

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

URT UMWELT UND RECYCLINGTECHNIK GMBH,
Petitioner,

v.

DUESENFELD GMBH,
Patent Owner.

IPR2024-00887
Patent 11,050,097 B2

Before MEREDITH C. PETRAVICK, CHRISTOPHER M. KAISER, and
KEVIN W. CHERRY, *Administrative Patent Judges*.

KAISER, *Administrative Patent Judge*.

DECISION
Granting Institution of *Inter Partes* Review
35 U.S.C. § 314, 37 C.F.R. § 42.4

I. INTRODUCTION

A. *Background and Summary*

URT Umwelt und Recyclingtechnik GmbH (“Petitioner”) filed a Petition (Paper 2, “Pet.”) requesting *inter partes* review of claims 1–3, 7–10,¹ 12, 13, and 15–19 (“the challenged claims”) of U.S. Patent No. 11,050,097 B2 (Ex. 1001, “the ’097 patent”). Duesenfeld GmbH (“Patent Owner”) filed a Preliminary Response (Paper 7, “Prelim. Resp.”). With our authorization, Petitioner filed a Reply to Patent Owner’s Preliminary Response (Paper 8, “Prelim. Reply”), and Patent Owner filed a Preliminary Sur-Reply (Paper 9, “Prelim. Sur-Reply”).

We have authority, acting on the designation of the Director, to determine whether to institute an *inter partes* review under 35 U.S.C. § 314 and 37 C.F.R. § 42.4(a). *Inter partes* review may not be instituted unless “the information presented in the petition filed under [35 U.S.C.] section 311 and any response filed under [35 U.S.C.] section 313 shows that there is a reasonable likelihood that the petitioner would prevail with respect to at least 1 of the claims challenged in the petition.” 35 U.S.C. § 314(a) (2018). “When instituting *inter partes* review, the Board will authorize the review to proceed on all of the challenged claims and on all grounds of unpatentability asserted for each claim.” 37 C.F.R. § 42.108(a) (2023).

For the reasons set forth below, upon considering the briefing and the evidence of record, we determine that the information presented in the Petition establishes a reasonable likelihood that Petitioner will prevail with

¹ In the Introduction and section headings of the Petition, Petitioner identifies claims 1–3, 7–9, 12, 13, and 15–19 as the challenged claims. Pet. i–ii. In the substantive content of the Petition, however, Petitioner includes claim 10 as a challenged claim as well. *Id.* at 34–35.

respect to at least one of the challenged claims, and we institute *inter partes* review on all of the challenged claims based on all of the grounds identified in the Petition.

B. Real Parties-in-Interest

Petitioner identifies URT Umwelt und Recyclingtechnik GmbH as the real party-in-interest. Pet. 2. Patent Owner identifies Duesenfeld GmbH as the real party-in-interest. Paper 4, 1.

C. Related Matters

The parties identify the following related court proceeding:
Duesenfeld GmbH v. Ascend Elements, Inc., Case No. 2:23-cv-01194 (D. Del.). Pet. 2; Paper 4, 1. In addition, the parties note that the '097 patent is also being challenged concurrently in IPR2024-00948. Paper 4, 1.

D. The '097 Patent

The '097 patent is titled “Method for the Treatment of Used Batteries, in Particular Rechargeable Batteries, and Battery Processing Installation” and issued on June 29, 2021. Ex. 1001, codes (45), (54). It is directed to “[a] method . . . for the treatment of used batteries, in particular lithium batteries.” *Id.* at code (57).

The '097 patent describes several prior-art methods of processing used batteries and discusses the disadvantages of each method. *Id.* at 1:25–50. “The invention [of the '097 patent] aims to reduce” these disadvantages. *Id.* at 1:54–55. To do so, the '097 patent describes

a method for the treatment of used batteries, in particular used lithium batteries, such as lithium-ion batteries, with the steps (a) comminuting the batteries such that comminuted material is obtained, (b) inactivating of the comminuted material such that an inactive comminuted material is obtained, and (c) filling a transport container with the inactive comminuted material.

Id. at 1:8–15. It also describes

a battery processing installation for the treatment of used batteries, in particular for the treatment of used lithium batteries with (a) a comminuting device for comminuting the batteries such that comminuted material is obtained, (b) an inactivation device for inactivating the comminuted material and (c) a filling device for filling a transport container with the inactivated comminuted material.

Id. at 1:16–23.

