

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

EVAPCO DRY COOLING, INC.,
Petitioner,

v.

SPG DRY COOLING USA LLC,
Patent Owner.

IPR2021-00687
Patent 10,551,126 B2

Before NEIL T. POWELL, GEORGE R. HOSKINS, and
SEAN P. O'HANLON, *Administrative Patent Judges*.

O'HANLON, *Administrative Patent Judge*.

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

I. INTRODUCTION

A. Background

Evapco Dry Cooling, Inc. (“Petitioner”) filed a Petition for *inter partes* review of claims 1–20 (“the challenged claims”) of U.S. Patent No. 10,551,126 B2 (Ex. 1001, “the ’126 patent”). Paper 2 (“Pet.”), 1. SPG Dry Cooling USA LLC (“Patent Owner”) filed a Preliminary Response. Paper 7 (“Prelim. Resp.”). With our authorization (*see* Ex. 3001), Petitioner filed a Preliminary Reply to the Preliminary Response (Paper 9, “Prelim. Reply”) and Patent Owner filed a Preliminary Sur-reply to the Preliminary Reply (Paper 10, “Prelim. Sur-reply”).

Institution of an *inter partes* review is authorized by statute only when “the information presented in the petition . . . and any response . . . 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). A decision to institute may not institute on fewer than all claims challenged in the petition. *SAS Inst. Inc. v. Iancu*, 138 S. Ct. 1348, 1354, 1359–60 (2018). If the PTAB institutes a trial, the PTAB will institute on all challenges raised in the petition. *See* Patent Trial and Appeal Board Consolidated Trial Practice Guide (“CTPG”) 64 (Nov. 2019) (“The Board will not institute on fewer than all claims or all challenges in a petition.”);¹ *see also AC Techs. S.A. v. Amazon.com, Inc.*, 912 F.3d 1358, 1364 (Fed. Cir. 2019) (“[I]f the Board institutes an IPR, it must . . . address all grounds of unpatentability raised by the petitioner.”).

¹ Available at <https://www.uspto.gov/TrialPracticeGuideConsolidated>.

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). For the reasons set forth below, upon considering the briefs and evidence of record, we conclude that the information presented shows that there is a reasonable likelihood that Petitioner would prevail in establishing the unpatentability of at least one of the challenged claims. Thus, we institute *inter partes* review of all challenged claims based on all asserted grounds.

B. Real Parties in Interest

Petitioner identifies itself and its parent company, Evapco, Inc., as real parties in interest. Pet. 119.

Patent Owner identifies itself as the sole real party in interest. Paper 4, 2.

C. Related Matters

The parties indicate that the '126 patent is the subject of the following district court proceeding:

SPG Dry Cooling USA LLC v. Evapco Dry Cooling, Inc.,
No. 3-20-cv-20131 (D.N.J. filed December 22, 2020).

Pet. 119; Paper 4, 2; Paper 6, 2. The parties further note various patents and patent applications in the priority chain of the '126 patent and petitions for *inter partes* review concerning two of the identified patents. Pet. 119; Paper 4, 2; Paper 6, 2.

D. The Challenged Patent

The '126 patent discloses “a mechanical draft cooling tower that utilizes air cooled condenser modules.” Ex. 1001, 1:22–23. Figures 1 and 2 illustrate the air-cooled condenser module and are reproduced below.

