 10. The errors in citation aside, Patent Owner’s evidence shows not-insignificant investment by the district court (and parties) in the related proceeding, including some claim construction, but not a “final” order thereon (at least not one identified by Patent Owner). *See Fintiv*, Paper 11 at 10 (“If, at the time of the institution decision, the district court has not issued orders related to the patent at issue in the petition, this fact weighs against exercising discretion to deny institution”). Indeed, it is clear that substantial work has been expended, but substantial work also remains to be expended in the parallel proceeding, including fact discovery, expert discovery, dispositive motion practice, and all effort related to advancing to trial. Ex. 2001, 3–4.

The facts here are not dissimilar from those in two of the Board’s informative decisions, which concluded that this *Fintiv* factor weighs marginally in favor of exercising discretion to deny. *See Sand Revolution II, LLC v. Continental Intermodal Group – Trucking LLC*, IPR2019-01393,

Paper 24 at 10–11 (PTAB June 16, 2020) (informative) (“*Sand Revolution*”) (finding that *Fintiv* factor 3 “weighs only marginally, if at all” toward discretionary denial even though district court had held a *Markman* hearing and construed the claims, because “much of the district court’s investment relates to ancillary matters untethered to the validity issue itself” and “much work remains in the district court case as it relates to invalidity”); *Fintiv II*, Paper 15 at 14 (explaining “that much work remains in this case as it relates to invalidity: fact discovery is in its early stages, with document production ongoing and depositions just getting underway, expert reports are not yet due, and substantive motion practice is yet to come”).

Based on the level of investment and effort already expended on claim construction and invalidity contentions in the parallel proceeding, and considering that much work remains as it relates to invalidity, on this record this factor marginally favors denial.

4. Factor 4: overlap between issues raised in the petition and in the parallel proceeding

Patent Owner contends that factor 4 weighs in favor of discretionary denial because there is complete overlap between the Petition and the parallel proceeding because the same invalidity grounds are raised in the latter as the unpatentability grounds in this proceeding. Prelim. Resp. 63–64 (citing Ex. 2006, 7, 45–99). Patent Owner concedes that Petitioner has filed a “*Sotera*-type stipulation in this matter,” but argues even that is not compelling because the Office has reduced the importance of such stipulations in a *Fintiv* analysis, and because there would nevertheless remain allegations in the district court that the claims are invalid over product prior art (“*CarnoJet*”) that embodies the published prior art (Best-2012) asserted here. *Id.*; see also *Sotera Wireless, Inc. v. Masimo Corp.*,

IPR2020-01019, Paper 12 at 18–19 (P.T.A.B. Dec. 1, 2020) (precedential as to § II.A)).

“Petitioner has voluntarily stipulated ‘that if the PTAB institutes IPR2024-00196, GRC agrees not to pursue any grounds raised in the petition, or any grounds GRC could have reasonably raised in the petition, in [the] district court litigation or any parallel proceeding.’ (Ex-1016.)”

Exhibit 1016 is a *Sotera*-type stipulation, as acknowledged by Patent Owner.

Under our current guidance, the filing of a *Sotera*-type stipulation is not conclusive, but remains “highly relevant” and will be considered “as part of [our] holistic analysis” here. *See* Guidance Memo.

Whether Petitioner has other bases for invalidating the ’457 patent, such as the CarnoJet prior art product identified in the district court, is not a consideration here if such bases could not be asserted in this proceeding (and are not being used to argue over the asserted prior art here as a loop hole from the stipulation, of which there is no evidence).

This proceeding is distinguished from *Motorola Solutions, Inc. v. Stellar, LLC*, IPR2024-01205 (and related proceedings), Paper 19 (PTAB, March 28, 2025), where the Office’s Acting Director granted director review, vacated a grant of institution, and denied institution based on a *Fintiv* analysis, in particular, finding that the *Sotera*-type stipulation in that case did not sufficiently mitigate a potential overlap in issues before PTAB and the district court because the district court defendant’s invalidity contentions asserted the *combination* of a prior art *system* and the prior art

publications *asserted* in the IPRs, which the stipulation did not moot.⁸ Unlike in *Motorola*, there is no evidence that the asserted prior art here is also asserted in the district court in combination with the CarnoJet product. *See* Ex. 2006; *see also* Prelim. Resp. 64 (Patent Owner alleging only that the CarnoJet is listed as prior art and *is* Petitioner’s cooling system (as is Best-2012), without indicating how Petitioner intends to assert the product prior art).

Accordingly, we find this factor weighs highly in favor of not exercising our discretion to deny institution.

5. Factor 5: whether the petitioner and the defendant in the parallel proceeding are the same party

Petitioner and Patent Owner acknowledge that the parties are the same in this proceeding and in the parallel proceeding. Prelim. Resp. 64 (citing Ex. 1012); Pet. 12. Patent Owner argues this weighs in favor of denial and Petitioner argues it is neutral. Prelim. Resp. 64; Pet. 12 (citing *Snap, Inc. v. SKR Technology LLC*, IPR2020-00820, Paper 15 (PTAB Oct. 21, 2020)).

Because Petitioner and the defendant in the parallel proceeding are the same party, this factor weighs in favor of discretionary denial. *See Fintiv II*, Paper 15 at 15 (“[b]ecause the petitioner and the defendant in the parallel proceeding are the same party, this factor weighs in favor of discretionary denial”). The facts here are different than in the *Snap, Inc. inter partes*

⁸ The Acting Director also found that the PTAB panel in *Motorola* had discounted the parties’/court’s investment in the parallel proceeding under *Fintiv* factor 3, which we have not. *See supra* Section II.A.3 (finding such investment marginally favors denial). Moreover, the Acting Director also found in *Motorola* that “the Petition [was] deficient and non-meritorious for numerous reasons,” but this is not the fact pattern presented here. *See infra* Section II.A.6 and Section II.F.

review cited by Petitioner because, there, the district court had stayed the case at the time of the Board’s institution decision, making any overlap in the parties moot.

6. Factor 6: other circumstances that impact the Board’s exercise of discretion

The final factor takes into account other circumstances that may bear on the decision to exercise discretion to deny institution, such as the merits of the patentability challenges. *Fintiv*, Paper 11 at 14–16. “For example, if the merits of a ground raised in the petition seem particularly strong on the preliminary record, this fact has favored institution.” *Id.* at 14–15.

Patent Owner contends that its merits arguments show “the Petition is deficient and non-meritorious for numerous reasons.” Prelim. Resp. 65.

On the other hand, Petitioner argues that “the compelling merits of the challenge presented herein [in its Petition] warrant institution.” Pet. 12–13.

Considering the record before us, wholistically “as part of a ‘balanced assessment of all relevant circumstances of the case, including the merits,’” we find that, the facts weigh against discretionarily denying institution under this factor. *Fintiv*, Paper 11 at 5, 14–16 (quoting TPG at 58, and discussing relevant considerations).⁹ For example, there is no evidence that the validity or patentability of the challenged patent claims has been previously adjudicated, the unpatentability challenge presented in the Petition is reasonable and “sufficiently strong” on the merits to overcome the threshold for institution (*see infra* Section II.F; *see also Comcast Cable Commc’ns.*,

⁹ Board’s Consolidated Trial Practice Guide (TPG), 84 Fed. Reg. 64,280, (Nov. 2019), *available at* www.uspto.gov/TrialPracticeGuideConsolidated. Familiarity with the Trial Practice Guide is expected.

