

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

COOLER MASTERS CO., LTD.,
Petitioner,

v.

AAVID THERMALLOY LLC,
Patent Owner.

IPR2019-00146
Patent 7,100,679 B2

Before LINDA E. HORNER, KEN B. BARRETT, and
ROBERT A. POLLOCK, *Administrative Patent Judges*.

POLLOCK, *Administrative Patent Judge*.

JUDGMENT
Final Written Decision
Determining No Challenged Claims Unpatentable
35 U.S.C. § 318(a)

Denying and Dismissing-in-Part Patent Owner's
Motion to Exclude Evidence
37 C.F.R. § 42.64

I. INTRODUCTION

This is a Final Written Decision in an *inter partes* review challenging the patentability of claims 1, 2, 4, and 5 of U.S. Patent No. 7,100,679 B2 (“the ’679 patent,” Ex. 1001). We have jurisdiction under 35 U.S.C. § 6.

Petitioner has the burden of proving unpatentability of a claim by a preponderance of the evidence. 35 U.S.C. § 316(e) (2012). Having reviewed the arguments of the parties and the supporting evidence, we find that Petitioner has not demonstrated by a preponderance of the evidence that any of claims 1, 2, 4, and 5 are unpatentable.

A. Procedural History

Cooler Master Co., Ltd. (“Petitioner”)¹ filed a Petition for an *inter partes* review of claims 1, 2, 4, and 5 of the ’679 patent. Paper 2 (“Pet.”). Aavid Thermalloy LLC (“Patent Owner”)² timely filed a Preliminary Response to the Petition. Paper 8 (“Prelim. Resp.”). Patent Owner also filed an unopposed “Motion & Certification under 37 C.F.R. § 42.100(b) Requesting District Court-Type Claim Construction” (Paper 5), which we granted (Paper 7, 3). In view of the then-available record, we concluded that Petitioner satisfied the burden, under 35 U.S.C. § 314(a), to show that there was a reasonable likelihood that Petitioner would prevail with respect to at least one of the challenged claims. Accordingly, on behalf of the Director (37 C.F.R. § 42.4(a) (2018)), and in accordance with *SAS Inst. Inc. v. Iancu*, 138 S. Ct. 1348, 1353 (2018) and the Office’s Guidance on the Impact of

¹ Petitioner identifies itself and CMI USA, Inc., as the real parties in interest. Pet. 1.

² Patent Owner identifies itself as the real party in interest and states that it is “wholly owned by LTI Holdings Inc. (d/b/a Boyd Corporation), which is wholly owned by Basilisk Holdings Inc.” Paper 4, 2.

SAS on AIA Trial Proceedings (Apr. 26, 2018),³ we instituted an *inter partes* review of all the challenged claims, on all the asserted grounds. Paper 9 (“Inst. Dec.”), 21.

After institution, Patent Owner filed a Response. Paper 29 (“PO Resp.”). Petitioner filed a Reply. Paper 35 (“Reply”). Patent Owner filed a Sur-reply. Paper 41 (“Sur-reply”). Patent Owner also filed a motion to exclude Exhibits 1004, 1040, 1041, and certain sections of Exhibit 1039 (Exhibits 3, 4 and attachment 3a). Paper 46. Petitioner opposed that motion (Paper 48), and Patent Owner filed a Reply (Paper 51).

On March 5, 2020, the parties presented arguments at oral hearing, the transcript of which is of record. Paper 54 (“Tr.”).

B. Related Proceedings

The ’679 patent is at issue in *Aavid Thermalloy LLC v. Cooler Master Co.*, Case No. 4:17-cv-05363 (N.D. Cal.). *See* Paper 2, 1; Paper 4, 2.

Petitioner requested *inter partes* review of the ’679 patent or related patents in IPR2019-00144, IPR2019-00145, IPR2019-00147, IPR2019-00333, IPR2019-00334, IPR2019-00337, and IPR2019-00338. The Board instituted each of these *inter partes* reviews, except for IPR2019-00145, IPR2019-00147, and IPR2019-00333.

C. The ’679 Patent

The ’679 patent, titled “Integrated Circuit Heat Pipe Heat Spreader with Through Mounting Holes,” is generally directed to “a heat pipe for cooling an integrated circuit chip” comprising two plates bonded at their edges to form an internal cavity or vapor chamber. *See* Ex. 1001, code (54),

³ <https://www.uspto.gov/patents-application-process/patent-trial-and-appeal-board/trials/guidance-impact-sas-aia-trial>.

1:13–16, 3:31–34. The disclosed heat pipe “has holes through its body to facilitate mounting . . . [and] requires no significant modification of the circuit board or socket because it is held in intimate contact with the integrated circuit chip by conventional screws attached to the integrated circuit mounting board.” *Id.* at 1:60–2:1.

The internal structure of the heat pipe is an evacuated vapor chamber with a limited amount of liquid and includes a pattern of spacers extending between and contacting the two plates or any other boundary structure forming the vapor chamber. The spacers prevent the plates from bowing inward, and therefore maintain the vital flat surface for contact with the integrated circuit chip. These spacers can be solid columns, embossed depressions formed in one of the plates, or a mixture of the two. *Id.* at 2:6–14. The spacers “support the flat plates and prevent them from deflecting inward and distorting the plates to deform the flat surfaces which are required for good heat transfer.” *Id.* at 2:21–24.

The spacers also make it possible to provide holes into and through the vapor chamber, an apparent inconsistency since a heat pipe vacuum chamber is supposed to be vacuum tight. This is accomplished by bonding the spacers, if they are solid, to both plates of the heat pipe, or, if they are embossed in one plate, bonding the portions of the depressions which contact the opposite plate to that opposite plate. With the spacer bonded to one or both plates, a through hole can be formed within the spacer and it has no effect on the vacuum integrity of the heat pipe vapor chamber, from which the hole is completely isolated.

Id. at 2:33–43. Figure 1 is reproduced below.

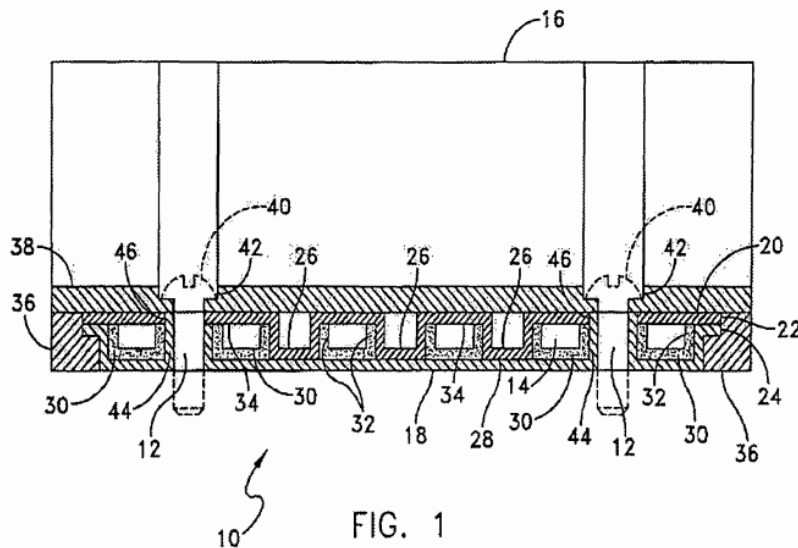


Figure 1 shows “a cross section view of the preferred embodiment of a flat plate heat pipe 10 of the invention with through holes 12 through its vapor chamber 14 and in contact with finned heat sink 16.” *Id.* at 3:25–28. “[H]eat pipe 10 is used to cool an integrated circuit chip (not shown) which is held against contact plate 18.” *Id.* at 4:12–13. “Heat pipe 10 is constructed by forming a boundary structure by sealing together two formed plates, contact plate 18 and cover plate 20. Contact plate 18 and cover plate 20 are sealed together at their peripheral lips 22 and 24 by conventional means, such as soldering or brazing.” *Id.* at 3:29–33.

The entire assembly of heat pipe 10, frame 34, and fin plate 38 is held together and contact plate 18 is held against an integrated circuit chip by conventional screws 40, shown in dashed lines, which are placed in holes 42 in fin plate 38 and through holes 12 in heat pipe 10.

Id. at 4:15–20.

Holes 12 penetrate heat pipe 10 without destroying its vacuum integrity because of their unique location. Holes 12 are located within sealed structures such as solid columns 44, and since columns 44 are bonded to cover plate 20 at locations 46,

holes 12 passing through the interior of columns 44 have no affect [sic] on the interior of heat pipe 10.