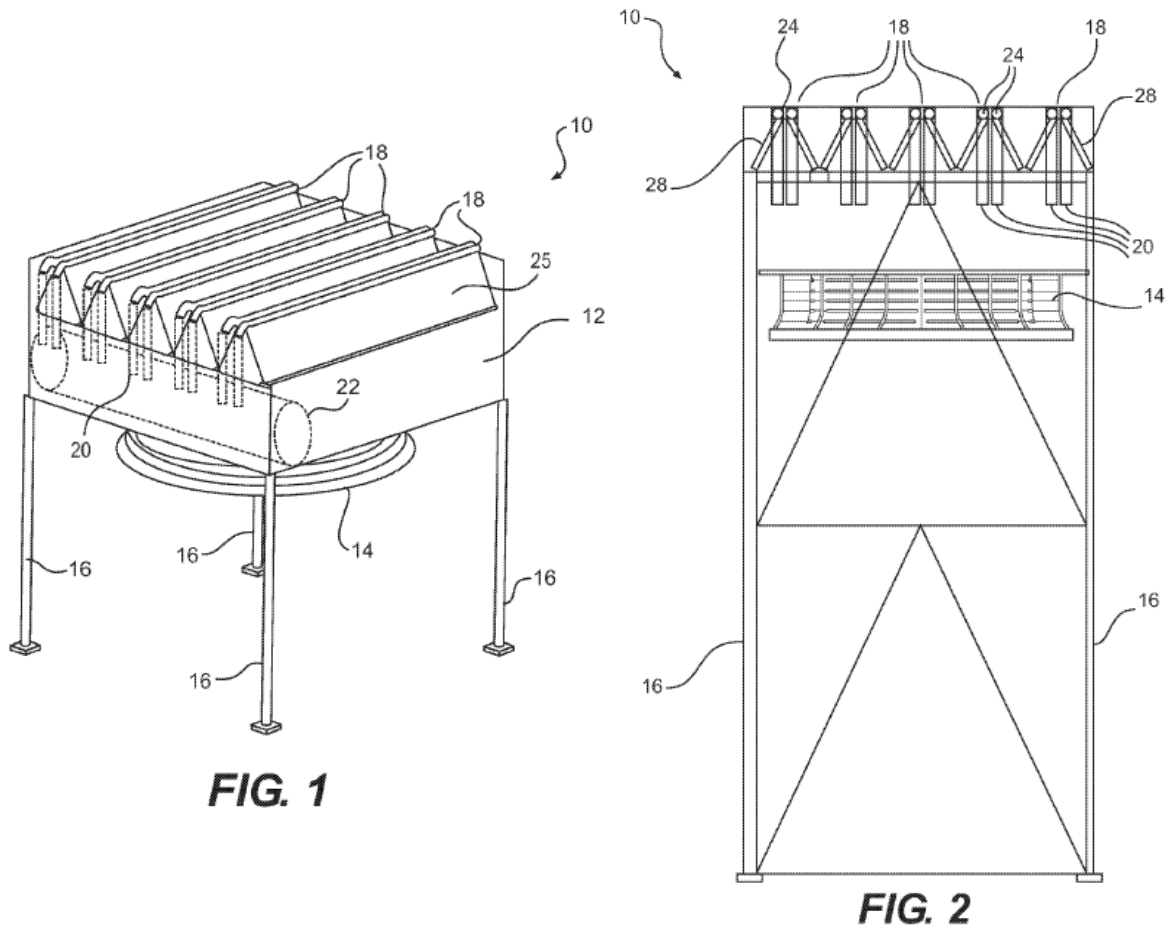


Figure 1 is a perspective view of air-cooled condenser module 10, and Figure 2 is a side view of the air-cooled condenser module. *Id.* at 4:5–10. The air-cooled condenser module includes multiple A-type geometry deltas 18, with each delta comprising two tube bundle assemblies 28. *Id.* at 4:57–60. Each tube bundle assembly includes a series of finned tubes to conduct heat transfer and a condensate header 27. *Id.* at 4:49–50, 4:63–66,

5:11–14, Fig. 4. The air-cooled condenser module also includes a fan disposed within fan shroud 14. *Id.* at 4:43–47.

The cooling towers are used to remove heat from steam or another industrial process fluid flowing through the tubes by a mechanical draft of a cooling fluid, such as atmospheric air, generated by the fan. Ex. 1001, 1:23–30. Steam flows in through main steam duct 22 and enters finned tubes 25 via risers 20 and manifolds 24. *Id.* at 4:53–58.