LLC v. Rovi Guides, Inc., IPR2019-00231, Paper 14 at 11 (PTAB May 20, 2019) (cited in *Fintiv*, Paper 11 at 15 n.29), Petitioner does not rely on expert testimony in an unusual or excessive way or to fill gaps in the asserted prior art's teachings (*see infra* Section II.F), there is no evidence that the claims have been in force for so long without challenge so as to create some settled expectation of validity, and there is no evidence of some other compelling interest that would support denying the Petition. As discussed below, we find that Petitioner has sufficiently established a likelihood of showing at trial that at least one claim is unpatentable as alleged.

Based on the record, we find this factor weighs in favor of institution.

7. Balancing the *Fintiv* Factors

Each of Factors 2, 3, and 5 weighs, to some degree (e.g., factor 2 more strongly and factors 3 and 5 to a lesser degree), in favor of exercising our discretion to deny institution. But, on balance, these do not outweigh the other *Fintiv* Factors weighing in favor, strongly or marginally, of *not* exercising our discretion to deny, particularly given the “highly relevant” filing of a *Sotera*-type stipulation considered under Factor 4, the possibility (at least the expected consideration) of a stay by the District Court considered under Factor 1, and the other relevant circumstances of the case considered under Factor 6. Thus, considering all of the factors holistically, we find, on balance, that the factors on this record do not weigh in favor of discretionary denial of the Petition. Accordingly, we decline to deny institution under 35 U.S.C. § 314(a).

B. LEGAL STANDARDS CONCERNING PATENTABILITY

“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*, 815 F.3d at 1363 (citing 35 U.S.C. § 312(a)(3) (requiring *inter partes* review petitions to identify “with particularity . . . the evidence that supports the grounds for the challenge to each claim”)). This burden of persuasion never shifts to Patent Owner. *See Dynamic Drinkware, LLC v. Nat’l Graphics, Inc.*, 800 F.3d 1375, 1378 (Fed. Cir. 2015) (discussing the burden of proof in *inter partes* review).

An *inter partes* review may be instituted if the information presented by a petitioner in the petition, in view of the patent owner’s preliminary response and the preliminary record, shows that there is a reasonable likelihood that the petitioner would prevail with respect to at least one of the claims challenged in the petition. 35 U.S.C. § 314.

The Supreme Court in *KSR International Co. v. Teleflex Inc.*, 550 U.S. 398 (2007), reaffirmed the framework for determining obviousness set forth in *Graham v. John Deere Co.*, 383 U.S. 1 (1966). The *KSR* Court summarized the four factual inquiries set forth in *Graham* (383 U.S. at 17–18) that are applied in determining whether a claim is unpatentable as obvious under 35 U.S.C. § 103(a) as follows: (1) determining the scope and content of the prior art; (2) ascertaining the differences between the prior art and the claims at issue; (3) resolving the level of ordinary skill in the art;¹⁰

¹⁰ *See infra* Section II.C.

and (4) considering objective evidence indicating obviousness or non-obviousness.¹¹ *KSR*, 550 U.S. at 406.

“The combination of familiar elements according to known methods is likely to be obvious when it does no more than yield predictable results.” *Id.* at 416. “[W]hen the question is whether a patent claiming the combination of elements of prior art is obvious,” the answer depends on “whether the improvement is more than the predictable use of prior art elements according to their established functions.” *Id.* at 417.

C. ORDINARY LEVEL OF SKILL IN THE ART

Petitioner contends:

A POSITA^[12] in the field of the '457 patent at the time of the earliest possible effective filing date (December 14, 2012) would have had Bachelor of Science degree in mechanical or chemical engineering and at least two years of experience relating to the design and/or implementation of fluid circulation systems involving application of fluid dynamics and heat transfer principles. Additional education may serve as a substitute for a lack of experience and vice versa. (Ex-1003-Dahm at ¶¶36-41, 63-70.)

Pet. 18–19. Patent Owner applies this same definition. Prelim. Resp. 6–7.

At this stage of the proceeding, we accept and use Petitioner’s proposed and unopposed definition of the ordinarily skilled artisan. It appears that Petitioner’s proposed definition comports with the level of skill in the art reflected in the prior art of record and the '457 patent, itself. *See Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001) (“the prior art

¹¹ At this stage of the proceeding, there is no evidence of objective indicia of obviousness or non-obviousness.

¹² The parties use the acronym POSITA to reference the person of ordinary skill in the art (or ordinarily skilled artisan).

itself [may] reflect[] an appropriate level” as evidence of the ordinary level of skill in the art) (quoting *Litton Indus. Prods., Inc. v. Solid State Sys. Corp.*, 755 F.2d 158, 163 (Fed. Cir. 1985)).

D. CLAIM CONSTRUCTION

Our claim construction positions herein are preliminary. Further argument by the parties is permitted.

The Board interprets claim terms in an *inter partes* review using the same claim construction standard that is used to construe patent claims in a civil action in federal district court. 37 C.F.R. § 42.100(b). In construing claims, district courts and the Board here, by default, give claim terms their ordinary and customary meaning, which is “the meaning that the term would have to 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).

Should claim terms require express construction, sources for claim interpretation include “the words of the claims themselves, the remainder of the specification, the prosecution history [i.e., the intrinsic evidence], and extrinsic evidence concerning relevant scientific principles, the meaning of technical terms, and the state of the art.” *Id.* at 1314 (quoting *Innova/Pure Water, Inc. v. Safari Water Filtration Sys., Inc.*, 381 F.3d 1111, 1116 (Fed. Cir. 2004)). “[T]he claims themselves [may] provide substantial guidance as to the meaning of particular claim terms.” *Id.* However, the claims “do not stand alone,” but are part of “‘a fully integrated written instrument’ . . . consisting principally of a specification that concludes with the claims,” and, therefore, the claims are “read in view of the specification.” *Id.* at 1315 (quoting *Markman v. Westview Instruments, Inc.*, 52 F.3d 967, 978–79 (Fed.

Cir. 1995) (en banc)). Any special definition for a claim term must be set forth in the specification “with reasonable clarity, deliberateness, and precision.” *In re Paulsen*, 30 F.3d 1475, 1480 (Fed. Cir. 1994). Without such a special definition, however, limitations may not be read from the specification into the claims. *In re Van Geuns*, 988 F.2d 1181, 1184 (Fed. Cir. 1993).

“[W]e need only construe terms ‘that are in controversy, and only to the extent necessary to resolve the controversy.’” *Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017) (quoting *Vivid Techs., Inc. v. Am. Sci. & Eng’g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999)).

Petitioner brings to our attention the claim language “a weir, integrated into the long wall of the tank adjacent all appliance slots,” “a weir... having an overflow lip,” and “adapted to facilitate substantial uniform recovery,” regarding claim construction in this proceeding, but does not argue that any specific interpretations are required. Pet. 19–23. Petitioner also identifies, but again takes no express position on their meaning here, claim terms “weir” and “plenum,” as having meanings agreed-to by the parties in “prior litigation.” *Id.* at 19.

Patent Owner identifies that, in related district court litigations, the courts construed “plenum” and “weir,” but, like Petitioner, does not otherwise argue that any claim language should be expressly construed here. Prelim. Resp. 7–8.

We address these claim terms below.

1. “weir”

The term “weir” is recited in each of the independent claims. Ex. 1001, 9:33–12:20 (claims). Petitioner does not expressly advocate for a construction of the term “weir,” but identifies that, in a district court proceeding, Patent Owner and a third-party defendant agreed that the term means “an overflow structure or barrier that determines the level of a liquid.” Pet. 19.