Id. at 4:22–27.

In addition to this preferred embodiment, the Specification describes an alternate embodiment. *Id.* at 2:41–53.

This [alternate] embodiment forms the through holes in the solid boundary structure around the outside edges of the two plates. This region of the heat pipe is by its basic function already sealed off from the vapor chamber by the bond between the two plates, and the only additional requirement for forming a through hole within it is that the width of the bonded region be larger than the diameter of the hole.

Id. at 2:44–51. The Specification explains that “with the holes located in the peripheral lips, the heat pipe boundary structure can be any shape.” *Id.* at 2:51–53.

Figure 2 of the '679 patent is reproduced below.

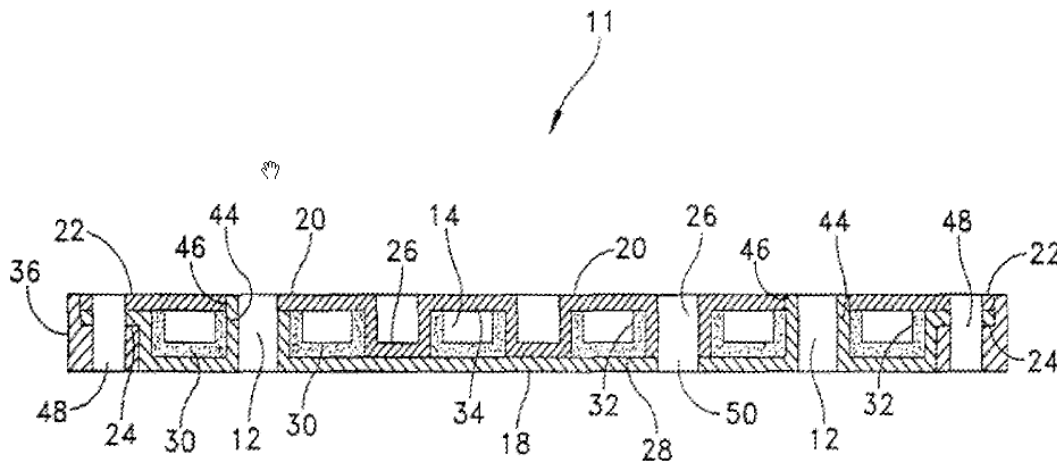


Figure 2 “is a cross section view of an alternate embodiment of the flat plate heat pipe 11 of the invention with through holes 48 located within peripheral lips 22 and 24 of the heat pipe and hole 50 shown in another sealed structure, one of the depressions 26.” *Id.* at 4:39–43. “Of course, the region of the peripheral edges is also a sealed structure since bonding between lips

22 and 24 is inherent because heat pipe 11 must be sealed at its edges to isolate the interior from the outside atmosphere.” *Id.* at 4:46–50.

D. Challenged Claims

Petitioner challenges claims 1, 2, 4, and 5 of the ’679 patent, of which only claim 1 is independent. Claim 1 recites:

1. A heat pipe for spreading heat comprising:
 - a boundary structure including spaced-apart first and second plates that define an enclosed vapor chamber, and at least one spacer positioned within said vapor chamber and extending between and contacting said first and second plates;
 - a depression formed in said first plate which projects into said vapor chamber and is bonded to said second plate; and
 - an opening defined through said depression and said second plate wherein said opening is isolated from said vapor chamber.

The remaining claims before us further relate to “a wick” positioned upon a depression within the vapor chamber (claim 2), a depression having “an annular outer surface that is bonded to a corresponding annular edge surface” in the second plate (claim 4), and “a peripheral lip located at an edge of said boundary structure” (claim 5).

E. Asserted Grounds of Unpatentability

Petitioner asserts two grounds of unpatentability (Pet. 5):⁴

Ground	Claim(s) Challenged	35 U.S.C. §	Reference(s)/Basis
1	1, 2, 4, 5	103(a) ⁵	Nakamura ⁶
2	1, 2, 4, 5	103(a)	Nakamura, Takahashi ⁷

In support of its patentability challenges, Petitioner relies on, *inter alia*, the Declaration of Dr. Himanshu Pokharna (Ex. 1002), the Supplemental Declaration of Dr. Himanshu Pokharna (Ex. 1032), the Declaration of Sylvia D. Hall-Ellis, Ph.D. (Ex. 1039), and the Declaration of Takao Miyano (Ex. 1044).

In opposing these challenges, Patent Owner relies on, *inter alia*, the Declaration of Amir Faghri, Ph.D. (Ex. 2002). Patent Owner also provides an independent certified translation of Nakamura, a translation of Nakamura relied on by Petitioner in the related district court litigation, and two machine translations of Nakamura. Exs. 2012–2015.

⁴ Petitioner’s brief reference to Ground 3 appears to be a typographical error. *See* Reply 21 n.9.

⁵ The Leahy-Smith America Invents Act (“AIA”), Pub. L. No. 112-29, 125 Stat. 284, 287–88 (2011), amended 35 U.S.C. § 103, effective March 16, 2013. Because the application from which the ’679 patent issued was filed before this date, the pre-AIA version of § 103 applies.

⁶ Japanese Unexamined Utility Model Application S50-55262; Year of publication: 1975; Inventor: Kazuo Nakamura (as translated). Ex. 1004 (includes the original Japanese-language publication and English-language translation).

⁷ Japanese Examined Utility Model Application Publication No. H8-10205; Published March 27, 1996; Inventors: Tadahito Takahashi, Kaoru Hasegawa, Muneaki Sokawa (as translated). Ex. 1005.

II. ANALYSIS

A. Principles of Law

“In an [*inter partes* review], the petitioner has the burden from the onset to show with particularity why the patent it challenges is unpatentable.” *Harmonic Inc. v. Avid Tech., Inc.*, 815 F.3d 1356, 1363 (Fed. Cir. 2016) (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). To prevail, Petitioner must establish by a preponderance of the evidence that the challenged claims are unpatentable. 35 U.S.C. § 316(e); 37 C.F.R. § 42.1(d).

A patent claim is unpatentable under 35 U.S.C. § 103(a) if the differences between the claimed subject matter and the prior art are such that the subject matter, as a whole, would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007). The question of obviousness is resolved on the basis of underlying factual determinations including: (1) the scope and content of the prior art; (2) any differences between the claimed subject matter and the prior art; (3) the level of skill in the art; and (4) any objective evidence of non-obviousness, if present.⁸ *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966).

⁸ The parties have not directed our attention to any objective evidence of non-obviousness.

B. Level of Ordinary Skill in the Art

In determining the level of ordinary skill in the art, we consider the “type of problems encountered in the art; prior art solutions to those problems; rapidity with which innovations are made; sophistication of the technology; and educational level of active workers in the field.” *In re GPAC Inc.*, 57 F.3d 1573, 1579 (Fed. Cir. 1995) (internal quotation marks and citation omitted).

Petitioner, relying on Dr. Pokharna’s testimony, asserts that the person of ordinary skill in the art at the time of the invention would have:

earned at least a graduate degree, such as an M.S., Ph.D., or equivalent thereof, in mechanical engineering or a closely-related field and possessed at least three years of specialized experience in designing and developing heat pipes or other heat transfer devices for thermal management in electronics and computer systems.

Pet. 12 (citing Ex. 1002 ¶¶ 8–10).

Relying on Dr. Faghri’s testimony, Patent Owner argues for a lower level of skill in the art than that proposed by Petitioner. PO Resp. 11–12. In particular, Patent Owner disagrees with Petitioner’s requirement for an advanced degree in mechanical engineering or a closely related field as it would, for example, exclude both the named inventors of the ’679 patent as well as “a large majority of active workers in the field at the time of the invention.” *Id.* at 12 (citing Ex. 2002 ¶ 80). Rather, Patent Owner contends that the person of ordinary skill in the art at the time of the invention would have

a Bachelor of Science degree in engineering and at least 3 years of experience working or studying in the field of heat pipes; or an equivalent level of education, training, and work experience.

Id. at 11 (citing Ex. 2002 ¶¶ 77–79).

We determine that the definition offered by Petitioner and Dr. Pokharna comports with the qualifications a person would have needed to understand and implement the teachings of the '679 patent and the prior art of record. *Cf. Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001) (recognizing that the prior art itself may reflect an appropriate level of skill in the art). Moreover, Petitioner concedes that this dispute as to the appropriate level of skill in the art “is immaterial because the challenged claims are invalid under both sides’ definitions.” Reply 1 n.2. We agree with Petitioner that the outcome of this proceeding is not dependent on our application of one party’s definition as compared to the other. Nonetheless, because Petitioner’s and Dr. Pokharna’s definition better reflects the level of ordinary skill in the art, we adopt and apply it here.