Each delta 18 is comprised of two individual heat exchange bundle assemblies 28, each bundle assembly including a series of finned tubes 25. Ex. 1001, 4:63–66. Each tube is approximately two meters long and each bundle is approximately 12 meters long. *Id.* at 4:66–5:1. The bundles of each pair preferably are positioned at an angle of approximately 20°–30° on either side of vertical. *Id.* at 5:1–10. This A-type configuration allows the bundles to self-support one another. *Id.* at 6:39–43. Each module typically consists of five deltas 18. *Id.* at 6:37–39, Figs. 1–2. The '126 patent purports that this provides a relatively large number of tubes that, combined with the relatively short tube length, increases heat transfer efficiency. *Id.* at 5:14–53.

The '126 patent issued from Application No. 16/196,840 (“the '840 application”) which is a continuation of Application No. 14/812,513, which is a continuation of Application No. 13/478,827 (issued as U.S. Patent No. 9,551,532). Ex. 1001, codes (21), (63), 1:7–23; Ex. 1002, 506. U.S. Patent No. 10,527,354 (Ex. 2004, “the '354 patent”), which issued from Application No. 16/515,363, is a continuation of the '840 application. Ex. 2004, codes (21), (63).

E. The Challenged Claims

Petitioner challenges claims 1–20 of the '126 patent. Pet. 1. Claims 1, 12, and 20 are independent. Claim 1 is illustrative of the challenged claims and is reproduced below:

1. A mechanical draft modular air cooled condenser comprising:
 - a first condenser pair including:
 - a first condenser bundle panel having a first top end and a first bottom end;
 - a first manifold disposed near the first top end;
 - a first condensate header connected to the first bottom end;
 - a second condenser bundle panel consecutive to the first condenser bundle panel, the second condenser bundle panel having a second top end and a second bottom end; and
 - a second condensate header connected to the second bottom end, the second condensate header parallel to the first condensate header, the first bottom end of the first condenser bundle panel and the second bottom end of the second condenser bundle converging toward each other;
 - a second condenser pair including:
 - a third condenser bundle panel consecutive to the second condenser bundle panel, the third condenser bundle panel having a third top end and a third bottom end, the second top end of the second condenser bundle panel and the third top end of the third condenser bundle panel converging toward each other;
 - a second manifold disposed near the second top end and the third top end, the first condensate header and the second condensate header disposed horizontally between and vertically below the first manifold and the second manifold;
 - a third condensate header connected to the third bottom end, the third condensate header parallel to the

first condensate header and parallel to the second condensate header;

a fourth condenser bundle panel consecutive to the third condenser bundle panel, the fourth condenser bundle panel having a fourth top end and a fourth bottom end; and

a fourth condensate header connected to the fourth bottom end, the fourth condensate header parallel to the third condensate header, the third bottom end of the third condenser bundle panel and the fourth bottom end of the fourth condenser bundle converging toward each other;

a shroud that houses a single fan, the single fan positioned to create a draft to flow over the first condenser bundle panel, over the second condenser bundle panel, over the third condenser bundle panel, and over the fourth condenser bundle panel; and

a support frame that supports the first, second, third, and fourth condenser bundle panels.

Ex. 1001, 6:60–7:46.

F. Asserted Grounds of Unpatentability

The Petition relies on the following prior art references:

Name	Reference	Exhibit
Schulenberg	US 3,073,575, issued January 15, 1963	1004
EPRI	<i>Air-Cooled Condenser Design, Specification, and Operation Guidelines</i> , Final Report, Electric Power Research Institute, December 2005	1005
Kröger	Detlev G. Kröger, <i>Air-Cooled Heat Exchangers and Cooling Towers: Thermal-Flow Performance Evaluation and Design</i> , PennWell Corp., 2004	1006
O’Kane	CA 2 444 475, issued February 16, 2010	1009
Schabosky	US 2009/0178279 A1, published July 16, 2009	1010

Petitioner asserts the following grounds of unpatentability:

Claim(s) Challenged	35 U.S.C. §	Reference(s)
1–20	103(a) ²	EPRI, Kröger
5, 6, 15	103(a)	EPRI, Kröger, Schabosky, O’Kane
1–20	103(a)	Schulenberg, Kröger
5, 6, 15	103(a)	Schulenberg, Kröger, Schabosky, O’Kane

Pet. 1. Petitioner submits a declaration of Anthony Jacobi, Ph.D. (Ex. 1003, “Jacobi Declaration”) in support of its contentions.