Patent Owner also identifies this agreed upon meaning in a district court proceeding, but further states that in the parallel district court proceeding involving the parties here, the court construed “weir” to mean “an overflow structure or barrier that a liquid flows over”; however, again, Patent Owner does not advocate for any specific construction of the term. Prelim. Resp. 7 (citing Ex. 1010, 26; Ex. 2001, 1; Ex. 2004, 3–4, 23).

Although either of the district court proceedings’ definitions of the term “weir” appears to accurately describe the feature, at this stage of the proceeding, we do not find it necessary to expressly interpret this claim language.

2. “plenum”

The term “plenum” is recited in each of the independent claims. Ex. 1001, 9:33–12:20 (claims). Petitioner does not expressly advocate for a construction of the term “plenum,” but identifies that, in a district court proceeding, Patent Owner and a third-party defendant agreed that the term means “a structure for dispensing liquid.” Pet. 19.

Patent Owner also identifies, without advocating for an express construction of the term, that it was agreed-to in the same district court proceeding with the third party, and also in the district court proceeding

between the parties here, that this was the meaning of “plenum.” Prelim. Resp. 7 (citing Ex. 1010, 26; Ex. 2003, 1; Ex. 2004, 3–4, 23; Ex. 2021, 1).

Although the district court proceedings’ definition of the term “plenum” appears to accurately describe the feature, at this stage of the proceeding, we find it unnecessary to expressly interpret this claim language.

3. “a weir, integrated horizontally into the long wall of the tank adjacent all appliance slots”

The phrase “a weir, integrated horizontally into the long wall of the tank adjacent all appliance slots,” is a part of all claims based on being recited by the independent claims. Ex. 1001, 9:33–12:20 (claims).

Petitioner asserts that there is some discord between how the Office during prosecution and Patent Owner before the Board have interpreted this claim language. Pet. 20–21. Petitioner identifies that in the former interpretation during prosecution of the ’457 patent, the Examiner found and Patent Owner did not dispute that the phrase “adjacent all appliance slots” referred to *the long wall of the tank being adjacent all appliance slots*; hence, the claimed weir was *in* such a wall. *Id.* (citing Ex. 1002, 437). In the latter interpretation before the Board, Patent Owner argued that it is the recited *weir that extends* along the length of the tank *and* is adjacent to all the appliance slots. *Id.* (citing Ex. 1010, 4). Thus, the conflict appears to be whether the weir must be present where the appliance slots are provided.

Petitioner asserts it here applies the second of these two options, i.e., Patent Owner’s previously asserted definition that it is *the weir that must extend* along the long wall of the tank so that *the weir is adjacent* all appliance slots, but that the resultant patentability conclusions here would not change under either interpretation. *Id.* (citing Ex. 1003 ¶¶ 73–75).

Patent Owner takes no express position on the interpretation of this claim language in its claim construction section of the Preliminary Response, but does assert later that it is the weir that is adjacent all appliance slots without providing a supporting argument or evidence on claim construction. *See* Prelim. Resp. 7–8; *see also id.* at 34–36 (asserting Petitioner has conceded a meaning).

Upon reviewing the intrinsic record, we find that during prosecution of the '457 patent the Examiner stated: “Applicant’s arguments that the ‘weir’ in the prior art does not lie adjacent ‘all appliance slots’ the examiner believes that grammatically, the phrase ‘adjacent all appliance slots’, as presently claimed modifies ‘the long wall of the tank’ and not the weir.” Ex. 1002, 437. In the subsequent prosecution events, including the immediately following preliminary amendment (accompanying an RCE) amending the claims, but not modifying the “weir” limitation, Patent Owner never contested the Examiner’s interpretation of this claim language finding the plain language of the claims, on its face and grammatically, required that it is the recited long wall and not the recited weir that must be adjacent all appliance slots. *Id.* at 468, 474–75.

Grammar is important in claim construction and, absent evidence to the contrary, can dictate the meaning of claim language. *SuperGuide Corp. v. DirecTV Enterprises, Inc.*, 358 F.3d 870, 884–88 (Fed. Cir. 2004). At this stage of the proceeding, considering the intrinsic record, we maintain the Office’s interpretation of this claim language, which was that, grammatically, the phrase at issue means that the weir is integrated horizontally into the long wall of the tank, and that long wall is adjacent the appliance slots.

If there is evidence to support a different construction of this claim language, the parties may address it at trial in a designated claim construction section of their briefs.

4. “a weir . . . having an overflow lip”

The phrase “a weir . . . having an overflow lip” is a part of claims 1–10. Ex. 1001, 9:33–12:20 (claims).

Petitioner asserts this language means that the recited “weir” has a “bottom surface of [its] opening,” which is its “overflow lip.” Pet. 21–22 (citing Ex. 1001, 4:27–32, Figs. 5, 6; Ex. 1002, 438; Ex. 1003 ¶¶ 76–80; Ex. 1010, 3).

Patent Owner takes no position on the meaning of this claim language. *See generally* Prelim. Resp.

Although Petitioner’s proposed definition of the term appears to accurately describe the feature, at this stage of the proceeding, we find it unnecessary to expressly interpret this claim language.

5. “adapted to facilitate substantially uniform recovery”

The term “adapted to facilitate substantially uniform recovery” is a part of all claims. Ex. 1001, 9:33–12:20 (claims).

Petitioner alludes to some dispute as to the meaning of this claim language, without providing any specifics. Pet. 23.

Patent Owner takes no position on the meaning of this claim language. *See generally* Prelim. Resp.

At this stage of the proceeding, we find it unnecessary to expressly interpret this claim language.

6. Summary on Claim Construction

At this point, we expressly construe only “a weir, integrated horizontally into the long wall of the tank adjacent all appliance slots,” and only preliminarily so for purposes of rendering this Institution Decision. *See Nidec Motor Corp.*, 868 F.3d at 1017. If either party intends to further argue claim construction at trial, they may, but should do so in a clearly designated section of their briefing so as to expressly identify such arguments. *See, e.g.*, 37 C.F.R. § 42.104(b)(3) (content of petition); *see also* TPG at 44–49 (Claim Construction). Claim construction arguments should not be relegated to patentability arguments on the facts.

E. PETITIONER’S ASSERTED PRIOR ART

We review and summarize the relevant portions of Petitioner’s asserted prior art references below. There is currently no dispute that each constitutes prior art. *See* Prelim. Resp. 8–57.

1. Best-2008 (Ex. 1004)

Best-2008, titled “LIQUID SUBMERGED, HORIZONTAL COMPUTER SERVER RACK AND SYSTEMS AND METHOD OF COOLING SUCH A SERVER RACK,” is the June 9, 2011 publication of U.S. Application 13/057,881, which was filed on August 10, 2009, but indicates priority to U.S. Provisional 61/188,589, which was filed on August 11, 2008. Ex. 1004, codes (21), (22), (54), (60).