According to the '097 patent, “the inactivation occurs . . . by way of drying the comminuted material.” *Id.* at 1:57–58. By doing this, “the amount of electrolyte that can be obtained from the comminuted material . . . is such that an electrochemical reaction is no longer possible, or only to a negligibly small extent.” *Id.* at 1:63–66. “In addition, no flammable or explosive gas phase forms above the battery fragments, as the organic carbonates of the electrolyte have been removed.” *Id.* at 1:66–2:2. This renders the comminuted material “largely inert,” so that it “can be transported safely, especially if it is packed under vacuum.” *Id.* at 2:2–4.

E. Illustrative Claims

Petitioner challenges claims 1–3, 7–9, 12, 13, and 15–19 of the '097 patent. Claims 1 and 12 are independent and illustrative; they are reproduced below.

1. A method for the treatment of used batteries, comprising the steps:
 - (a) comminuting the batteries such that comminuted material is obtained;
 - (b) inactivating the comminuted material such that an inactivated comminuted material is obtained, wherein the inactivating step is performed during or after the comminuting step; and

(c) filling a transport container with the inactivated comminuted material;

wherein the inactivating step is performed by drying the comminuted material, and

wherein the drying occurs at a maximum pressure of 300 hPa.

Ex. 1001, 10:45–59.

12. A battery processing installation for treatment of used batteries, comprising:

(a) a comminution unit configured to comminute the batteries such that comminuted material is obtained;

(b) an inactivation device comprising a drying device configured to inactivate the comminuted material, wherein the inactivation device is configured to perform the inactivating step during or after the comminuting step of the comminution unit;

(c) a filling device configured to fill a transport container with the inactivated comminuted material; and

(d) a vacuum installation connected to the drying device and configured to generate a vacuum in the drying device.

Ex. 1001, 11:48–61.

F. Asserted Grounds of Unpatentability

Petitioner asserts the following grounds of unpatentability (Pet. 4–5, 17–57):

Claim(s) Challenged	35 U.S.C. §	Reference(s)/Basis
1–3, 7, 8, 10	103	LithoRec, ² DIN 28400, ³ Perry ⁴
9	103	LithoRec, DIN 28400, Perry, Hanisch ⁵
12, 13, 15, 16, 18, 19	102	LithoRec
17	103	LithoRec, Hanisch

In support of its unpatentability arguments, Petitioner relies on the declaration of Volker Spies (Ex. 1003).

II. ANALYSIS

A. Legal Standards

In *Graham v. John Deere Co. of Kansas City*, 383 U.S. 1 (1966), the Supreme Court set out a framework for assessing obviousness under 35 U.S.C. § 103 that requires consideration of four factors: (1) the “level of ordinary skill in the pertinent art,” (2) the “scope and content of the prior art,” (3) the “differences between the prior art and the claims at issue,” and (4) if in evidence, “secondary considerations” of non-obviousness, such as “commercial success, long-felt but unsolved needs, failure of others, etc.” *Id.* at 17–18. “While the sequence of these questions might be reordered in any particular case,” *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 407 (2007), the U.S. Court of Appeals for the Federal Circuit has repeatedly

² Arno Kwade et al., “LithoRec Recycling Lithium-Ion Batteries,” Cuvillier Verlag (2012) (Ex. 1004, English translation submitted as Ex. 1016).

³ “Vacuum Technology—Terms and Definitions—General Terms.” DIN 28400-1, German Institute for Standards e.V., 1990 (Ex. 1007, English translation submitted as Ex. 1018).

⁴ “Perry’s Chemical Engineers’ Handbook 7th Edition.” New York: McGraw-Hill, 1997 (Ex. 1006).

⁵ WO 2013/023640 A1, published Feb. 21, 2013 (Ex. 1013, English translation provided as Ex. 1020).

emphasized that “it is error to reach a conclusion of obviousness until all those factors are considered,” *WBIP, LLC v. Kohler Co.*, 829 F.3d 1317, 1328 (Fed. Cir. 2016). Because Patent Owner does not address objective evidence of non-obviousness, we focus solely on the first three *Graham* factors.

B. Level of Ordinary Skill in the Art

The level of ordinary skill in the pertinent art at the time of the invention is a factor in how we construe patent claims. *See Phillips v. AWH Corp.*, 415 F.3d 1303, 1312–13 (Fed. Cir. 2005) (en banc). It is also one of the factors we consider when determining whether a patent claim is obvious over the prior art. *See Graham*, 383 U.S. at 17–18.