C. Claim Construction

1. Introduction

“A party may request [in the form of a motion] a district court-type claim construction approach to be applied if a party certifies that the involved patent will expire within 18 months from the entry of the Notice of Filing Date Accorded to Petition.” 37 C.F.R. § 42.100(b) (2018). In this proceeding, Patent Owner filed such a motion certifying that the '679 patent will expire within 18 months from the entry of the Notice of Filing Date Accorded to Petition, and specifically, no later than May 12, 2019, and requested a district court-type claim construction. Paper 5. Petitioner did not oppose Patent Owner’s motion, which we granted. Paper 7, 3.

In applying a district court-type construction, we generally construe a claim in accordance with the ordinary and customary meaning as understood by a person of ordinary skill in the art when read in the context of the

specification and prosecution history. *See Phillips v. AWH Corp.*, 415 F.3d 1303, 1313 (Fed. Cir. 2005) (en banc). Only those claim terms that are in controversy need to be construed, and only to the extent necessary to resolve the controversy. *Vivid Techs., Inc. v. Am. Sci. & Eng'g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999); *see also Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co. Matal*, 868 F.3d 1013, 1017 (Fed. Cir. 2017) (applying *Vivid Techs.* in the context of an *inter partes* review).

Petitioner initially proposed claim constructions for “vapor chamber,” “lip,” and “spacer.” Pet. 13–28. For the purpose of institution, we determined that no term required express construction. Inst. Dec. 10.

In its Response, Patent Owner proposes its own definitions for “vapor chamber,” “lip,” and “spacer. . . extending between and contacting said first and second plates.” PO Resp. 13–26. For the purpose of this Decision, we need only address the meaning of “spacer” as used in the context of independent claim 1.

2. “spacer . . . extending between and contacting said first and second plates”

Claim 1, the only independent claim before us, recites “at least one spacer. . . extending between and contacting said first and second plates.” Patent Owner construes this term as referring to a “structure separate from and in contact with the first and second plates and configured to maintain a space or clearance between the plates.” *See* PO Resp. 26; Ex. 2002 ¶¶ 113–118.

Petitioner, however, argues that we should construe “spacer” as used in claim 1 as an integral or non-integral structure used to maintain a space or clearance between the plates forming a vapor chamber. Pet. 25–26; Reply

14–16 (citing Ex. 1032 ¶¶ 35–37). In support, Petitioner points to the Specification’s teaching that

[t]he internal structure of the heat pipe is an evacuated vapor chamber with a limited amount of liquid and includes a pattern of spacers extending between and contacting the two plates or any other boundary structure forming the vapor chamber. The spacers prevent the plates from bowing inward, and therefore maintain the vital flat surface for contact with the integrated circuit chip. These spacers can be solid columns, embossed depressions formed in one of the plates, or a mixture of the two.

Pet. 26–27 (citing Ex. 1001, 2:6–14); *see* Reply 16 (citing Ex. 1032 ¶¶ 35–37). As interpreted by Petitioner’s expert, Dr. Pokharna, the above passage indicates “that the ‘spacers *extending between and contacting the two plates* ... prevent the plates from bowing inward, and ... can be ... embossed *depressions* formed in one of the plates” Ex. 1002 ¶ 64 (quoting Ex. 1001, 2:6–14). Referencing extrinsic evidence, Petitioner further points to a dictionary definition of spacer as “a device or piece for holding two members at a given distance from each other” and notes that in the present context, “the ‘two members’ . . . are the two plates enclosing the vapor chamber.” Pet. 26 (quoting Ex. 1020; Ex. 1002 ¶ 50).

Petitioner argues that Figures 1 and 2 of the ’679 patent, reproduced above in section I(C), illustrate that the term “spacer” encompasses “structure[s] separate from the plates,” i.e., solid columns, as well as depressions within one (or both) plates. *See* Reply 14–16. Referencing its color-coded and annotated version of Figures 1 and 2, Petitioner argues that they “show both depressions (26-gold) and solid columns (44-red) ‘extend between and contact’” the plates.” *Id.* at 15. Petitioner further reasons that because “the depressions (26-gold) are integral with the first plate, and the solid columns (44-red) are integral with the second plate, . . . the ‘extending

between and contacting’ language when read in light of the specification expressly allows for both integral and non-integral spacers.” *Id.* at 16 (citing, e.g., Ex. 1032 ¶¶ 35–36).

As an initial matter, we agree with Petitioner that a “spacer” as used in the ’679 patent Specification is employed to maintain a space or clearance between the plates forming a vapor chamber. We further agree with Petitioner that the Specification uses the term “spacer” to broadly encompass depressions embossed in and, thus, integral to a plate. However, we do not agree with Petitioner that the Specification describes such an embossed depression, even though it may be considered a “spacer,” as “extending between and contacting” two plates. The following evidence persuades us that the claim language “at least one spacer. . . extending between and contacting said first and second plates” does not include embossed depressions.

First, as Patent Owner points out, in addition to the “*spacer* . . . extending between and contacting said first and second plates,” claim 1 separately recites “*a depression* formed in said first plate,” which projects into said vapor chamber and is bonded to said second plate. PO Resp. 25–26 (emphasis added) (citing *Becton, Dickinson & Co. v. Tyco Healthcare Grp., LP*, 616 F.3d 1249, 1254 (Fed. Cir. 2010) (“Where a claim lists elements separately, the clear implication of the claim language is that those elements are distinct components of the patented invention.”)); *see* Ex. 2002 ¶ 114. Whereas claim 1 requires that a spacer contact *both* the first and second plates, it makes clear (as do claims 4 and 6) that a depression formed in a first plate is bonded to only the opposing plate. *See* Ex. 1001, claim 7 (reciting that a “depression formed in said second plate . . . is in contact with an inner surface of said first plate”). We, thus, infer from the structure of the

'679 patent claims alone that the “at least one spacer” and the “depression” recited in claim 1 are distinct components with distinct properties. In particular, the claimed “*spacer . . . extending between and contacting said first and second plates*” is a distinct element between and in contact with two plates, whereas the claimed “depression” is a part of one plate that contacts, or is bonded to, an opposing plate.

We also credit Dr. Faghri’s opinion that one of ordinary skill in the art would not read column 2, lines 6–14 of the Specification as supporting Petitioner’s construction. *See* Ex. 2002 ¶¶ 114–116 (cited at PO Resp. 26). Referencing Dr. Pokharna’s interpretation of that passage, Dr. Faghri testifies:

Petitioner’s expert conflates the first sentence of the above-quoted paragraph with the last sentence, stating that the challenged patents “acknowledge[] that the ‘spacers *extending between and contacting* the two plates . . . prevent the plates from bowing inward and . . . can be . . . embossed *depressions* formed in one of the plates’” *See, e.g., . . .* Ex. 1002 (Pokharna IPR2019-00146 Decl.) ¶¶ 64-65 . . . (ellipses and emphasis in original).

Id. ¶ 116. Instead, Dr. Faghri reasonably opines, and we agree,

when the last sentence of the above-quoted paragraph states that “[t]hese spacers can be solid columns, embossed depressions formed in one of the plates, or a mixture of the two,” it is referring to the preceding sentence and describing examples of structure that can be used to “prevent the plates from bowing inward.” It is not identifying “embossed depressions formed in one of the plates” as “spacers extending between and contacting the two plates.” This is at least because a depression would not be understood to *contact* the plate in which it is formed; otherwise, the word “contacting” becomes meaningless.

Id.

We find persuasive that the Specification indicates that a spacer is bonded to both the first and second plates, but a depression bonds to, or contacts, only one opposing plate. The Specification distinguishes between spacers formed of “solid columns” or “embossed depressions formed in one of the plates.” Ex. 1001, 2:13–14. According to the Specification, certain steps in constructing a vapor chamber “[are] accomplished by bonding the spacers, if they are solid, to both plates of the heat pipe, or, if they are embossed in one plate, bonding the portions of the depressions which contact the opposite plate to that opposite plate.” *Id.* at 2:35–39. Thus, we agree with Patent Owner’s assertion that only the solid type of spacer “would have been understood by a [person of ordinary skill in the art] at the time of the invention as ‘extending between and contacting’ both plates,” as required by claim 1. PO Resp. 26 (citing Ex. 2002 ¶ 117).