II. ANALYSIS

A. Principles of Law

Petitioner bears the burden of persuasion to prove unpatentability, by a preponderance of the evidence, of the claims challenged in the Petition. 35 U.S.C. § 316(e). This burden never shifts to Patent Owner. *Dynamic Drinkware, LLC v. Nat’l Graphics, Inc.*, 800 F.3d 1375, 1378 (Fed. Cir. 2015). The Board may authorize an *inter partes* review if we determine that the information presented in the Petition and Patent Owner’s Preliminary Response shows that there is a reasonable likelihood that Petitioner would prevail with respect to at least one of the claims challenged in the Petition. 35 U.S.C. § 314(a).

² The application resulting in the ’126 patent claims priority to a date prior to the date when the Leahy-Smith America Invents Act (“AIA”), Pub. L. No. 112–29, 125 Stat. 284 (2011), took effect. Thus, we refer to the pre-AIA version of section 103.

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 the 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) when in evidence, any objective evidence of nonobviousness.³ *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966).

B. Level of Ordinary Skill in the Art

The level of ordinary skill in the art is “a prism or lens” through which we view the prior art and the claimed invention. *Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001). The person of ordinary skill in the art is a hypothetical person presumed to have known the relevant art at the time of the invention. *In re GPAC Inc.*, 57 F.3d 1573, 1579 (Fed. Cir. 1995). In determining the level of ordinary skill in the art, we may consider certain factors, including 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.” *Id.* (internal quotation marks and citation omitted).

³ At this stage of the proceeding, the parties have not directed us to any such objective evidence.

Petitioner contends that a person having ordinary skill in the art at the time of the invention (“POSITA”) “would have had at least a Bachelor’s degree in an academic area emphasizing chemical engineering, mechanical engineering, or a similar discipline, and at least two years of experience in the field working with heat exchangers.” Pet. 4 (citing Ex. 1003 ¶ 12).

Patent Owner does not contest Petitioner’s proposed definition or offer one of its own. *See generally* Prelim. Resp.

We find Petitioner’s description to be consistent with the problems and solutions disclosed in the patent and prior art of record, and adopt it as our own for purposes of this Decision. *See, e.g., GPAC*, 57 F.3d at 1579 (approving the determination of the level of ordinary skill in the art by appeal to the references of record).

C. Claim Construction

In an *inter partes* review, claims are construed using the same claim construction standard that would be used to construe the claims in a civil action under 35 U.S.C. § 282(b), including construing the claims in accordance with the ordinary and customary meaning of such claims as understood by one of ordinary skill in the art and the prosecution history pertaining to the patent. 37 C.F.R. § 42.100(b). Thus, we apply the claim construction standard as set forth in *Phillips v. AWH Corp.*, 415 F.3d 1303 (Fed. Cir. 2005) (en banc). In addition to the specification and prosecution history, we also consider use of the terms in other claims and extrinsic evidence including expert and inventor testimony, dictionaries, and learned treatises, although extrinsic evidence is less significant than the intrinsic

record. *Id.* at 1312–17. Usually, the specification is dispositive, and it is the single best guide to the meaning of a disputed term. *Id.* at 1315.

Only those terms that are in controversy need be construed, and only to the extent necessary to resolve the controversy. *Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017) (citing *Vivid Techs., Inc. v. Am. Sci. & Eng’g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999)).

Petitioner contends that “no express constructions are required.”
Pet. 4.

Patent Owner does not propose a construction for any claim term. *See generally* Prelim. Resp.

For purposes of this Decision, and based on the record before us, we determine that no construction of any term is necessary. We note that this determination does not preclude the parties from arguing their proposed constructions of the claims during trial. Indeed, the parties are hereby given notice that claim construction, in general, is an issue to be addressed at trial. A final determination as to claim construction will be made at the close of the proceeding, after any hearing, based on all the evidence of record. The parties are expected to assert all of their claim construction arguments and evidence in the Petition, Patent Owner’s Response, Petitioner’s Reply, or otherwise during trial, as permitted by our rules.