Factors pertinent to a determination of the level of ordinary skill in the art include “(1) the educational level of the inventor; (2) type of problems encountered in the art; (3) prior art solutions to those problems; (4) rapidity with which innovations are made; (5) sophistication of the technology; and (6) educational level of active workers in the field.” *Envtl. Designs, Ltd. v. Union Oil Co. of Cal.*, 713 F.2d 693, 696–97 (Fed. Cir. 1983) (citing *Orthopedic Equip. Co. v. All Orthopedic Appliances, Inc.*, 707 F.2d 1376, 1381–82 (Fed. Cir. 1983)). “Not all such factors may be present in every case, and one or more of these or other factors may predominate in a particular case.” *Id.*

Petitioner contends that one of ordinary skill in the art “would have had a B.S. degree in electrical engineering, materials science, chemical engineering, or an equivalent field, as well as at least 2 to 3 years of academic or industry [experience] in the recycling or processing of lithium-ion batteries.” Pet. 14. On the present record, Patent Owner does not

contest Petitioner’s proposed definition of a person of ordinary skill in the art. Prelim. Resp. 19.

For purposes of this Decision, we adopt Petitioner’s assessment of the level of ordinary skill in the art, as, on the present record, it appears consistent with the ’097 patent and the asserted prior art. *See Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001).

C. Claim Construction

We apply the same claim construction standard used in the federal courts—in other words, the claim construction standard that would be used to construe the claim in a civil action under 35 U.S.C. § 282(b), which is articulated in *Phillips*. *See* 37 C.F.R. § 42.100(b). Under the *Phillips* standard, the “words of a claim ‘are generally given 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, i.e., as of the effective filing date of the patent application.” *Phillips*, 415 F.3d at 1312–13.

Petitioner argues that “[n]o claim construction is needed,” because “[t]he claims are unpatentable under any reasonable interpretation.” Pet. 15. That said, Petitioner directs us to alleged definitions of several terms in the specification or prosecution history of the ’097 patent. *Id.* at 15–17. Patent Owner argues that “[c]laim construction is not required to deny the Petition.” Prelim. Resp. 26.

Based on the present record, we agree with both parties that we need not expressly construe any claim terms at this time.⁶ *See Realtime Data, LLC v. Iancu*, 912 F.3d 1368, 1375 (Fed. Cir. 2019) (“The Board is required to construe ‘only those terms . . . that are in controversy, and only to the extent necessary to resolve the controversy.’” (quoting *Vivid Techs., Inc. v. Am. Sci. & Eng’g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999))).

D. Asserted Anticipation by LithoRec

Petitioner argues that claims 12, 13, 15, 16, 18, and 19 were anticipated by LithoRec. Pet. 39–55. Patent Owner disagrees. Prelim. Resp. 44–54.

1. Overview of LithoRec

LithoRec reports the results of a project in which “several processes for recycling traction batteries were evaluated.” Ex. 1016, 1. In particular, LithoRec discloses a “[c]onceptual design of a recycling pilot plant.” *Id.* at 222. Part of this design focuses on “[s]eparation of active materials,” and this separation includes both “[p]re-shredding” and “[d]rying.” *Id.* at 224–226. According to LithoRec, “[t]he electrolytes need to be evaporated for the subsequent dry treatment processes” in order for both to “eliminate[] the potential hazard of flammable solvents” and “convert[] the active mass into

⁶ If either party intends to further argue claim construction at trial, including the alleged plain and ordinary meaning of a particular term, they 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* Patent Trial and Appeal Board Consolidated Trial Practice Guide, 84 Fed. Reg. 64,280, at 46, 48–45 (Nov. 2019) (available at <https://www.uspto.gov/TrialPracticeGuideConsolidated>). Claim construction arguments should not be relegated to patentability arguments on the facts.

the dry powder form required for dry processing.” *Id.* at 226. Because “some of the liquids to be vaporized are highly flammable solvents, the drying temperature should probably be severely restricted. This in turn speaks in favor of drying under vacuum, as the drying temperature can be kept low.” *Id.*

2. *Enablement of LithoRec*

Patent Owner argues that “LithoRec is not enabling for purposes of” Petitioner’s anticipation ground. Prelim. Resp. 54 (citing Prelim. Resp. 41–43; Ex. 2010 ¶¶ 92–94, 140–144, 164–168); Prelim. Sur-Reply 3–7. Petitioner disagrees. Prelim. Reply 3–8. On the present record, we are persuaded that Petitioner has shown sufficiently that LithoRec is enabling.