Considering the evidence of record, we agree with Patent Owner that “the ‘spacer’ limitation of claim 1 cannot be construed to encompass an ‘embossed depression formed in one of the plates’” because “a depression would not be understood to *contact* the plate in which it is formed; otherwise, the word ‘contacting’ becomes meaningless.” *Id.* (citing Ex. 2002 ¶ 116). As an example, although a spacer formed from an embossed depression in a first plate may contact a second plate, it cannot reasonably “contact[] said first . . . plate” from which it is formed. We also do not discern how an embossed depression could “extend[] between . . . said first and second plates” when it is itself formed from—and contiguous with—one of the plates that it must extend between. To hold otherwise would render the word “between” meaningless.

In view of the above, we adopt Patent Owner’s construction of “spacer . . . extending between and contacting said first and second plates”

as referring to a “structure separate from and in contact with the first and second plates and configured to maintain a space or clearance between the plates.” *See* PO Resp. 26; Ex. 2002 ¶¶ 113–118.⁹

With this claim interpretation in mind, we now examine the grounds asserted in the Petition.

D. Unpatentability over Nakamura Alone (Ground 1) and Nakamura in Combination with Takahashi (Ground 2)

Petitioner challenges claims 1, 2, 4, and 5 as obvious in view of Nakamura alone, and in combination with Takahashi. Pet. 5, 28–54. Patent Owner opposes on the ground that Petitioner has failed to prove Nakamura is prior art, and on the merits of Petitioner’s obviousness assertions. PO Resp. 27–56; Sur-reply 8–24.¹⁰

We have reviewed the evidence of record including the Petition and Petitioner’s expert declarations and Patent Owner’s arguments and evidence, including its experts’ declarations. We address first the threshold issue of whether Nakamura qualifies as prior art with respect to the ’679 patent.

⁹ Petitioner addresses arguments regarding the alternative construction Patent Owner proposed before the district court. *See* Pet. 26–28 (referencing Ex. 1019, 5–6); *id.* at 40–41. Patent Owner does not pursue its earlier construction here, and it is not germane to our analysis. We also note that neither party argues or presents evidence that the district court construed the term ‘spacer’ in the related litigation.

¹⁰ Noting in its Reply that “[c]laims 1, 2, and 4 do not recite a ‘lip’ limitation,” Petitioner states that it “no longer relies on Ground 1 relative to claim 5 for this IPR.” Reply 17–18. But Petitioner does not sufficiently explain its position and we have not been presented with, for example, a motion for partial adverse judgment or a joint motion to withdraw ground 1 from this proceeding or otherwise limit the Petition. Accordingly, we analyze Ground 1 on the full record developed during trial.

1. Status of Nakamura as Prior Art

The '679 patent claims priority through a series of continuation applications first filed on May 12, 1999. Ex. 1001, code (63). Petitioner contends that Nakamura is prior art under 35 U.S.C. § 102(b), asserting that “Nakamura is a ‘Japanese Unexamined Utility Model Application Publication S50-55262 [in the Year] (1975)’ that was filed on September 18, 1973 and published in 1975.” Pet. 28; *see also id.* at iv (Exhibit list stating “Year of Publication: 1975”).

Patent Owner, in the Preliminary Response, argued that Petitioner had failed to establish that Nakamura qualifies as prior art because Petitioner’s English translation of Nakamura adds a parenthetical “(1975)” after the number “S50-55262” where no such parenthetical is included in the original document. Prelim. Resp. 13–14. Patent Owner also argued that Nakamura did not contain indicia, such as INID¹¹ codes, that often qualify a foreign patent application as a “printed publication” and that “[i]f Nakamura had been published, the publication date (among other data) would be provided on the first page of the document, and identified with the appropriate INID code(s).” *Id.* at 6–7, 10–12. Patent Owner further argued that “Nakamura includes no indication that it was indexed in a meaningful way” and “does not identify any date prior to May 12, 1999 on which Nakamura was available to and locatable by the public.” *Id.* at 11, 14.

In the Institution Decision, the Board determined that Petitioner provided enough evidence, including at least the translated version of Nakamura, to make the requisite threshold showing of a reasonable

¹¹ “‘INID’ is an acronym for ‘Internationally agreed Numbers for [the] Identification of (bibliographic) Data.’” Ex. 2001, 1.

likelihood of prevailing on the issue of whether Nakamura is a printed publication. *See* Inst. Dec. 19. The Board noted that the USPTO Manual of Patent Examining Procedure (MPEP) explains that “Japanese patent application publications show the date in Arabic numerals by indicating . . . the year of the reign of the Emperor,” and observed that “[a]dding the year of the Emperor, 1925, to the numeral ‘50’ shown on the original document yields the year 1975, which corresponds to Petitioner’s assertion of a publication date.” *Id.* at 13 (quoting MPEP § 901.05(a) (9th ed. rev. 07.2015 Jan. 2018)). The Board further noted that Patent Owner did not provide citation to any authority for the proposition that a Japanese *unexamined* utility model application like Nakamura, if published, would be formatted with INID codes. *Id.* at 19. The Board also encouraged the parties to meet and confer regarding Japan Patent Office practice in the 1970s as applied to unexamined utility model applications to try to resolve this issue. *Id.* at 14–15.

After institution, Patent Owner filed objections to evidence that included various objections to Nakamura. Paper 16, 1–2 (objecting to Exhibit 1004 under Federal Rule of Evidence (FRE) 104, FRE 401, FRE 901, and FRE 1002). Petitioner responded by serving Patent Owner with supplemental evidence, including the Chen Declaration.¹² *See* 37 C.F.R. § 42.64(b)(2) (authorizing a party relying on evidence to which an objection is timely served to respond to the objection by serving supplemental evidence within ten business days of service of the objection).

¹² This supplemental evidence consisted of a Declaration of Kyle Chen Responsive to Patent Owner’s Objections to Evidence with attached Exhibits A–E. Patent Owner submitted a copy of Petitioner’s Supplemental Evidence as an exhibit in order to address it in Patent Owner’s Response. Ex. 2011.

Patent Owner argued in its Response that “these documents should not be considered unless and until [this supplemental evidence is] properly filed as supplemental information.” PO Resp. 33–34. We understand Petitioner to have relied on the Chen Declaration as a means to resolve Patent Owner’s objections to the relevance and authentication of Exhibit 1004. Petitioner never filed the Chen Declaration with the Board. Thus, we do not consider the content of the Chen Declaration for purposes of resolving this issue. We note, however, that attached as Exhibit B to the Chen Declaration appears to be a copy of the condensed version of Nakamura, as published in the Japanese Gazette, and an English language translation thereof. Ex. 2011, 14–20 (Ex. B); Tr. 29:4–21. Thus, Patent Owner apparently received a copy of the condensed version of Nakamura prior to filing its Patent Owner Response.

Patent Owner, in its Response, argues that Petitioner “fails to present evidence that Nakamura was a ‘patent or printed publication’ prior to the ’679 Patent’s May 12, 1999 priority date,” and that, “based on the evidence presented, Nakamura is neither a patent nor a printed publication.” PO Resp. 27. Specifically, Patent Owner argues that “Petitioner has failed to file *any evidence* that Nakamura was actually disseminated or publicly accessible or findable before the May 12, 1999 priority date.” *Id.* at 30. Patent Owner asserts that Nakamura does not have an abstract and nothing in the record suggests that Nakamura was classified before May 12, 1999. *Id.* at 30–31. Patent Owner further asserts that “Nakamura has no INID codes to identify any relevant bibliographic data.” *Id.* at 32. Patent Owner argues that Petitioner has filed no evidence of any actual dissemination of Nakamura, or any means by which Nakamura might have been accessed by interested members of the public. *Id.* In sum, Patent Owner asserts that Petitioner’s

evidence is not sufficient to support a finding that one skilled in the art, employing reasonable diligence, would have been able to locate and retrieve Nakamura prior to May 12, 1999. *See id.*

Petitioner, in reply to Patent Owner’s arguments regarding dissemination and public accessibility, relied on a declaration from Takao Miyano (“the Miyano Declaration”), a Japanese patent attorney, to show that at the time of Nakamura, the Japan Patent Office provided public access to utility model applications by publishing a condensed version of the full application in the Japan Utility Model Gazette and by allowing public inspection of the full application at the Japan Patent Office. Reply 16–17 (citing Ex. 1044).¹³ Petitioner, thus, asserts that “the full version of Nakamura (Ex-1004) was publicly accessible as of May 26, 1975 when its condensed version was published.” *Id.* (citing Ex. 1044 ¶¶ 11–17).