D. Overview of the Asserted Prior Art

1. Schulenberg

Schulenberg discloses an air-cooled surface condenser. Ex. 1004, 1:9–17. Figure 3 illustrates a vertical section view of the condenser and is reproduced below.

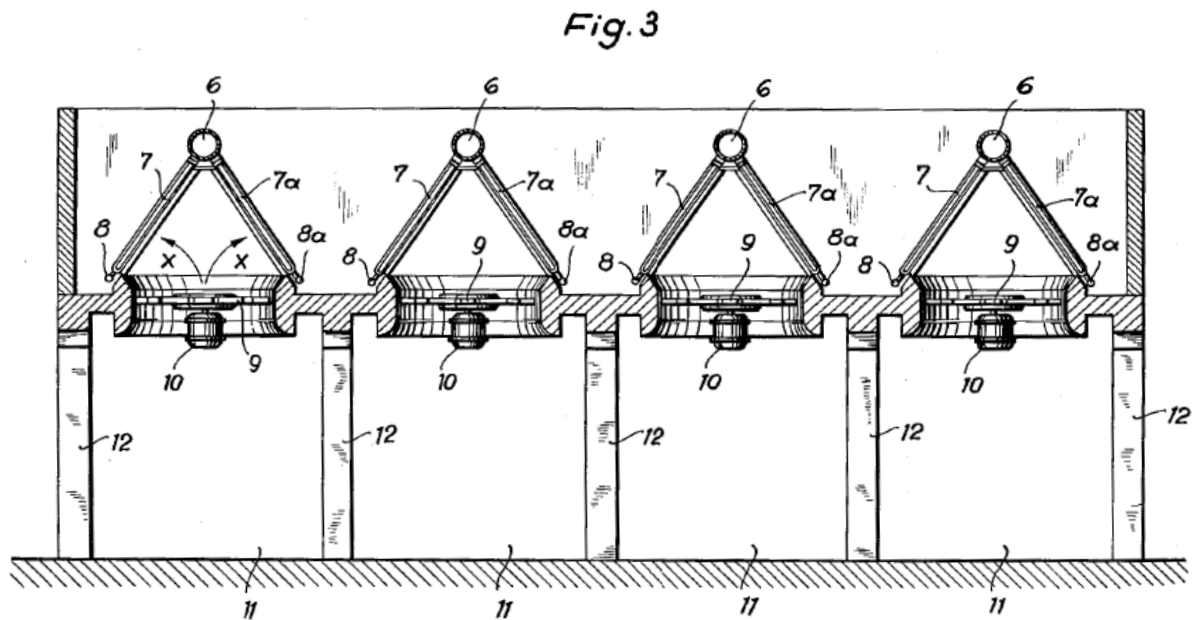


Figure 3 is a vertical section view of the condenser. *Id.* at 3:29–30. Steam from an electric generator enters the condenser via steam distribution conduits 6 and passes into condenser elements 7, 7a. *Id.* at 3:49–67, Fig. 1. The condenser elements are arranged in roof-shape to form an equilateral triangle with lower ends connected to condenser collecting conduits 8, 8a. *Id.* at 3:68–4:2. Blowers 9 are positioned beneath the condenser elements. *Id.* at 4:2–7. The blowers draw air through suction apertures 12 provided in the sides of chamber 11 and force the drawn air upwards through the condenser elements. *Id.* at 4:22–27.

Each condenser element includes multiple rows of parallel ribbed tubes. Ex. 1004, 4:43–55, Figs. 5–6. This arrangement, however, causes the tubes in the different rows to experience different condensation conditions due to the drop in the temperature difference between the cooling air and steam as the air passes through the rows of tubes. *Id.* at 5:35–42. Ensuring that the cooling air is cold enough for tubes further away from the fan, however, can lead to condensate freezing within the tubes positioned closer to the fans. *Id.* at 5:42–6:5, Fig. 5. To overcome this problem, Schulenberg provides throttling devices that limit the amount of steam that can enter the tubes positioned further away from the fans. *Id.* at 2:29–50, 6:6–11. Such throttling devices may be in the form of nozzles (*id.* at 6:11–14, Fig. 6) or diaphragms (*id.* at 6:39–45, Fig. 7). The cross-sectional areas of these throttling devices are gauged based on the steam temperature and the mean cooling air temperature in the region of the respective rows of tubes so that condensate from all tube rows enters condensate collecting chamber 19 at the same temperature. *Id.* at 6:14–29, 6:49–56. The blowers can be regulated so that condensation occurs along substantially the entire length of the tubes. *Id.* at 6:29–38.