“In order to anticipate a claimed invention, a prior art reference must enable one of ordinary skill in the art to make the invention without undue experimentation.” *Impax Labs., Inc. v. Aventis Pharms., Inc.*, 545 F.3d 1312, 1314 (Fed. Cir. 2008). In addition, “[a]n anticipatory reference need only enable subject matter that falls within the scope of the claims at issue, nothing more.” *Schering Corp. v. Geneva Pharms.*, 339 F.3d 1373, 1381 (Fed. Cir. 2003).

Patent Owner argues that this standard is not met with respect to the purported anticipation of claim 12 of the ’097 patent by LithoRec. Specifically, Patent Owner argues that “[t]oo many components of [LithoRec’s] conceptual pilot plant would have worked at cross-purposes with one another to allow for inactivation of shredded battery material by vacuum drying without undue experimentation.” Prelim. Resp. 42 (citing Ex. 2010 ¶¶ 95–108, 142–143). In particular, Patent Owner argues that “[t]he proposed vacuum drying works at odds with the recommended

vibratory fluidized bed dryer,” as well as with the recommended “cross-flow hogger.” *Id.* (citing Ex. 2010 ¶¶ 95–108, 143); *see* Prelim. Sur-Reply 4–5.

Petitioner, however, directs us to evidence that LithoRec is not limited to the use of cross-flow hoppers and vibratory fluidized bed dryers. Prelim. Reply 4–5 (citing Ex. 1003 ¶¶ 132–153; Ex. 1016, 223–235; Ex. 1022 ¶¶ 16–18). For example, LithoRec discloses the use of “[c]onvection dryers” and “[s]low or high-speed rotor shredders” in addition to vibratory fluidized bed dryers and cross-flow hoppers. Ex. 1016, 226. Thus, on the present record, we are not persuaded that LithoRec is limited to the use of vibratory fluidized bed dryers and cross-flow hoppers in the way that Patent Owner argues it is. Because the only non-enablement arguments in the present record are based on the difficulty of vacuum drying using a vibratory fluidized bed dryer and a cross-flow hogger attached to the same nitrogen circuit, we are not persuaded that there is a sufficient question of enablement to warrant the denial of institution. We encourage the parties to develop the enablement issue further at trial.

3. *Analysis of Claim 12*

a) *Disputed Limitation: “Inactivation Device Comprising a Drying Device Configured to Inactivate the Comminuted Material”*

Claim 12 recites “an inactivation device comprising a drying device configured to inactivate the comminuted material.” Ex. 1001, 11:52–56. Petitioner argues that LithoRec discloses this limitation. Pet. 43–46. Patent Owner disagrees. Prelim. Resp. 44–45, 48–50.

In particular, Patent Owner argues that “[t]here is no mechanism described in LithoRec to ensure that the material exiting the dryer be dried to the point of inactivation.” *Id.* at 49. According to Patent Owner,

“[i]nactivation is what results when the drying process is complete,” such that insufficient drying does not result in the inactivation recited in claim 12. *Id.* at 49–50 (citing Ex. 1001, 3:49–4:18, 8:54–55). On the present record, we are not persuaded by this argument.

The first portion of the '097 patent cited by Patent Owner describes only a “preferred” method, not an embodiment to which the challenged claims can be limited. *See* Ex. 1001, 3:49 (“A method is preferred . . .”), 4:5 (“The comminuted material is preferably dried until . . .”). As for the other portion of the '097 patent that Patent Owner cites, it is not clear on the present record that we should interpret the statement that “[t]he drying of the comminuted material results in inactivated comminuted material” in the manner that Patent Owner urges (i.e., that inactivation is the endpoint of the drying process). *See* Ex. 1001, 8:54–55. Petitioner argues that this same statement means that inactivating and drying are used synonymously in the '097 patent, with both referring to the removal of a carbonate solvent from the conducting salt. *Pet.* 16, 44–45. On the present record, Petitioner’s argument finds more support than does Patent Owner’s argument. First, the '097 patent states that the “inactivation device” not only includes, but is “in the form of a drying device,” suggesting that drying and inactivation are intended to have similar, if not identical, meanings. Ex. 1001, 8:14–15. In addition, the '097 patent defines “drying” as “the removal of at least one solvent in the conducting salt,” with “dimethyl carbonate” and “ethyl methyl carbonate” identified as such solvents. *Id.* at 2:23–27. Moreover, during prosecution of the '097 patent, the applicant argued that “inactivation device” should be interpreted to have the structure of “a ‘drying device.’” Ex. 1002, 154. Although we encourage the parties to bolster the record on

this question during trial, we are not persuaded on the present record that inactivation should be limited in the way that Patent Owner argues.