Best-2008 discloses that its invention relates to an: “Apparatus, systems, and methods for efficiently cooling computing devices having heat-generating electronic components, such as, for example, independently operable servers, immersed in a dielectric liquid coolant in a tank.” *Id.* at Abstract. Best-2008 discloses several embodiments of tanks and systems for

holding computing devices and circulating dielectric liquid coolant therethrough. *Id.* ¶ 25. Best-2008 states, “the immersion of servers into a liquid coolant within the fixture apparatus various embodiments 400, 500, 600, 700, and 800 of the fixture apparatus shown in FIGS. 3-14 reduces the temperature difference between server electronic components generating heat and the liquid coolant medium used to cool them.” *Id.* ¶ 109. Best-2008 concludes its written description stating:

Although the invention has been described with reference to specific embodiments, these descriptions are not meant to be construed in a limiting sense. Various modifications of the disclosed embodiments, as well as alternative embodiments of the invention will become apparent to persons skilled in the art upon reference to the description of the invention. It should be appreciated by those skilled in the art that the conception and the specific embodiment disclosed may be readily utilized as a basis for modifying or designing other structures for carrying out the same purposes of the present invention.

Id. ¶ 140.

Best-2008 Fig. 6 is reproduced below:

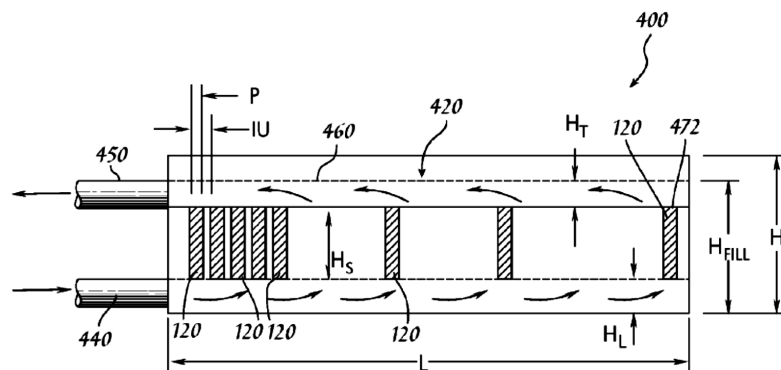


Fig. 6

Fig. 6 shows “a side elevation view of the immersion-cooled rack shown in FIG. 3,” which shows “a perspective view of an exemplary immersion-

cooled rack having a plurality of independently operable servers mounted therein.” *Id.* ¶¶ 36, 39. More specifically, Fig. 6 shows rack apparatus 400, servers 120, tank 410 (not labeled, having length L and height H, with an open top 430, also not labeled), (dielectric) liquid coolant 422 (not labeled, but understood that H_{FILL} refers to the fill height of the liquid coolant), inlet pipe 440, and outlet pipe 450. *Id.* ¶¶ 83–84, 86. Inlet pipe 440 is shown connected to a wall of tank 410 along its bottom and it is connected to a heat exchanger to flow lower temperature or cooled (potentially filtered) liquid coolant into the tank. *Id.* ¶ 84; *see also id.* ¶¶ 65–82, Figs. 1A, 1B, 2. Outlet pipe 450 is shown connected to the same tank wall at its top and is connected to collection piping to flow heated coolant out of the tank to the external heat exchanger. *Id.* Servers 120 are shown as being mounted inside tank 410 orthogonally to its length L (the side of servers 120 is shown).

They are not labeled, but Fig. 6 also includes arrows, which are understood to represent the flow of liquid coolant (*see* reference 560 in Figs. 7 and 8), which is disclosed as flowing along the bottom of the tank and up through the spaces between the servers 120, to collect at “a common manifold area above the server rack 470, such that the flow “through the plurality of servers” is “improved” and “enhanced,” “thereby enhancing the cooling of each respective server.” *Id.* ¶ 86; *see also id.* ¶ 92 (disclosing how coolant flows along the bottom of the tank then to the top of the tank). “This configuration permits the liquid coolant heated by the heat generating components in the servers to naturally rise through the servers and exit through the top or ‘front panel’ of the servers.” *Id.* ¶ 87.

Figure 14 is reproduced below:

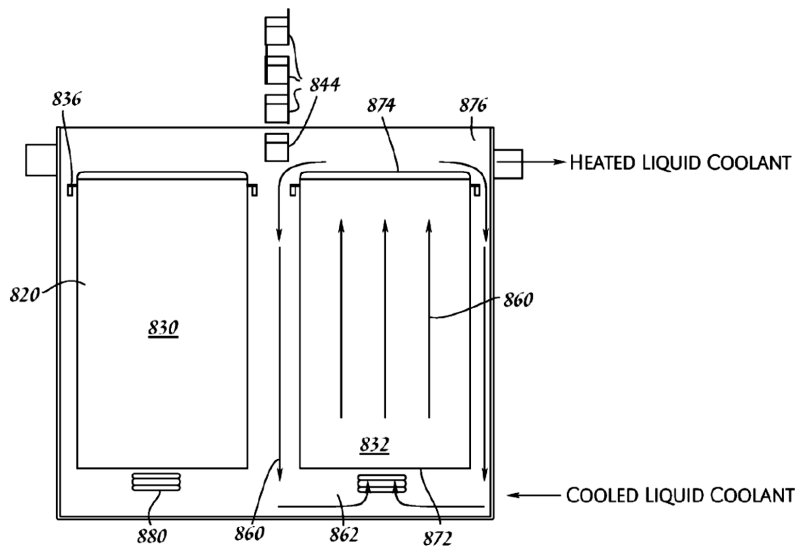


Fig. 14

Fig. 14 shows “another end elevation view of the immersion-cooled server racks of FIG. 11 showing the flow of liquid coolant,” where Fig. 11 shows “a perspective view of side-by-side immersion-cooled racks having a plurality of independently operable servers mounted therein with the electrical connections to the servers shown.” *Id.* ¶¶ 44, 48. More specifically, Fig. 14 shows rack apparatus 800 (not labeled in figure), tank 810 (with open top 812, neither labeled), liquid coolant 822 (not labeled), servers 820 (with tops 874 and bottoms 872) and server racks 830, 832, inlet pipe (identified by “COOLED LIQUID COOLANT” and arrow), outlet pipe (identified by “HEATED LIQUID COOLANT” and arrow), and a coolant fluid flow 860 (arrows). *Id.* ¶¶ 97–108; *see also id.* Fig. 11 (identifying Fig. 14’s unlabeled features).

Best-2008 states, “[t]his configuration permits the liquid coolant heated by the heat generating components in the servers to naturally rise through the servers and exit through the front panel of the servers. Because

the flow is relatively low in comparison to the total volume of the container, the fluid conducts to be relatively uniform temperature.” *Id.* ¶ 104.

Best-2008 explains that the coolant flows 860 (arrows) through servers 820 by entering the tank at the inlet piping at the tank’s bottom, into a volume of coolant 862 at the bottom of the tank, moving up between servers 820 to a top volume of coolant 876 at the top surface 822 (not labeled) near outlet piping at the tank’s top. *Id.* ¶ 108. Best-2008 explains that fluid velocity augmentation devices, such as fans 880 or “nozzles mounted on the end of a line from the cooling inlet piping which may be directed toward the desired entry point of the liquid coolant into the servers to enhance the fluid velocity of the liquid coolant through the servers,” can be provided under the server racks 830, 832 to “improv[e] the flow of the coolant through the plurality of servers.” *Id.* ¶ 107.

2. Osada (Ex. 1005)

Osada, titled “Liquid tank and weir member,” is a Japanese application published on July 3, 2001. Ex. 1005, codes (43), (54).