2. EPRI

EPRI is a technical report issued by the Electric Power Research Institute that “provides information to guide the development and specification of [air-cooled condenser (‘ACC’)] design conditions.”

Ex. 1005, v.⁴ Figure 2-6 provides a schematic drawing of an ACC and is reproduced below.

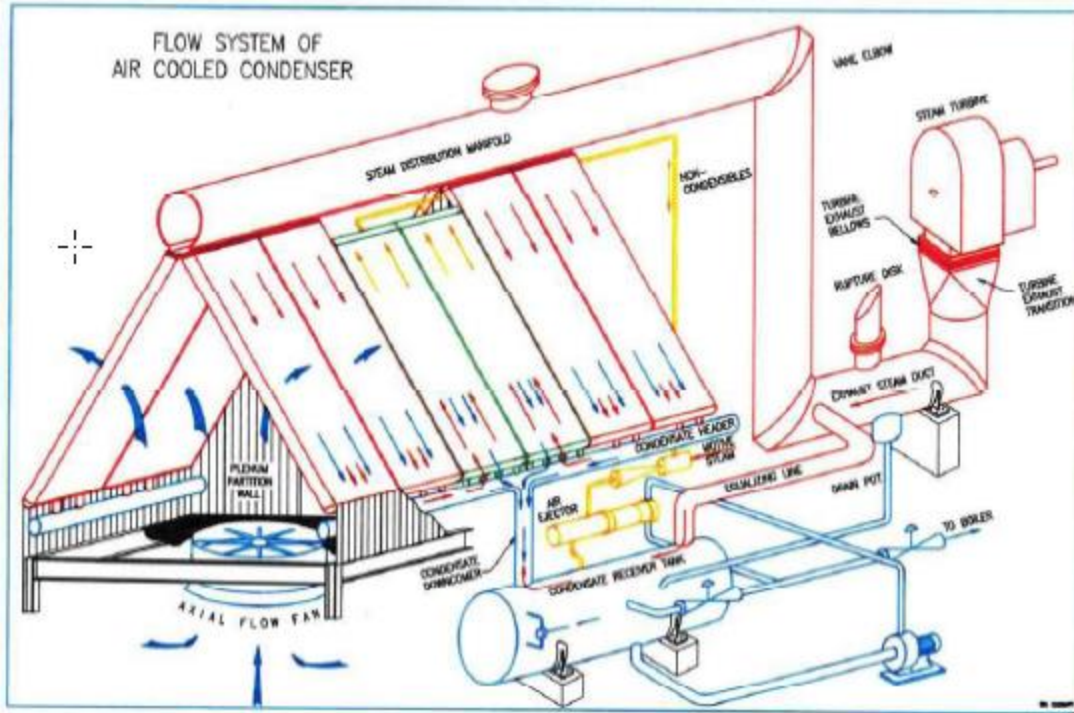


Figure 2-6

Figure 2-6 is a schematic of an ACC. *Id.* at 2-8. Exhaust steam from a turbine is ducted from the turbine exit through a series of ducts to a steam distribution manifold. *Id.* at 2-5. The “steam distribution manifold . . . runs horizontally along the apex of a row of finned-tube, air-cooled heat exchangers arranged in an A-frame (or delta) configuration. A typical full-scale ACC consists of several such rows, sometimes referred to as ‘streets’ or ‘lanes.’” *Id.* “Each row consists of several cells,” and “[e]ach cell consists of several bundles of finned tubes arranged in parallel, inclined