With inactivation meaning the same as drying, and both terms referring to the removal of at least one solvent, such as dimethyl carbonate or ethyl methyl carbonate, from the conducting salt, we proceed to Petitioner’s argument for LithoRec disclosing the “inactivation device” and “inactivating step” of claim 12. Petitioner argues that LithoRec discloses this limitation when it states that “[t]he electrolytes need to be evaporated for the subsequent dry treatment process[es] On the one hand, this step eliminates the potential hazard of flammable solvents and, on the other hand, converts the activate mass into the dry powder form required for dry processing.” Pet. 44 (quoting Ex. 1016, 226). On the present record, we find this argument persuasive. LithoRec not only discloses removing some of the solvent from the electrolyte, but also discloses removing sufficient solvent to “eliminate[] the potential hazard of flammable solvents.” Ex. 1016, 226. LithoRec also teaches that these solvents include dimethyl carbonate. *Id.* at 100.

*b) Disputed Limitation: “Vacuum Installation
Connected to the Drying Device and Configured to
Generate a Vacuum in the Drying Device”*

Claim 12 recites “a vacuum installation connected to the drying device and configured to generate a vacuum in the drying device.”

Ex. 1001, 11:59–61. Petitioner argues that LithoRec discloses this limitation. Pet. 47–49. Patent Owner disagrees. Prelim. Resp. 44–48.

In particular, Patent Owner argues for three reasons that LithoRec’s drying device does not operate under a vacuum. *Id.* First, Patent Owner argues that “[t]he drying device recommended by LithoRec is a vibratory

fluidized bed dryer, which is not a vacuum dryer.” *Id.* at 46 (citing Ex. 1016, 227; Ex. 2010 ¶¶ 69–77, 95–99, 150). In particular, Patent Owner argues that “it was known that vibratory fluidized bed dryers operate at atmospheric pressure,” and LithoRec teaches that its “drying system contains a ‘blower,’” which “generate[s] positive pressure, not vacuum.” *Id.* (citing Ex. 1016, 235; Ex. 2010 ¶¶ 98–99, 151–152). Patent Owner is correct that LithoRec discloses the use of a vibratory fluidized bed dryer and a blower, and Vani Dantam, Patent Owner’s declarant, testifies that such a dryer and blower setup would not operate under a vacuum. Ex. 1016, 227, 235; Ex. 2010 ¶¶ 95–99, 150–152. But LithoRec also discloses that “the drying temperature should probably be severely restricted. This in turn speaks in favor of drying under vacuum, as the drying temperature can be kept low.” Ex. 1016, 226. To the extent that Dantam is correct that a vibratory fluidized bed dryer cannot be operated under a vacuum, given LithoRec’s teaching that drying under vacuum is favorable, we are not persuaded that the present record limits LithoRec’s disclosure to the use of vibratory fluidized bed dryers. We invite the parties to develop the record on this question more fully at trial.

Patent Owner next argues that LithoRec’s dryer is connected to a cross-flow hogger, that cross-flow hoggers cannot operate under vacuum, and that the connection of the dryer to the non-vacuum cross-flow hogger means that the dryer cannot operate under vacuum. Prelim. Resp. 46–47 (citing Ex. 1016, 227, 230, 235; Ex. 2010 ¶¶ 100–108, 153–158, 167). It is true that LithoRec discloses the use of a cross-flow hogger and a dryer that are connected to the same nitrogen circuit, suggesting they would operate at the same pressure. Ex. 1016, 230. Moreover, Dantam testifies that “[i]f

there were a vacuum, the cross-flow hogger would overheat, and the dust would not get carried away.” Ex. 2010 ¶ 108. But LithoRec also discloses that “the drying temperature should probably be severely restricted. This in turn speaks in favor of drying under vacuum, as the drying temperature can be kept low.” Ex. 1016, 226. To the extent that Dantam is correct that a cross-flow hogger cannot be operated under a vacuum and that LithoRec’s dryer and cross-flow hogger must operate at the same pressure, given LithoRec’s teaching that drying under vacuum is favorable, we are not persuaded that the present record limits LithoRec’s disclosure to the use of cross-flow hoggers. We invite the parties to develop the record on this question more fully at trial.