Osada states that its invention relates to:

a liquid tank that is a liquid tank having one, two, or more overflow boxes in order to force the overflow of impurities that may be suspended in a top layer part of liquid accumulated in the liquid tank along with liquid from a weir part, wherein it is possible to perform stable liquid filtration without causing any marked changes in the liquid amount that may flow into the overflow box over the weir part even if there is vertical variation in the position of the liquid surface in the liquid tank and, furthermore, it is possible to perform efficient liquid filtration by forcing the inflow of not only the floating impurities that can easily float on the liquid surface in the liquid, but also of impurities that may easily float in lower layers, into the overflow box for recovery; and a weir member for the liquid tank.

(MEANS FOR SOLVING) Each liquid tank 11 to 15 has overflow boxes B1 and B2 in order to force the overflow of impurities that may be suspended in the top layer part in the liquid accumulated in each liquid tank along with the liquid from weir parts 21 and 22, and, in the weir parts 21 and 22, overflow notches 20 are formed in top margin part of partition walls w1 and w2 between the overflow box and the liquid tank, or detachable weir members 8 and 8' are provided in which overflow notches 80 are formed.

Id. at Abstract.

Osada discloses liquid tanks having weirs and illustrates both a prior-known “conventional” tank and weir system and what Osada indicates is its inventive tank and notched-weir system. Osada’s Figure 16(A), reproduced below, shows “a conventional example” of a “rectangular” weir:

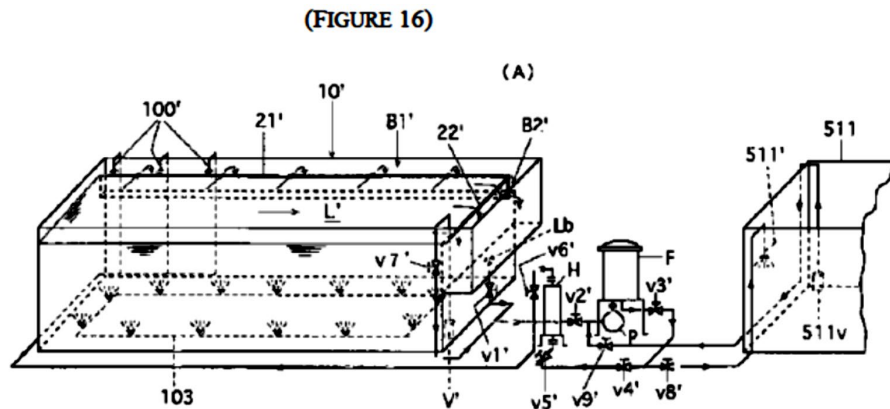
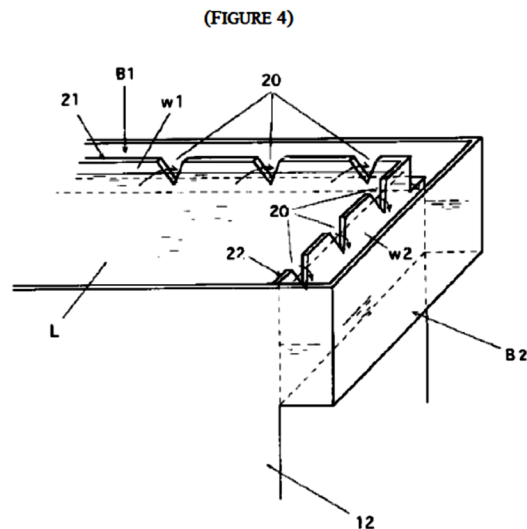


Figure 16(A) shows liquid tank 10' having weirs 21', 22' (and 23', not shown) that flow (indicated by arrows) liquid L' to overflow boxes B1', B2' (another box B3' is provided but not illustrated). *Id.* ¶ 50. Once collected in overflow box B1', liquid L' flows into box B2' and then through flow port Lb in the bottom of Box B2' (or through suction head 106 (not shown)) to filter F, and then to heat exchanger H (for warming liquid), and then to liquid return port 100' leading back to tank 10'. *Id.* ¶¶ 50–54.

Osada discloses that such a conventional, rectangular weir was provided in the art for removing floating impurities from liquid in an associated tank. *Id.* ¶ 10. Such impurities may be introduced from internal sources or by foreign material falling into the liquid. *Id.* ¶ 3. Osada identifies that the conventional weir may be useful for removing impurities floating on top of the liquid, but is not as capable at removing impurities suspended in lower levels of the liquid. *Id.* ¶ 10. Further, Osada identifies that it is possible in a conventional weir for the amount of overflow to increase too rapidly so too much liquid accumulates in the overflow box and directional flow ceases. *Id.* ¶ 6–8.

Osada’s Fig. 4 is reproduced below:



“Figure 4 is a perspective view of one portion of the liquid tank 12.” *Id.* ¶ 37. Fig. 4 shows liquid tank 12 having “one long side” with overflow box B1 along that long side, where tank 12 holds liquid L inside weir 21, which has overflow notches 20 for the flow of liquid L into overflow box B1; there is also weir 22 having overflow notches 20 to flow liquid L into overflow box B2, which is fluidly connected to box B1. *Id.* ¶¶ 38–39, 126–127. The

shape of overflow notches 20, which may be triangular, but need not be, regulates liquid L flow thereover to prevent undesired rapidly increased flow and allows internally suspended particles to pass. *Id.* ¶¶ 128–132.

Osada states:

The number of notches for use in liquid overflow in a single weir part may be established as needed. It is preferable to provide multiple notches over a broad range, and it is even more preferable to provide these notches at uniform spacing to ensure that it is possible to force the flow of all of the floating impurities that are easily suspended on the liquid surface and impurities that are more likely to be suspended in the lower layers into the overflow box over the entirety of the liquid in the liquid tank.

Id. ¶ 18.

3. Best-2012 (Ex. 1006)

Best-2012, titled “HARD DRIVE COOLING FOR FLUID SUBMERSON COOLING SYSTEMS,” is the July 31, 2014 published version of U.S. Application 14/237,100, which was filed August 4, 2012. Ex. 1006, codes (10), (21), (22), (54).

Best-2012 states that its invention relates to:

Hard disk drives and computing systems to which they are connected are cooled by submerging the computing systems into a dielectric liquid coolant in a tank and by thermally coupling the hard disk drives to a heat conductive extension that is partly submerged into the coolant and partly out of the coolant. To keep the hard disks drives out of the coolant, they are mounted to the part of the heat conductive extension that is out of the coolant. In such a configuration, the hard disk drives are cooled through conduction of the heat from the hard disk drive to the coolant via the heat conductive extension. A pump may be used to move warmer coolant from the tank into a heat

exchanger where the coolant is cooled and to move the cooled coolant back into the tank.

Id. at Abstract.

Best-2012 discloses velocity augmentation devices along the length of a pressure manifold 710, and also teaches a suction manifold 720; each of these manifolds is the length of the long side of a coolant tank 600. *Id.* ¶ 70, Fig. 7c. These manifolds provide a flow of coolant in the tank 600. *Id.* ¶ 72.

F. GROUND 1—ALLEGED OBVIOUSNESS OVER BEST-2008
AND OSADA

Under Ground 1, Petitioner asserts that claims 1–16 would have been obvious over the combination of the teachings of Best-2008 and Osada and, therefore, are unpatentable. Pet. 3, 28–73 (citing Ex. 1001, 2:23–27, 2:31–33, 3:56–60, 4:50–61, 6:7–21; Ex. 1003 ¶¶ 99, 105–153, 158–231, 232–263, 269, 278; Ex. 1004 ¶¶ 25–31, 60–127, 131, 136–138, Figs. 1A–17A/B; Ex. 1005 ¶¶ 1–2, 6–7, 10–12, 15, 17–21, 26–27, 31, 47–54, 133, 137–143, Figs. 4, 6(C), 7–8, 16(A); Ex. 1017, 818; Ex. 1019, 11–12; Ex. 1021, 416, 422, 457).