Patent Owner argues that this new evidence and new arguments filed with Petitioner’s Reply are improper as untimely. Sur-Reply 9–11. Patent Owner argues that to rely on this new evidence, Petitioner should have sought to submit the evidence as supplemental information in accordance with 37 C.F.R. § 42.123. *Id.* Because we rely, in part, on the Miyano Declaration, we address Patent Owner’s arguments as to the timeliness of Petitioner’s presentation of this evidence.

As recently discussed in *Hulu, LLC v. Sound View Innovations, LLC*, IPR2018-01039, Paper 29 (PTAB Dec. 20, 2019) (precedential), “at the institution stage, the petition must identify, with particularity, evidence sufficient to establish a reasonable likelihood that the reference was publicly

¹³ The Miyano Declaration includes six attachments, labeled Exhibits A through F, which correspond, respectively, to Exhibits 1045 through 1050.

accessible before the critical date of the challenged patent and therefore that there is a reasonable likelihood that it qualifies as a printed publication.” *Id.* at 13. The decision in *Hulu* further describes “limited opportunities” for the petitioner to present new evidence after the filing of the petition to support a showing that a reference is a printed publication, including “in a reply to a patent owner preliminary response” and “in a motion to file supplemental information.” *Id.* at 14. The *Hulu* decision explains that new evidence submitted in a reply must be responsive to arguments raised in the patent owner response. *Id.* The decision explains that “if the patent owner challenges a reference’s status as a printed publication, a petitioner may submit a supporting declaration with its reply to further support its argument that a reference qualifies as a printed publication.” *Id.* at 15. The decision further describes that a petitioner may move to submit new evidence as supplemental information if the patent owner does not challenge the reference’s status as a printed publication. *Id.*

In this case, the evidence submitted with the Petition includes Nakamura itself in the original Japanese and a certified translation. Ex. 1004. On its first page, Nakamura contains evidence in the form of certain indicia including its identification as a Japan Patent Office document (stamp at lower right), a title containing the word “Publication” followed by the number S50-55262, and the translated date of 1975 in the publication number (50 plus 1925, the year of the Emperor).

As discussed above, Patent Owner presented arguments challenging the dissemination and public accessibility of Nakamura in its Patent Owner Response. *See, e.g.*, PO Resp. 30 (“Petitioner has failed to file ***any evidence*** that Nakamura was actually disseminated or publicly accessible or findable before the May 12, 1999 priority date.”). Petitioner submitted the Miyano

Declaration and supporting exhibits (Exs. 1044–1050) specifically in response to Patent Owner’s challenges to dissemination and public accessibility of Nakamura, raised in Patent Owner’s Response. We find that this new evidence is permissible here because it was filed in response to arguments raised in Patent Owner’s Response. Also, the new evidence did not amount to, or result in, a change to Petitioner’s theory in the case, and is relied on to further support Petitioner’s initial position raised in the Petition that Nakamura qualifies as a printed publication. Thus, we do not agree with Patent Owner that Petitioner’s new evidence, submitted in the Reply, was improper as untimely.

Patent Owner also argues that Petitioner’s Reply “includes scant argument or explanation as to why it believes Nakamura is a printed publication” and instead improperly incorporates by reference the arguments and explanations from the Miyano Declaration. Sur-Reply 10 (citing Ex. 1044). We disagree with Patent Owner that the arguments presented in Petitioner’s Reply are inadequate. The Reply explains how the Japan Patent Office provided public access to utility model applications at the time of Nakamura, including by publication of a condensed version of the application in the Japanese Utility Model Gazette and by allowing public inspection of the full application at the Japan Patent Office upon request. Reply 16–17. Petitioner properly refers in its Reply to the Miyano Declaration as support for these assertions. *Id.* The Reply also explains how an interested member of the public would obtain access to the full version of the publication. *Id.* Again, Petitioner properly refers in its Reply to the Miyano Declaration for support. *Id.* Thus, we consider the arguments raised in Petitioner’s Reply, along with the supporting evidence cited in the Reply, to ascertain whether Nakamura qualifies as prior art.

Having clarified the universe of evidence to which we will look to decide the prior art status of Nakamura, we now examine the evidence to assess whether it is sufficient to establish Petitioner's position as to Nakamura as a prior art printed publication.

In an *inter partes* review, a petitioner "may request to cancel as unpatentable 1 or more claims of a patent . . . only on the basis of prior art consisting of patents or printed publications." 35 U.S.C. § 311(b). In this case, Petitioner contends Nakamura is a "printed publication" within the meaning of § 311 and does not assert that Nakamura is a "patent." *See* Pet. 28; Reply 16.

We look to the underlying facts to make a legal determination as to whether a reference is a printed publication. *Suffolk Techs., LLC v. AOL Inc.*, 752 F.3d 1358, 1364 (Fed. Cir. 2014). The determination of whether a given reference qualifies as a prior art "printed publication" involves a case-by-case inquiry into the facts and circumstances surrounding its disclosure to members of the public. *In re Klopfenstein*, 380 F.3d 1345, 1350 (Fed. Cir. 2004). The key inquiry is whether the reference was made "sufficiently accessible to the public interested in the art" before the critical date. *In re Cronyn*, 890 F.2d 1158, 1160 (Fed. Cir. 1989); *see In re Wyer*, 655 F.2d 221, 226 (CCPA 1981). "A given reference is 'publicly accessible' upon a satisfactory showing that such document has been disseminated or otherwise made available to the extent that persons interested and ordinarily skilled in the subject matter or art exercising reasonable diligence, can locate it." *Bruckelmyer v. Ground Heaters, Inc.*, 445 F.3d 1374, 1378 (Fed. Cir. 2006) (citation omitted). *Bruckelmyer* and *Wyer* specifically addressed the public accessibility of laid open patent applications.

In *Bruckelmyer*, the issue was whether two figures of a Canadian application that were withdrawn, and thus, absent in the issued patent but still of record in the prosecution history, are part of the subsequently published patent. *Bruckelmyer*, 445 F.3d at 1377. *Bruckelmyer* argued that a patent application located in a foreign patent office that has been laid open for inspection is not a printed publication, especially considering absence of evidence indicating that the contents of the file wrapper were disseminated or copied. *Id.* at 1377–78. The court disagreed explaining:

[t]he “printed publication” provision of § 102(b) “was designed to prevent withdrawal by an inventor . . . of that which was already in the possession of the public.” . . . Whether a given reference is a “printed publication” depends on whether it was “publicly accessible” during the prior period. A given reference is “publicly accessible” upon a satisfactory showing that such document has been disseminated or otherwise made available to the extent that persons interested and ordinarily skilled in the subject matter or art exercising reasonable diligence, can locate it and recognize and comprehend therefrom the essentials of the claimed invention without need of further research or experimentation.

Id. at 1378 (internal citations omitted); *see also Wyer*, 655 F.2d at 226.

With respect to *Wyer*, the issue was whether an Australian patent application laid open for public inspection was a printed publication if only an abstract of the application was published by the Australian Patent Office. *Wyer*, 655 F.2d at 223, 226. The court found that, although there is no evidence of actual viewing or dissemination of any copy of the application,

there is no dispute that the records were maintained for this purpose. Given that there is also no genuine issue as to whether the application was properly classified, indexed, or abstracted, we are convinced that the contents of the application were sufficiently accessible to the public and to persons skilled in the pertinent art to qualify as a “printed publication.”

Id. at 226.

In considering *Wyer*, the court in *Bruckelmyer* also explained:

The existence of a published abstract that would have allowed one skilled in the art exercising reasonable diligence to locate the foreign patent application and the fact that the application was classified and indexed in the patent office, were central to the *Wyer* court’s conclusion that the application was “publicly accessible.”

Bruckelmyer, 445 F.3d 1379.

In this case, Petitioner provides a certified translation of Nakamura with its Petition. *See* Ex. 1004, 12.¹⁴ The top of the first page is translated as “Japanese Unexamined Utility Model Application Publication S50–55262 (1975).” *Id.* at 1; *see also* Ex. 2012, 1 (same). The as-translated first page contains a seal of the Japan Patent Office (bottom right) and certain numbered items, including “1 Title of the Invention” and “2 Inventor.” Ex. 1004, 1. The first page also twice recites the date of September 18, 1973 (near the top and in the seal of the Japan Patent Office). *Id.* This 1973 date coincides with that which Petitioner contends is the application filing date. Pet. 46.