Finally, Patent Owner argues that LithoRec’s nitrogen circuit would, at best for Petitioner, operate at a very slight vacuum that is more consistent with the dryer and cross-flow hogger connected to the nitrogen circuit operating at atmospheric pressure than with those machines operating under a vacuum. Prelim. Resp. 47–48 (citing Ex. 1016, 227, 230, 235; Ex. 2010 ¶¶ 109–114, 155–158). LithoRec discloses a need “to ensure the negative pressure in the [nitrogen] circuit at all times,” and Dantam testifies that LithoRec maintains this negative pressure solely “for workplace safety reasons” and that, for these purposes, a pressure of “a few Pascals” below atmospheric pressure “would be sufficient.” Ex. 1016, 227; Ex. 2010 ¶ 113. As with the arguments discussed above, however, on the present record, LithoRec’s teaching that drying should occur under a vacuum means that LithoRec cannot be limited to any specific process that is required to operate at atmospheric pressure. We invite the parties to develop the record on this question more fully at trial.

Thus, we are persuaded, on the present record, that Petitioner shows sufficiently that LithoRec discloses a dryer that operates under a vacuum. Further, we are persuaded, on the present record, by Petitioner's argument that it shows sufficiently that a person of ordinary skill in the art would have understood that a vacuum dryer would require a connected vacuum installation. Pet. 48; Ex. 1002, 157.

c) Undisputed Limitations of Claim 12

Claim 12 also recites

12. A battery processing installation for treatment of used batteries, comprising:

- (a) a comminution unit configured to comminute the batteries such that comminuted material is obtained;
- (b) . . . wherein the inactivation device is configured to perform the inactivating step during or after the comminuting step of the comminution unit; [and]
- (c) a filling device configured to fill a transport container with the inactivated comminuted material

Ex. 1001, 11:48–61. Petitioner argues that LithoRec discloses these limitations. Pet. 39–47.

After reviewing Petitioner's arguments and information regarding the limitations identified immediately above, including the Spies Declaration, which are not addressed by Patent Owner at this stage (*see* Prelim. Resp.; Prelim. Sur-Reply), we are persuaded that Petitioner sufficiently demonstrates, for purposes of this Decision, that LithoRec discloses the preamble of claim 12 and the undisputed limitations.

d) Conclusion Regarding Claim 12

Based on the current record, we determine that Petitioner has shown a reasonable likelihood that it will prevail in demonstrating that claim 12 is

unpatentable as anticipated by LithoRec. Accordingly, we institute *inter partes* review with respect to all grounds asserted in the Petition.

4. *Claims 13, 15, 16, 18, and 19*

Because Petitioner demonstrates a reasonable likelihood of success in proving that at least one claim of the '097 patent is unpatentable, we institute on all grounds and all claims raised in the Petition. *See* 37 C.F.R.

§ 42.108(a). Therefore, at this stage of the proceeding, it is not necessary for us to provide an assessment of every challenge raised by Petitioner, especially, as in this case, when Patent Owner does not separately argue those claims. *See* Prelim. Resp. 54. Those challenges, in our view, are best left for trial after full development of the record.

E. Asserted Obviousness over LithoRec and Hanisch

Petitioner argues that claim 17 would have been obvious over LithoRec and Hanisch. Pet. 56–57. Patent Owner disagrees. Prelim. Resp. 54–55. Patent Owner's response to Petitioner's challenge to claim 17, however, is based on Petitioner not having shown sufficiently the unpatentability of claim 12, from which claim 17 depends, as anticipated by LithoRec. *Id.* Accordingly, Patent Owner does not separately address the merits of Petitioner's challenge to claim 17. Because Petitioner demonstrates a reasonable likelihood of success in proving that at least one claim of the '097 patent is unpatentable, we institute on all grounds and all claims raised in the Petition. *See* 37 C.F.R. § 42.108(a). Therefore, at this stage of the proceeding, it is not necessary for us to provide an assessment of every challenge raised by Petitioner, especially, as in this case, when Patent Owner does not separately argue this claim. This challenge, in our view, is best left for trial after full development of the record.