Patent Owner opposes Petitioner’s positions on the merits. Prelim. Resp. 16–39, 44–57 (citing Ex. 1001, 4:11–26, 4:30–33, claims 1, 6, 11, Figs. 7–9; Ex. 1002, 468, 538; Ex. 1003 ¶¶ 75, 77, 128, 132–134, 174–176, 196–198, 264–268; Ex. 1004 ¶¶ 81, 83–84, 86–87, 89–90, 97, 103, 107, 123, 131, Figs. 1–6, 11, 13, 14, 17B; Ex. 1005, Abstract, ¶¶ 1–4, 7–8, 11, 15, 18, 88, Fig. 4; Ex. 2003, 1; Ex. 2004, 4, 23; Ex. 2021, 1).

We summarize and address the parties’ positions below.

1. Petitioner’s Positions

Petitioner asserts that Best-2008 discloses fluid systems and open-topped tanks to hold and circulate dielectric coolant for cooling electrical

components, such as computer servers, and that, *inter alia*, by nature of such tanks being open-topped and exposed to particulates, Best-2008's systems are disclosed as requiring filtration to keep the system working unhindered. Pet. 23–25, 28–31 (citing Ex. 1003 ¶¶ 84–86, 89, 99, 100–113, 116; Ex. 1004 ¶¶ 27–29, 65–67, 69, 80, 83, 91–92, 94, 97, 110, Figs. 1A–6; Ex. 1017–1019). Best-2008 is not specific about how its coolant is filtered. *Id.* at 30–31 (citing Ex. 1003 ¶¶ 115–118; Ex. 1004 ¶¶ 27–29, 69, 80, 83, 92, 114, 126).

Petitioner asserts that Osada discloses using weirs, both conventional-rectangular and improved-notched, in filtering liquid from open-topped tanks, where the liquid overflows a weir, carrying with it particulates, and is then (similar to Best-2008) circulated to a filter and heat exchanger and returned to the tank. *Id.* at 26, 31–35 (citing Ex. 1003 ¶¶ 90–92, 122–131; Ex. 1005, Abstract, ¶¶ 2–3, 6–7, 10–12, 15, 17–21, 50–54, 133, 137–143, Figs. 3, 4, 16A).

Petitioner asserts that the ordinarily skilled artisan would have had reasons to look to Osada's weir systems for Best-2008's unspecified coolant filtration because the Osada and Best-2008 liquid recirculation systems are similar, the Best-2008 fluid outlet pipes are provided in the walls of its tanks, Osada identifies that weirs were already “widely used” for open-topped tanks, and either of Osada's weir styles (conventional or notched) would have been expected to succeed in Best-2008's system. *Id.* at 35–36. Petitioner further asserts that Best-2008's objectives of flowing coolant to efficiently cool a plurality of servers, controlling coolant flow, monitoring and uniformly-maintaining coolant temperature, using vertical coolant flow and convection, and using fluid augmentation devices, would all be

furthered by predictably using Osada's weirs and overflow boxes because Osada teaches or suggests improved fluid flow, liquid temperature uniformity, and upward fluid flow in filtering tank fluid. *Id.* at 36–40 (citing Ex. 1003 ¶¶ 119–153; Ex. 1004 ¶¶ 26–30, 66, 68–70, 73–74, 80–82, 87–88, 98, 102–105, 107, 111, 116, 126–127, Figs. 16, 17A/B; Ex. 1005 ¶ 18, Fig. 16(A); Ex. 1017, 818, Ex. 1019, 11–12; Ex. 1021, 416, 422, 457).

We focus on claim 1 here. Petitioner asserts its preamble (“[a]n appliance immersion cooling system comprising”) is taught by Best-2008 in disclosing systems for cooling servers using a circulating dielectric coolant in a tank. *Id.* at 41 (citing Ex. 1003 ¶¶ 158–160; Ex. 1004 ¶ 25).

Regarding the first clause of claim 1 (“a tank adapted to immerse in a dielectric fluid a plurality of electrical appliances, each in a respective appliance slot distributed vertically along, and extending transverse to, a long wall of the tank, the tank comprising”), Petitioner asserts it is taught by Best-2008 in its disclosing immersing racks of servers vertically in liquid coolant in a tank, the servers arranged and distributed along the long wall of the tank. *Id.* at 41–45 (citing Ex. 1001, 2:23–27 (the '457 patent stating Best-2008 teaches this limitation; Ex. 1003 ¶¶ 161–170; Ex. 1004 ¶¶ 60–120, Figs. 3–15).

Petitioner addresses the next clause of claim 1 (“a weir, integrated horizontally into the long wall of the tank adjacent all appliance slots, having an overflow lip adapted to facilitate substantially uniform recovery of the dielectric fluid flowing through each appliance slot”), asserting it is taught by the combination of Best-2008 and Osada because Best-2008 discloses tanks with fluid outlet pipes in short and/or long walls and the ordinarily skilled artisan would have used Osada's weir, which is provided along the

length of its tanks' long wall, to improve Best-2008's coolant filtration, such that, as coolant flowed over that weir in Best-2008's tank, the coolant would uniformly flow up and through each installed server so the coolant would be of uniform temperature in the tank. *Id.* at 45–49 (citing, *inter alia*, Ex. 1003 ¶¶ 132, 171–181, n.2; Ex. 1004 ¶¶ 84, 86–87, 92, 104, Figs. 3–4, 6; Ex. 1005 ¶¶ 18, Figs. 4, 16(A)). Petitioner asserts that adding Osada's notches adjacent each of Best-2008's appliances would also achieve such coolant flow and uniformity. *Id.* at 48–49 (citing Ex. 1003 ¶¶ 182–185).

Regarding the next clause of claim 1 (“a dielectric fluid recovery reservoir positioned vertically beneath the overflow lip of the weir and adapted to receive the dielectric fluid as it flows over the weir”), Petitioner points to Osada's overflow boxes provided to catch weir overflow. *Id.* at 49–51 (citing Ex. 1003 ¶¶ 150–153, 186–190; Ex. 1005 ¶ 18, Fig. 4).

As to the next clause of claim 1 (“a primary circulation facility adapted to circulate the dielectric fluid through the tank, comprising: a plenum, positioned adjacent the bottom of the tank, adapted to dispense the dielectric fluid substantially uniformly upwardly through each appliance slot”), Petitioner asserts that Best-2008 teaches this in disclosing pumps, heat exchangers, and piping to recirculate dielectric fluid through the tank. *Id.* at 51–52 (citing Ex. 1001, 4:50–61; Ex. 1003 ¶¶ 191–194; Ex. 1004 ¶ 67, Figs. 1A–2). Regarding the recited “plenum” and its features, Petitioner points to two alternative structures disclosed by Best-2008 as teaching it: (1) the inlet pipe and volume of liquid coolant at the bottom of the tank as illustrated by Best-2008's Fig. 6; and (2) mechanical structures below the servers called “fluid velocity augmentation devices,” which can be fans or nozzles (“mounted on the end of a line from the cooling inlet piping which

may be directed toward the desired entry point of the liquid coolant into the servers to enhance the fluid velocity of the liquid coolant through the servers”), as disclosed in Best-2008 at paragraphs 107, 123 (and illustrated at, e.g., Fig. 14). *Id.* at 52–54 (further citing, *inter alia*, Ex. 1003 ¶¶ 195–200, 269, 278; Ex. 1004 ¶ 86).