Patent Owner asserts that Nakamura does not qualify as prior art because, unlike the published applications in *Wyer* and *Bruckelmyer*, Nakamura does not include an abstract, and because nothing in the record suggests that Nakamura was classified before the effective filing date of the ’679 patent, i.e., May 12, 1999. PO Resp. 30–31 (“Nakamura includes no indication that it was abstracted, classified, or indexed in a meaningful

¹⁴ In citing to Nakamura in this section, we refer to the page numbers of the exhibit rather than the numbers in parentheses at the bottom center of the translation.

way.”). Patent Owner also compares Nakamura to Takahashi (Ex. 1005) and Morikawa (Ex. 1023) and notes that, unlike these published Japanese applications, Nakamura does not include INID codes. *Id.* at 31. Patent Owner argues that “[i]f Nakamura had been published, the publication date (among other data) would be provided on the first page of the document, and identified with the appropriate INID code(s).” *Id.* at 31–32. Patent Owner also argues that Petitioner has not filed any evidence of actual dissemination of Nakamura or any means by which Nakamura might have been accessed by interested members of the public. *Id.* at 32.

In reply, Petitioner provides evidence of Japan Patent Office procedures at the time of Nakamura that shows that under Japanese utility model law in the period of 1973–1975, the Japan Patent Office would publish a condensed version of the utility model application in the Utility Model Gazette and the complete version of the utility model application was made available for public inspection at the Japan Patent Office on the same day that the condensed version was published. Ex. 1044 ¶¶ 13–15 (explaining that the public would gain access to the full version by presenting identifying information such as the publication number). Petitioner provides a copy of the condensed version of Nakamura published in the Japanese Utility Model Gazette in 1975. Ex. 1047. According to Petitioner’s declarant, this condensed version of Nakamura was published on May 26, 1975. Ex. 1044 ¶¶ 11–13. We also observe that this condensed version of Nakamura includes INID codes similar to those that appear on the faces of Morikawa and Takahashi. Ex. 1047, 1 (showing circled numbers on the face of the publication that correspond to INID codes on the faces of Morikawa (Ex. 1023) and Takahashi (Ex. 1005)). We also observe that although the condensed version of the published application does not appear

to include an abstract, it does include a title, drawings with a brief explanation of the drawings, a detailed explanation of the device, and claims. Ex. 1044 ¶ 12; Ex. 1047. Thus, we find that the condensed version of Nakamura, which was published in the Japanese Utility Model Gazette, was classified and sufficient detail of the contents of the application were provided such that one skilled in the art exercising reasonable diligence would have been able to locate Nakamura.

According to Petitioner’s declarant, under Japanese law in effect in 1973–1975, the complete version of Nakamura (Ex. 1004) was “made available to the public on May 26, 1975, i.e., the same day [the condensed version of Nakamura] published.” Ex. 1044 ¶ 14. Thus, according to Petitioner’s declarant, to gain access to the full version of Nakamura, a member of the public need only present identifying details of the application, available from the published condensed version, to be given access to the full version. Reply 16–17; Ex. 1044 ¶¶ 15–17. Based on this evidence, we find that the condensed version of Nakamura, as published in the Japanese Utility Model Gazette, would have been a roadmap to the full version of the Nakamura application, so that the contents of the full Nakamura application were sufficiently accessible to the public and to persons skilled in the pertinent art to qualify as a “printed publication.” This is sufficient to make Nakamura (Ex. 1004) publicly accessible as of May 26, 1975.

We determine that Petitioner has provided enough evidence to show that Nakamura qualified as a printed publication “more than a year before May 12, 1999, the earliest possible effective filing date of the challenged claims of the ’679 patent.” *See* Pet. 12, 28; Ex. 1001, code (63). This evidence includes a copy of the condensed version of Nakamura, which

included classification codes and was published in the Japanese Utility Model Gazette; a copy of the complete application, available upon request from the Japan Patent Office using the information provided in the published condensed version; and Mr. Miyano's evidence of Japan Patent Office practice at the time of Nakamura's publication. Accordingly, Petitioner has established that Nakamura qualifies as prior art under § 102(b). *See* Pet. 28.

2. Overview of Nakamura (Exhibit 1004)

Nakamura discloses:

a heat pipe that transfers heat by a sealed container made of thermally conductive metal plates and a refrigerant enclosed in the sealed container, wherein a portion of one or both of opposing upper and lower surfaces of the sealed container has a molded concavity and a hole for component installation is provided in a concavity joining surface where the concavity and a flat surface opposing the concavity or an opposing concavity are joined together.

Ex. 1004, 4;¹⁵ *see also* Ex. 2012, 5 (describing a sealed container made of “sheet metal,” a coolant in the sealed container, recessed portions in the upper and lower faces of the sealed container, and holes in the recess joint surfaces). Figures 3 and 4 are reproduced below:

¹⁵ In citing to Nakamura in this and following sections, we follow Petitioner's convention of citing to the numbers in parentheses at the bottom center of the translation rather than those used in numbering the pages of the exhibit overall. We also omit the translator's marginalia, parentheticals, and italics.

Figure 3

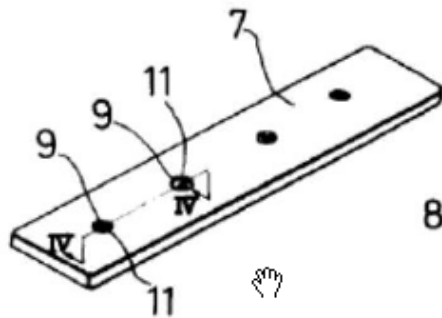
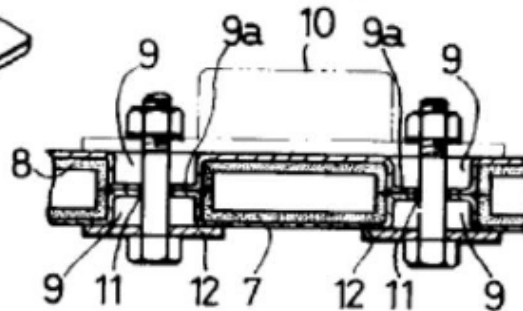


Figure 4



Figures 3 and 4 illustrate examples of a heat pipe of Nakamura's invention, with Figure 3 being a perspective view and Figure 4 being a partial cross-sectional view of Figure 3 at cutting plane line IV–IV. Ex. 1004, 4, 7; Ex. 2012, 5–6, 8. “In Figures 3 and 4, 7 is a sealed container where thin plates of a material with favorable thermal conductivity such as copper or aluminum are formed into a sealed configuration by soldering, brazing, or the like and 8 is a wick that . . . is affixed to an inner-wall surface of the sealed container 7.” Ex. 1004, 5; *see also* Ex. 2012, 6 (describing that reference numeral 7 denotes a sealed container “made of a thin sheet of a high thermal conductivity material” that is formed to be “airtight by soldering, brazing or the like” and has wick 8 attached to the interior wall surfaces of sealed container 7).

On both surfaces of the sealed container 7, a concavity 9 of a depth one-half of a thickness of the sealed container 7 is provided via pressing or the like in a state of the thin plate prior to being assembled into the sealed configuration. A concavity joining surface 9a of the concavity 9 is finished flat after pressing is completed and is applied in advance to preliminary soldering. The concavity joining surfaces 9a can then be readily and [reliably] adhered by being pressurized and heated before and after work of forming the sealed container 7 by soldering or the

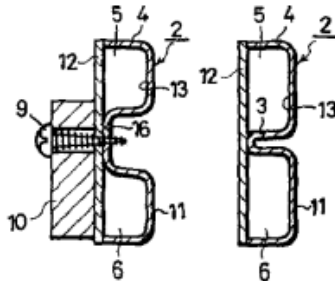
like. Then, after air inside the sealed container 7 is extracted, a refrigerant is enclosed in an interior hollow portion.

Ex. 1004, 5; *see also* Ex. 2012, 6 (similar translation).

To install the heat pipe to component 10 to be cooled, holes 11 “can be drilled into the concavity joining surfaces 9a and installation can be performed via a bolt or the like via a washer 12.” Ex. 1004, 5–6; *see also* Ex. 2012, 6–7 (similar translation). “By mounting the component to be cooled in this manner, the component to be cooled can be made to directly contact the heat panel [and, t]herefore, an efficiency of heat transfer is very favorable.” Ex. 1004, 6; *see also* Ex. 2012, 7 (similar translation).