F. Asserted Obviousness over LithoRec, DIN 28400, and Perry

Petitioner argues that claims 1–3, 7, 8, and 10 would have been obvious over the combination of LithoRec, DIN 28400, and Perry. Pet. 17–35. Petitioner also argues that claim 9 would have been obvious over the combination of LithoRec, DIN 28400, Perry, and Hanisch. *Id.* at 35–38. Patent Owner disagrees with both of these arguments. Prelim. Resp. 26–44. Based on the current record, we are not persuaded that Petitioner has established a reasonable likelihood of prevailing on this asserted obviousness ground with respect to any challenged claim.

1. Overview of DIN 28400

DIN 28400 is a glossary that provides “Terms and Definitions” of “General terms” related to “Vacuum technology.” Ex. 1018, 1. The definitions are provided “[i]n conjunction with International standard ISO 3529-1:1981 published by the International Organization for Standardization (ISO).” *Id.* DIN 28400 provides a definition for “Vacuum,” disclosing that “Vacuum refers to the state of a gas when the pressure of the gas, and thus the number density of molecules, in a container is lower than outside.” *Id.* ¶ 1.1. Alternatively, DIN 28400 defines vacuum as “refer[ring] to the state of a gas . . . when the pressure of the gas is lower than 300 mbar, i.e. lower than the lowest atmospheric pressure on the Earth’s surface.” *Id.* In addition, DIN 28400 provides pressure ranges corresponding to “Rough (low) vacuum,” “Medium vacuum,” “High vacuum HV,” and “Ultra-high vacuum UHV.” *Id.* at Table 1. For “Rough (low) vacuum,” the applicable pressure range is disclosed to be “ $1 \cdot 10^5$ to $1 \cdot 10^2$ ” Pascals, which we note is a range of 1 to 1000 hPa. *Id.*

2. *Overview of Perry*

Perry is a copy of the Seventh Edition of Perry's Chemical Engineers' Handbook, an engineering reference book. Ex. 1006. A portion of Perry discloses information about "Batch Through-Circulation Dryers," including "Vacuum-Shelf Dryers," which Perry describes as "indirect-heated batch dryers consisting of a vacuum[-]tight chamber usually constructed of cast iron or steel plate, heated supporting shelves within the chamber, a vacuum source, and usually a condenser." *Id.* at 12-44. According to Perry, these dryers "are used extensively for drying pharmaceuticals, temperature-sensitive or easily oxidizable materials, and materials so valuable that labor cost is insignificant," and they "operate in the range of 1 to 25 mmHg pressure." *Id.* at 12-44–12-45.

3. *Analysis of Claim 1*

a) *Disputed Limitation: "Wherein the Drying Occurs at a Maximum Pressure of 300 hPa"*

Claim 1 recites "wherein the drying occurs at a maximum pressure of 300 hPa." Ex. 1001, 10:58–59. Petitioner contends that DIN 28400 and Perry teach or suggest this limitation and that a person of ordinary skill in the art would have had a reason to combine the teachings of these references with those of LithoRec. Pet. 24–28.

(1) *Combination of LithoRec and DIN 28400*

Petitioner argues that "LithoRec discloses general conditions at which drying should occur, including keeping pressures low in order accommodate the evaporation of highly flammable solvents" but that "LithoRec does not explicitly teach a specific vacuum pressure to be used." *Id.* at 25. Instead, Petitioner argues first that "DIN 28400 teaches the conditions that define a vacuum according to the international standard ISO 3529-1: 1981 that was

issued by the International Organization for Standardization (ISO)” and that “[o]ne of the conditions that meets the international standard ISO 3529-1: 1981 for a vacuum is that the pressure is between 0 and 300 millibars (i.e., between 0 and 300 hPa).” *Id.* at 25–26 (citing Ex. 1018 ¶ 1.1). For this reason, Petitioner argues that a pressure of 300 hPa or less “was well known for producing a vacuum,” “was part of the international standard and thus certainly would have been used by a [person of ordinary skill in the art] who already knew to implement a dryer with a vacuum from LithoRec.” *Id.* at 26.