Regarding the penultimate clause of claim 1 (“a secondary fluid circulation facility adapted to extract heat from the dielectric fluid circulating in the primary circulation facility, and to dissipate to the environment the heat so extracted”), Petitioner point to Best-2008’s heat exchanger and associated cooling apparatus. *Id.* at 54–55 (citing Ex. 1003 ¶¶ 201–205; Ex. 1004 ¶ 67, Figs. 1A–2).

As for claim 1’s final clause (“a control facility adapted to coordinate the operation of the primary and secondary fluid circulation facilities as a function of the temperature of the dielectric fluid in the tank”), Petitioner asserts Best-2008 discloses a controller that coordinates all of its system’s functioning. *Id.* at 55–56 (citing Ex. 1003 ¶¶ 206–211; Ex. 1004 ¶¶ 68, 120–125, 135, Figs. 1A–2, 17B).

Thus, Petitioner has mapped the limitations of independent claim 1 to the teachings of the Best-2008-Osada combination and identified a reason, with rational underpinning, to have made the combination, with a reasonable expectation of success. Petitioner has similarly addressed claims 2–16, but for the purposes of this Institution Decision, we will not review or analyze that portion of the Petition.

2. Patent Owner’s Positions

As indicated above, Patent Owner disputes Petitioner’s assertions of obviousness over Best-2008 and Osada.

Patent Owner first argues that Best-2008 does not teach the claimed plenum, or any plenum. Prelim. Resp. 20–30. Patent Owner’s position is that, if a plenum is a structure for dispensing liquid, what Petitioner identifies as a plenum does not qualify because it is not a structure, but merely a volume inside Best-2008’s tank, pointing to the region of Best-2008’s Fig. 6. *Id.* at 20–25 (citing Ex. 2003, 1; Ex. 2004, 4; Ex. 2021, 1). Patent Owner discusses embodiments described in the ’457 patent relating to a plenum, but does not expressly argue for a claim construction of the term. *Id.* at 21–23 (citing Ex. 1001, 4:11–26, Figs. 7–9). Patent Owner acknowledges that Petitioner’s position on the “plenum” is not limited to Best-2008’s Fig. 6, but also embraces some “mechanical structures,” but argues that Petitioner fails to explain how “fans 880” of Best-2008, which do not dispense liquid, depict a “plenum.” *Id.* at 26–27 (citing Ex. 1004 ¶¶ 86, 107, 123, Figs. 11, 13, 14).

Moreover, Patent Owner argues that, in addition to not disclosing a plenum structure, Best-2008 fails to teach a plenum adapted to dispense dielectric fluid substantially uniformly upwardly through each appliance slot, as claimed. *Id.* at 27–30 (citing Ex. 1003 ¶¶ 196–198; Ex. 1004 ¶ 107, Fig. 6). Patent Owner argues that the arrows in Best-2008’s drawings do not depict uniform flow of coolant, and it could also be concluded that they depict non-uniform flow. *Id.* at 27–29. Patent Owner also argues that the Best-2008 mechanical structures, i.e., fans, disclosed as provided to “increase the mixing of the dielectric liquid coolant” and “improv[e] the flow of the coolant through the plurality of servers,” do not function to flow the coolant uniformly upwardly as claimed. *Id.* at 29–30.

Patent Owner next argues that the combination of Best-2008 and Osada does not teach a weir “adjacent all appliance slots” and “adapted to facilitate uniform recovery of the dielectric fluid through each appliance slot.” *Id.* at –39 (citing Ex. 1001, 4:30–33; Ex. 1002, 468, 538; Ex. 1003 ¶¶ 75, 77, 174–175, 264–265; Ex. 1004 ¶¶ 86–87, 89; Ex. 1005 ¶¶ 1–2, 7, 15, 18, Fig. 4; Ex. 22003, 1; Ex. 2004, 23; Ex. 2021, 1). On this argument, Patent Owner’s points are that: (1) Best-2008 has no weir at all (it has a pipe); (2) Osada has no appliance (server) slots and thus does not teach its weir adjacent to all appliance slots; (3) there would have been no motivation for an ordinarily skilled artisan to incorporate Osada’s weir adjacent all appliance slots in Best-2008; (4) Osada’s notches in its weir do not extend the length of the tank; (5) even if the notches do extend the length of the tank they would not facilitate uniform recovery of dielectric fluid through each appliance slot, but more fluid would flow at the notches; and (6) the enhanced flow of dielectric fluid desired by Best-2008 would not be achieved by Osada’s notches that reduce fluid flow.¹³ *Id.*

Patent Owner also argues that there would not have been motivation, without improper hindsight, to combine the teachings of Best-2008 and Osada. *Id.* at 44–50. Patent Owner argues that Best-2008 does not seek an enhanced way to filter its coolant; it does not desire enhanced filtration, but makes only a single reference to a filter and, optionally, provides a removable top to solve its problems. *Id.* at 46–47 (citing Ex. 1003 ¶¶ 89, 132–134; Ex. 1004 ¶¶ 103). Patent Owner argues that filtration is more

¹³ Patent Owner makes some points in this briefing that appear to relate to claim construction; however, Patent Owner expressed no position on claim construction. *See* Prelim. Resp. 7–8.

important to Osada’s technology, where impurities may build up from processing; thus, Osada’s structure is for a materially different purpose than Best-2008’s tank. *Id.* at 47–48 (citing Ex. 1004 ¶ 81; Ex. 1005 ¶¶ 1–4, 11, 88). Patent Owner argues that Osada’s weirs would not “enhance” Best-2008’s dielectric coolant flow as the latter reference desires, but would do the opposite by reducing flow. *Id.* at 48–50 (Ex. 1005, Abstract, ¶¶ 7–8, 15). Based on this, Patent Owner asserts the only possible reason to combine the references would have been hindsight bias. *Id.* at 50.

Finally, Patent Owner argues that it was improper for Petitioner to merge features from different embodiments disclosed by Best-2008 and Osada to achieve the claimed subject matter. *Id.* at 51–57. Patent Owner argues that even for some single limitations Petitioner combined more than one embodiment from a reference.

3. Analysis

At this stage of the proceeding, based on the current record, we are satisfied that Petitioner has met its burden for institution. No argument by Patent Owner persuades us otherwise. Petitioner has shown that each limitation and element of claim 1 is taught or suggested by the combination of Best-2008 and Osada. Moreover, Petitioner’s asserted reason to combine the references is supported by the references’ disclosures: Best-2008 suggests filtration of its coolant is desirable, but provides no specific means for doing so; Osada teaches a way of filtering fluid from an open-top tank, similar to Best-2008’s.

Regarding Patent Owner’s argument that Petitioner fails to show that the Best-2008-Osada combination teaches a plenum, the argument ignores that Petitioner points to Best-2008’s nozzles (Ex. 1004 ¶¶ 107, 123) as being

a plenum. *See* Pet. 53–54. Nozzles are structures (as compared to an area of the tank below the servers of Fig. 6), and Best-2008 states that such “nozzles [are] mounted on the end of a line from the cooling inlet piping which may be directed toward the desired entry point of the liquid coolant into the servers to enhance the fluid velocity of the liquid coolant through the servers,” which is a structure not unsimilar to the plenum described in the ’457 patent. Ex. 1004 ¶ 107; *compare* Ex 1001, 4:12–26 (describing the plenum as a structure below the appliance slots, fed by inlet piping, with orifices directed to the appliance slots to direct fluid thereto for a uniform flow). Moreover, a nozzle connected to an inlet pipe to spray coolant, according to Best-2008’s disclosure, is “a structure for dispensing liquid,” which is the suggested-but-not-argued meaning of “plenum” according to Patent Owner. *See, e.g.*, Prelim Resp. 7.