3. Overview of Takahashi (Exhibit 1005)

Takahashi discloses a heat pipe “fixed with screws for mounting heating elements, such as transistors or the like.” Ex. 1005, 3:14–15, 26–29. By way of illustration, Takahashi Figures 3 and 4 are reproduced below.



Figures 3 (left) and 4 (right) show cross-sectional views of one embodiment of the disclosed heat pipe “wherein the inside of a square tube container (2) with both ends sealed [and] made of aluminum . . . is divided into a gas-phase hydraulic fluid passage (5) on the upper side and a liquid-phase hydraulic fluid passage (6) on the lower side by an intermediate partition wall (3).” *Id.* at 4:48–57; *see id.* at 8:9–11.

[T]he container (2) is provided with a first plate member (11) that has a concave part for hydraulic fluid passage (13) over almost the total length on one side, a peripheral wall (4) surrounding it,

and an intermediate partition wall (3); and a second plate member (12) in a strip shape for covering the opening of the concave part for hydraulic fluid passage (13).

Id. at 4:65–5:4.

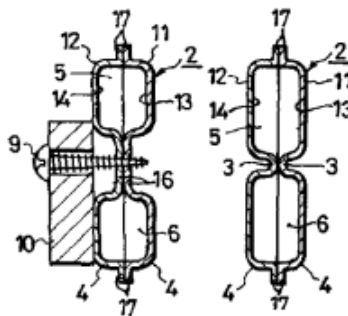
The container (2) is formed by mutually superimposing the first and second plate members (11) and (12) that constitute a container (2) and bonding by a vacuum brazing method the tip of the peripheral wall (4) of the first plate member (11), the peripheral edge part of the second plate member (12) in a strip shape, the tip of the intermediate partition wall (3) of the first plate member (11), and the facing surface of the junction for mounting heating elements (16) and the second plate member (12).

Id. at 5:12–20.

The screws (9) for mounting heating elements (10), such as transistors, or the like, are directly fastened into the container (2) in the junction portion for mounting heating elements (16) in an intermediate partition wall (3), allowing the heating elements (10) to be in direct contact with the wall surfaces of the container (2). Therefore, thermal resistance of a heat pipe (1) is small, and even when the pipe is installed horizontally, for example, it can be operated normally, and has excellent heat radiation performance. The plate fins (15) [(shown in Figure 2)] are mounted in parallel at the end of the evaporator side of the container (2).

Id. at 5:27–38.

Takahashi Figures 5 and 6 are reproduced below.



Figures 5 (left) and 6 (right) show cross-sectional views of a second embodiment with plate members (11) and (12) “constitut[ing] a square tube container (2) with both ends sealed [and] both built by press-molded aluminum plates.” *Id.* at 6:4–9; *see id.* at 8:12–16.

The tips of the peripheral walls (4) and (4) of both plate members (11) and (12) are provided with flanges (17) and (17), respectively, where these plate members (11) and (12) are superimposed with the concave parts (13) and (14) facing inwards, for example, the flanges (17) and (17) at the tips of the peripheral walls (4) and (4) of both plate members (11) and (12), and the tips of intermediate partition walls (3) and (3) are joined to each other by a vacuum brazing method to form a container (2).

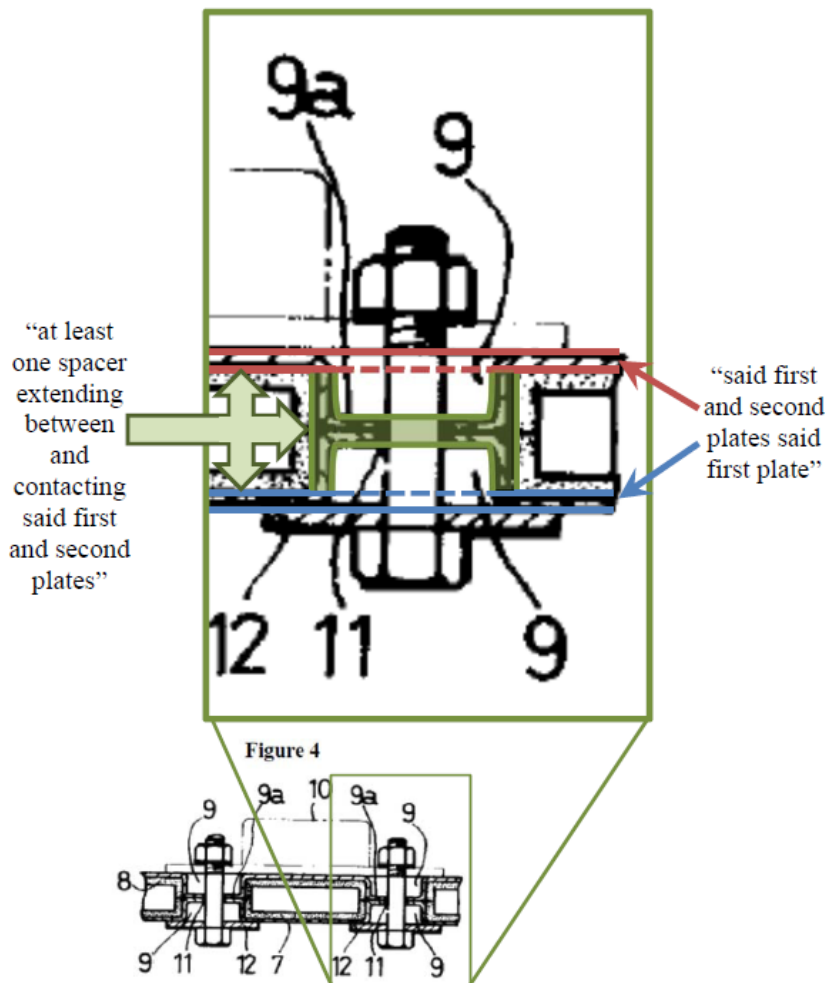
Id. at 6:14–22.

4. “at least one spacer extending between and contacting said first and second plates”

For Grounds 1 and 2, Petitioner relies solely on Nakamura as disclosing “at least one spacer extending between and contacting said first and second plates,” as recited in independent claim 1. Pet. 36–41; Reply 21–22. Patent Owner opposes. PO Resp. 45–47, 53; Sur-reply 14. Because each of the remaining claims before us, claims 2, 4, and 5, depend from claim 1, Petitioner’s failure to demonstrate that Nakamura discloses this element, as discussed in our analysis below, is dispositive.

Petitioner contends that the “spacer” element is disclosed by a set of opposing concavities 9 formed in the upper and lower plates of Nakamura’s heat pipe. Pet. 36–38. Petitioner’s argument is predicated on a construction of “spacer” that “allows for integral or non-integral spacers” and “does not exclude a situation where a depression extends from one plate and contacts another.” Reply 22.

Petitioner illustrates its theory with the following version of Nakamura's Figure 4:



Pet. 38. The above figure depicts Nakamura's Figure 4 along with an expanded version of a portion of Figure 4 annotated with claim limitations and colored markings. *See id.* According to Petitioner, the expanded and annotated portion of Nakamura's Figure 4, above, shows two opposing concavities 9 having "concavity joining surfaces" 9a. Pet. 36. Petitioner contends that these elements form an "H-shaped structure correspond[ing] to

the ‘at least one spacer’ limitation under [its] . . . claim construction proposal[] for ‘spacer.’” *Id.* at 36–37.¹⁶

Referencing its annotations, Petitioner contends that the “H-shaped structure (indicated in green) . . . is ‘between and contacting said first and second plates’ (indicated in red and blue, respectively).” *Id.* at 36.¹⁷ Noting that “Nakamura discloses that ‘the outer wall does not deform’ since the ‘concavity’ created by the ‘pressing’ process and labeled as ‘9’ are installed,” Petitioner further contends that the illustrated “H-shaped structure is a ‘structure used to create or maintain space between the plates.’” Pet. 36–39 (quoting Ex. 1004, 7) (citing Ex. 1002 ¶¶ 63–64). Reflecting the testimony of Dr. Pokharna, Petitioner further argues that the above-identified “‘spacer’ is ‘positioned within said vapor chamber’ . . . [b]ecause the ‘spacer disclosed in Nakamura is *surrounded* by the ‘vapor chamber,’ i.e., the ‘cavity or space’ inside the ‘sealed container’ disclosed in Nakamura.” *Id.* at 39–40; Ex. 1002 ¶ 65.