⁴ We note that Petitioner cites to the document pagination rather than the exhibit pagination. *See, e.g.*, Pet. 11. We likewise cite to the document pagination for consistency.

rows in both walls of the A-frame cell.” *Id.* “Steam from the steam distribution manifold enters the tubes at the top, condenses on the inner tube walls and flows downward (concurrent with remaining uncondensed steam) to condensate headers at the bottom of the bundles.” *Id.* “Large axial flow fans . . . are located in the floor of the cells” and “provid[e] forced-draft air cooling to the finned-tube heat exchangers.” *Id.*

3. Kröger

Kröger is a handbook intended “to provide modern analytical and empirical tools for evaluation of the thermal-flow performance or design of air-cooled heat exchangers and cooling towers.” Ex. 1006, x.⁵ Kröger describes, *inter alia*, a hybrid system that combines features of an air-cooled heat exchanger and a wet-cooling tower. *Id.* at 27. One example of such a hybrid system includes auxiliary dry/wet coolers located outside the cooling tower. *Id.* at 30. “These coolers consist of heat exchanger bundles arranged in a V-configuration below an axial flow fan.” *Id.* This auxiliary cooler is pictured in Figure 1.3.3 reproduced below.

⁵ We note that Petitioner cites to the document pagination rather than the exhibit pagination. See, e.g., Pet. 23. We likewise cite to the document pagination for consistency.



Figure 1.3.3 is a picture of auxiliary dry/wet cooling cells. *Id.*

4. *O’Kane*

O’Kane relates to a method and package system for transporting large longitudinal items such as wind turbine blades and towers. Ex. 1009, 1:4–10. O’Kane discloses that the frames of the package system have widths that are preferably smaller than or the same size as the width of a standard freight container. *Id.* at 9:5–7. In particular, O’Kane discloses that the width of a standard freight container is approximately eight feet, the height is approximately eight feet, and the length is twenty or forty feet. *Id.* at 9:7–13.

5. *Schabosky*

Schabosky discloses “a method for setting up a condensation facility.” Ex. 1010 ¶ 1. One objective of Schabosky is to improve preassembly of

pipe bundles that are to be connected to form a delta. *Id.* ¶ 7. Figure 1 of Schabosky illustrates a pipe bundle assembly and is reproduced below.

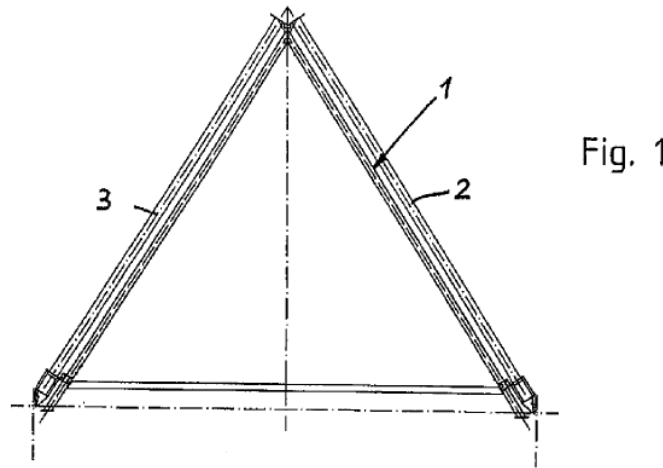


Figure 1 depicts roof-shaped preassembly frame 1 on which pipe bundles 2, 3 are placed for connection. *Id.* ¶ 25. The pipe bundles are connected to each other at their roof ridge region to form a heat exchanger delta. *Id.* At installation, a crane moves the preassembly frame and connected pipe bundles into position for welding the heat exchanger delta to a steam distribution line. *Id.*

E. Discretion Under 35 U.S.C. § 325(d)

Patent Owner argues that we should exercise our discretion under 35 U.S.C. § 325(d) to deny institution of *inter partes* review because substantially the same prior art and arguments advanced by Petitioner were presented during prosecution of the application resulting in the '126 patent. Prelim. Resp. 10–34.