As to whether the Best-2008 nozzles would have dispensed coolant “substantially uniformly upwardly through each appliance slot,” it is the repeatedly expressed objective of Best-2008 to enhance the flow of coolant *through its plurality of servers*, at a *uniform* temperature, to cool *each* server, which, on the current record, at least suggests this uniformity of flow and, as the nozzles are disclosed to be below the servers and the coolant exit is at the tank’s top, the flow would be upward. Ex. 1004 ¶¶ 27–29, 86–87, 98, 102, 104, 107, 126; *see also* Ex. 1003 ¶¶ 119, 140, 182, 183, 191, 198. In fact, Best-2008 explains that a reason to configure its tank so coolant enters at the bottom and exits at the top, and for providing fluid velocity augmentation devices like fans and nozzles below the servers, is to enhance/improve coolant flow, homogeneity, and temperature uniformity as it rises through the servers. Ex. 1004 ¶¶ 104, 107–108.

As to Patent Owner’s argument that the Best-2008-Osada combination fails to teach “a weir, integrated horizontally into the long wall of the tank adjacent all appliance slots, having an overflow lip adapted to facilitate substantially uniform recovery of the dielectric fluid flowing through each appliance slot,” we are, at this point, unconvinced by the argument. Patent Owner’s position assumes bodily incorporation of Osada’s teachings into Best-2008, which is not required for obviousness. *Allied Erecting & Dismantling Co., Inc. v. Genesis Attachments, LLC*, 825 F.3d 1373, 1381 (Fed. Cir. 2016). Best-2008 is asserted for teaching the required tank and slots with appliances, needing some type of filtration system, which Osada teaches as a weir (either conventional or notched). *See* Ex. 1004, Figs. 1A and 2 (disclosing a “black box” filter as element 160 and 340). Based on the evidence of record, once Osada’s weir (element 21 of Figs. 4, 16(A)) is incorporated into Best-2008’s tank, just as it is in Osada’s tank, it would be provided at least along the long wall of the tank, which in Best-2008 is adjacent the appliance slots. *See, e.g.*, Ex. 1004, Figs. 3, 6, 11, 14; Ex. 1005, Figs. 4, 16(A).

Moreover, Osada does not expressly state it, but it illustrates what appears to be uniform flow of liquid over its weirs, indicated using arrows, which Dr. Dahm testifies would have been understood to represent uniform flow of the liquid. Ex. 1003 ¶ 177; Ex. 1005, Fig. 16(A). And, as already discussed, an objective of Best-2008 is the enhanced flow of coolant between/through all servers, which would further suggest that any modification to its system would also be directed to, or at least not undermine, such a goal. *See* Ex. 1003 ¶¶ 119–120, 136, 144–149.

As to Patent Owner's arguments that the ordinarily skilled artisan would have had no motivation to combine Best-2008 and Osada as proposed in the Petition, we are not persuaded. Best-2008's systems require filtration, but the reference does not explain what filtration system is used. Osada discloses a similarly configured liquid tank for holding components and liquid and teaches using a weir as part of a filtration system.

The motivation-to-combine analysis is a flexible one. “[A]ny need or problem known in the field of endeavor at the time of invention and addressed by the patent can provide a reason for combining the elements in the manner claimed,” but the “analysis ‘need not seek out precise teachings directed to the specific subject matter of the challenged claim, for a court can take account of the inferences and creative steps that a person of ordinary skill in the art would employ.’”

Intel Corp. v. PACT XXP Schweiz AG, 61 F.4th 1373, 1379–80 (Fed. Cir. 2023) (quoting *KSR*, 550 U.S. at 418, 420 (emphasis added)). On this record, Osada's weirs were a “known technique” to address open-topped tank filtration, which Best-2008 required, and an ordinarily skilled artisan would have recognized that a weir would improve Best-2008's systems similarly to how it improves Osada's systems. *See id.* at 1380. As the disclosures of the prior art references themselves are cited to support the reasons for their combination, at this point, we cannot agree that only hindsight would supply a reason to combine and modify the asserted art.

As to Patent Owner's final argument, that Petitioner's rationale for obviousness draws from and combines elements from too many different embodiments of the references, again we are not persuaded. “Combining two embodiments disclosed adjacent to each other in a prior art reference does not require a leap of inventiveness.” *Boston Scientific Scimed, Inc. v. Cordis Corp.*, 554 F.3d 982, 991 (Fed. Cir. 2009). Also, “in a section 103

inquiry, . . . all disclosures of the prior art, including unpreferred embodiments, must be considered.”” *Merck & Co. Inc. v. Biocraft Labs., Inc.*, 874 F.2d 804, 807 (Fed. Cir. 1989) (quoting *In re Lamberti*, 545 F.2d 747, 750 (CCPA 1976)). Best-2008, itself, urges that the specifics of its embodiments are not limiting and that its embodiments may be modified and altered as would be apparent to the ordinarily skilled artisan. *See* Ex. 1004 ¶ 140.

In view of our preliminary conclusions above, we find that, on the current record, Petitioner has sufficiently mapped the limitations of the claims to the disclosures of Best-2008 and Osada, identified a reason with rational underpinning why the ordinarily skilled artisan would have combined the teachings of the references, and identified that there would have been a reasonable expectation of success. Petitioner has shown under Ground 1 that there is reasonable likelihood that at least one of the ’457 patent’s claims would have been obvious over Best-2008 and Osada.

Although we do not address claims 2–16 here, trial is instituted on all grounds and all claims. Petitioner’s challenges to the patentability of these other claims, as well as claim 1, will be addressed in any final written decision in this proceeding.

G. GROUND 2—ALLEGED OBVIOUSNESS OVER BEST-2008, OSADA, AND BEST-2012

Petitioner also presents Ground 2, alleging obviousness of claims 1–16 over Best-2008, Osada, and Best-2012. Pet. 3, 73–81.

Because we determine that Ground 1, as discussed above, warrants institution, we do not address the merits of this additional ground at this point, but it is included in the instituted review. *See* 37 C.F.R. § 42.108(a). Ground 2 will be addressed in any final decision in this proceeding.

III. CONCLUSION

On the record before us, Petitioner has demonstrated a reasonable likelihood of showing at trial that at least one challenged claim of the '457 patent is unpatentable under at least one ground. Accordingly, we institute an *inter partes* review of the challenged claims of the '457 patent on all grounds alleged by Petitioner. This decision does not reflect a final determination on the patentability of the claims.

ORDER

Accordingly, it is hereby:

ORDERED that, pursuant to 35 U.S.C. § 314, an *inter partes* review of claims 1–16 of the '457 patent, in accordance with each ground of challenge in the Petition, is hereby *instituted*; and

FURTHER ORDERED that, pursuant to 35 U.S.C. § 314(c) and 37 C.F.R. § 42.4(b), *inter partes* review of the '457 patent will commence on the entry date of this Decision, and notice is hereby given of the institution of a trial.

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