The relevant language of independent claim 1 is not merely “spacer” but “spacer. . . extending between and contacting said first and second plates,” which we construe as referring to a “structure separate from and in

¹⁶ Petitioner also addresses obviousness under the construction of “spacer” that Patent Owner proposed before the district court but that we do not adopt here. *See id.* at 36–41; section II(C)(2), n.7, above.

¹⁷ Petitioner and its expert also reference Nakamura’s Figures 5 and 6, which show embossed depressions in only one plate. Pet. 39–40; Ex. 1002 ¶ 64. Nonetheless, we agree with Patent Owner that “Petitioner’s grounds are based on the concavities 9 described and illustrated with respect to Figure 4 of Nakamura,” and Petitioner’s passing reference to the alternative embodiment of Nakamura’s Figures 5 and 6 does not substantially affect our analysis, which focuses on the embodiment of Figure 4. *See* PO Resp. 46 (citing Inst. Dec. 15–18).

contact with the first and second plates and configured to maintain a space or clearance between the plates.” *See* section II(C)(2), above. Applying this panel’s construction, we agree with Patent Owner that Petitioner has neither shown how Nakamura discloses this limitation, nor identified any rationale or motivation to modify Nakamura to provide a “spacer. . . extending between and contacting said first and second plates,” as recited in claim 1. *See* PO Resp. 46–47. As discussed above, Petitioner seeks to satisfy this limitation by pointing to the “H-shaped structure” defined by concavities pressed into opposing plates of the heat pipe illustrated in Nakamura’s Figure 4. But as Patent Owner points out, “these concavities are integral with the portions of the container in which they are formed, and a concavity cannot be said to contact the same plate in which it is formed without rendering the term ‘contacting’ in claim 1 meaningless.” *Id.* (citing Ex. 2002 ¶¶ 116, 145).

Even were we to apply Petitioner’s proposed construction of “spacer,” Petitioner arguments would fail because they rely on the same structure to satisfy both the first plate and the spacer extending between and contacting the first and second plates. *See* Ex. 2002 ¶ 145. Although, as noted at page 14 of Patent Owner’s Sur-reply, we identified this defect with respect to similar language in a related, copending proceeding, Petitioner has not satisfactorily addressed this issue. *See* IPR2019-000144, Paper 9, 33 (“Cooler Master has not addressed adequately at this stage how, for example, the concavity joining surface 9a of the lower plate can serve as both part of the spacer and as part of the lower plate for purposes of the recitation in claim 11.”).

For the above reasons, Petitioner does not establish that Nakamura discloses “at least one spacer extending between and contacting said first

and second plates,” as required independent claim 1, as well as claims 2, 4, and 5, which depend from claim 1. Nor does Petitioner argue that Nakamura, alone, or in combination with Takahashi renders this element obvious. Accordingly, Petitioner has failed to carry its burden to establish that claims 1, 2, 4, and 5 would have been obvious under Grounds 1 or 2.

E. Patent Owner’s Motion to Exclude Evidence

Patent Owner moves to exclude Exhibits 1004, 1040, and 1041, as well as Exhibits 3 and 4 and attachment 3a to Exhibit 1039, pursuant to 37 C.F.R. § 42.64(c). Paper 46; Paper 51. Petitioner opposes the motion. Paper 48.

Patent Owner first requests that we exclude Exhibit 1004 (Nakamura) as not relevant under FRE 104 on the grounds that Petitioner failed “to introduce sufficient proof that Exhibit 1004 was publically accessible such that it qualifies as a prior art printed publication under Unites States law.” *Id.* at 3. As set forth in section II(D)(1), above, the evidence of record leads us to an entirely different conclusion regarding Nakamura’s prior art status. Because Petitioner persuades us that Nakamura qualifies as a prior art printed publication as of the earliest possible effective filing date of the challenged claims of ’679 patent, we deny Patent Owner’s request on its merits.

Moreover, the test for relevance is found in Federal Rule of Evidence 401, which provides:

Evidence is relevant if:

- (a) it has any tendency to make a fact more or less probable than it would be without the evidence; and
- (b) the fact is of consequence in determining the action.

Fed. R. Evid. 401. The pertinent purported fact is that Nakamura is a printed publication. That fact is of consequence in our determination as to whether Petitioner has satisfied its burden on the patentability challenges involving Nakamura. As discussed above, the parties' dispute involves certain indicia contained in or missing from (as Patent Owner argues) the Nakamura reference itself. Those indicia or the lack thereof in the document have a tendency to make the fact that Nakamura is a printed publication more or less probable. Thus, the Nakamura reference, Exhibit 1004, is relevant as to whether Nakamura is a printed publication. Accordingly, we deny Patent Owner's motion to exclude Nakamura (Ex. 1004).

We deny Patent Owner's remaining requests for the following reasons.

Exhibit 1040 is a prior art printed publication titled "Countability and Number in Japanese-to-English Machine Translation" by Francis Bond, Kentaro Ogura, and Satoru Ikehara, dated August 1994, and published in the *Proceedings of the 15th International Conference on Computational Linguistics*. According to Petitioner's expert Dr. Hall-Ellis a book copy of Exhibit 1040 is attached to her declaration as Exhibit 3, and a digital version of the same conference paper is labeled Attachment 3a. Ex. 1039 ¶¶ 48–49; see Paper 46, 6. Exhibit 1041 is a prior art printed publication by Murata, Masaki and Makoto Nagao, titled, "*Determination of referential property and number of nouns in Japanese sentences for machine translation into English*," and published in *Computation and Language* on or about May, 19, 1994. According to Dr. Hall-Ellis, a copy of Exhibit 1041 is attached to her declaration as Exhibit 4. Ex. 1039 ¶ 50; see Paper 46, 6.

In responding to Dr. Faghri's opinion that the Japanese translations of Morikawa refer to a single "plate," Petitioner's technical expert,

Dr. Pokharna, relies on Exhibits 1040 and 1041 as evidence “that it is well-known that the Japanese do not differentiate plural nouns from singular, and it is ‘very difficult’ for human translators to convert Japanese nouns into an appropriate plural or singular version in English.” Ex. 1032 ¶ 55.¹⁸ Patent Owner now seeks to exclude all versions of Exhibits 1040 and 1041 under Federal Rules of Evidence 701 and 702 as “contain[ing] opinions based on scientific, technical, or other specialized knowledge within the scope of FRE 702, for which no proper expert testimony has been provided,” and under Federal Rule of Evidence 403 “because any probative value is substantially outweighed by the danger of unfair prejudice.” Paper 46, 2.

FRE 701 and 702 expressly apply to the testimony of a “witness.” Patent Owner provides no authority for extending these rules to cover information contained in printed publications. For at least this reason, we do not find Patent Owner’s argument persuasive.

With respect to FRE 403, we agree with and adopt Petitioner’s argument that the risks of unfair prejudice are minimal because “[t]he Board sits as a non-jury tribunal with administrative expertise, and as such is well-positioned to determine and assign appropriate weight to evidence.” *See* Paper 48, 5–6 (citations omitted).

Accordingly, we deny this portion of Patent Owner’s motion on the merits. In the alternative, because we do not address the substance of any version of Exhibits 1040 or 1041 in this Decision, we further dismiss Patent Owner’s request as moot with respect to Exhibits 1040 and 1041.

¹⁸ Petitioner, in some places, refers to Dr. Pokharna by his first name. *See* Paper 48, 5.

III. CONCLUSION

Petitioner has *not* shown by a preponderance of the evidence that the challenged claims of the '679 patent are unpatentable, as summarized in the following table:

Claims	35 U.S.C. §	Reference(s)/Basis	Claims Shown Unpatentable	Claims Not Shown Unpatentable
1, 2, 4, 5	103(a)	Nakamura		1, 2, 4, 5
1, 2, 4, 5	103(a)	Nakamura, Takahashi		1, 2, 4, 5
Overall Outcome				1, 2, 4, 5

IV. ORDER

In consideration of the foregoing, it is hereby:

ORDERED that claims 1, 2, 4, and 5 of U.S. Patent No. 7,100,679 B2 have *not* been proven to be unpatentable;

FURTHER ORDERED that Patent Owner's motion to exclude Exhibits 1004, 1040, 1041, and certain sections of Exhibit 1039 is *denied*, and in the alternative, dismissed-in-part as moot with respect to Exhibits 1040 and 1041 only; and

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

IPR2019-00146
Patent 7,100,679 B2

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