We do not find Petitioner’s argument persuasive. First, although DIN 28400 states that one definition of a vacuum is “the state of a gas . . . when the pressure of the gas is lower than 300 mbar,” it also defines a vacuum as “the state of a gas when the pressure of the gas, and thus the number density of molecules, in a container is lower than outside,” and it includes pressures as high as 1000 hPa in its definition of “Rough (low) vacuum.” Ex. 1018 ¶ 1.1, Table 1. Petitioner does not explain why a person of ordinary skill in the art would have chosen the 300-mbar definition over either of the other definitions, neither of which is limited to the “maximum pressure of 300 hPa” of claim 1. Pet. 25–26. Moreover, Petitioner does not cite any evidence to support its contention that, because a pressure of 300 hPa or less “was part of the international standard,” it “certainly would have been used by a [person of ordinary skill in the art] who already knew to implement a dryer with a vacuum from LithoRec.” *Id.* at 26.

(2) Combination of LithoRec and Perry

As noted above, Petitioner argues that “LithoRec discloses general conditions at which drying should occur, including keeping pressures low in

order accommodate the evaporation of highly flammable solvents” but that “LithoRec does not explicitly teach a specific vacuum pressure to be used.” *Id.* at 25. Petitioner argues next that “Perry includes a section devoted to vacuum dryers and teaches an operating pressure range for an exemplary type of vacuum dryer,” specifically a “[s]helf vacuum dryer[,]” which “‘operate[s] in the range of 1 to 25 mmHg pressure’ (1.33 to 33.33 hPa).” *Id.* at 26 (quoting Ex. 1006, 12-45). According to Petitioner, because “Perry provides a concrete example of a vacuum dryer operating within the claimed range, . . . a [person of ordinary skill in the art] would have been motivated to select a vacuum pressure for the dryer of LithoRec within the claimed range.” *Id.*

We do not find Petitioner’s argument persuasive. Petitioner does not explain why a person of ordinary skill in the art would have considered Perry’s teachings regarding a shelf vacuum dryer to define the operating pressure for the vacuum dryer of LithoRec. *Id.* This lack of explanation is particularly troublesome given the teachings of LithoRec that “batch drying is not used” and of Perry that “[v]acuum-shelf dryers are indirect-heated batch dryers.” Ex. 1006, 12-44; Ex. 1016, 226.

b) Conclusion Regarding Claim 1

Based on the current record, we determine that Petitioner has not shown a reasonable likelihood that it will prevail in demonstrating that claim 1 is unpatentable as obvious in view of LithoRec, DIN 28400, and Perry. Nevertheless, for the reasons discussed above with respect to claim 12, we institute trial with respect to all challenged claims on all grounds asserted in the Petition.

4. *Claims 2, 3, and 7–10*

As discussed above, Petitioner does not show a reasonable likelihood that it will prevail in demonstrating that claim 1 would have been obvious over LithoRec, DIN 28400, and Perry. Petitioner relies on its arguments with respect to claim 1 in arguing for the obviousness of claims 2, 3, and 7–10, all of which depend from claim 1. Pet. 28–35, 37–38. Accordingly, Petitioner does not show a reasonable likelihood that it will prevail in demonstrating that claims 2, 3, 7, 8, and 10 would have been obvious over LithoRec, DIN 28400, and Perry, or that it will prevail in demonstrating that claim 9 would have been obvious over LithoRec, DIN 28400, Perry, and Hanisch. Nevertheless, for the reasons discussed above with respect to claim 12, we institute trial with respect to all challenged claims on all grounds asserted in the Petition.

III. CONCLUSION

For the reasons set forth above, we determine that Petitioner has demonstrated a reasonable likelihood of prevailing with respect to at least one challenged claim of the '097 patent, and we institute *inter partes* review on all challenged claims and on all grounds presented.

Our factual findings, conclusions of law, and determinations at this stage of the proceeding are preliminary, and based on the evidentiary record developed thus far. This is not a final decision as to the patentability of claims for which *inter partes* review is instituted. Our final decision will be based on the record as fully developed during trial.

IV. ORDER

In consideration of the foregoing, it is hereby:

ORDERED that, pursuant to 35 U.S.C. § 314(a), an *inter partes* review is instituted for claims 1–3, 7–10, 12, 13, and 15–19 of the '097 patent on the grounds asserted in the Petition; and

FURTHER ORDERED that, pursuant to 35 U.S.C. § 314(c) and 37 C.F.R. § 42.4, notice is hereby given of the institution of a trial, which shall commence on the entry date of this decision.

IPR2024-00887
Patent 11,050,097 B2

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