1. Legal Framework

Institution of *inter partes* review is discretionary. *See Harmonic Inc. v. Avid Tech., Inc.*, 815 F.3d 1356, 1367 (Fed. Cir. 2016) (“[T]he PTO is

permitted, but never compelled, to institute an IPR proceeding.”); 35 U.S.C. § 314(a). Pursuant to 35 U.S.C. § 325(d), in determining whether to institute an *inter partes* review, “the Director may take into account whether, and reject the petition or request because, the same or substantially the same prior art or arguments previously were presented to the Office.”⁶ In evaluating whether to exercise our discretion to deny institution under § 325(d), we weigh the following non-exclusive factors:

- (a) the similarities and material differences between the asserted art and the prior art involved during examination;
- (b) the cumulative nature of the asserted art and the prior art evaluated during examination;
- (c) the extent to which the asserted art was evaluated during examination, including whether the prior art was the basis for rejection;
- (d) the extent of the overlap between the arguments made during examination and the manner in which Petitioner relies on the prior art or Patent Owner distinguishes the prior art;
- (e) whether Petitioner has pointed out sufficiently how the Examiner erred in its evaluation of the asserted prior art; and
- (f) the extent to which additional evidence and facts presented in the Petition warrant reconsideration of the prior art or arguments.

Becton, Dickinson & Co. v. B. Braun Melsungen AG, IPR2017-01586, Paper 8 at 17–18 (PTAB Dec. 15, 2017) (designated precedential in relevant part). Although *Becton, Dickinson* involved prior art or arguments that were presented during examination of the patent application, the enumerated factors “should be read broadly . . . to apply to any situation in which a

⁶ The Board institutes trial on behalf of the Director. 37 C.F.R. § 42.4(a).

petition relies on the same or substantially the same art or arguments previously presented to the Office during a proceeding pertaining to the challenged patent.” *Advanced Bionics, LLC v. Med-El Electromedizinische Geräte GMBH*, IPR2019-01469, Paper 6 at 10 (Feb. 13, 2020) (designated precedential). Factors (a), (b), and (d) relate to whether the art and arguments presented in the petition are the same or substantially the same as those previously presented to the Office. *Id.* Factors (c), (e), and (f) “relate to whether the petitioner has demonstrated a material error by the Office” in its prior consideration of that art or arguments. *Id.*

Thus, under § 325(d), the Board uses the following two-part framework: (1) whether the same or substantially the same art previously was presented to the Office or whether the same or substantially the same arguments previously were presented to the Office; and (2) if either condition of [the] first part of the framework is satisfied, whether the petitioner has demonstrated that the Office erred in a manner material to the patentability of [the] challenged claims.

Id. at 8.

2. Background

The ’126 patent was filed as the ’840 application on November 20, 2018, with nine claims, of which claim 1 was independent. Ex. 1002, 522–24. On December 26, 2018, Patent Examiner Kamran Tavakoldavani⁷ rejected claim 1 as being obvious over Vouche⁸ in view of Nobel.⁹ *Id.* at 352–55. The Examiner found Vouche to disclose, *inter alia*, a

⁷ We note that Examiner Tavakoldavani also examined the application resulting in the ’354 patent. *See, e.g.*, Ex. 2005, 18.

⁸ US 2009/0220334 A1, published September 3, 2009 (Ex. 2001).

⁹ US 2010/0263840 A1, published October 21, 2010 (not of record).

condenser module comprising four condenser bundles, four condensate headers, and a shroud housing a fan. *Id.* at 352–54. The Examiner provided an annotated version of Vouche Figure 1 showing the components mapped to the claim elements. *Id.* at 354. The Examiner found Nobel to teach a single fan positioned to create a draft over four condenser bundles. *Id.* at 354–55.

The Applicant responded on March 12, 2019, by amending claim 1 to recite, *inter alia*, that the four condensate headers are parallel. Ex. 1002, 328–29. The Applicant argued that Nobel failed to teach a fan positioned to create a draft over four condenser bundles that include parallel condensate headers. *Id.* at 335–36.

On April 9, 2019, an unidentified third-party made a submission of prior art. Ex. 1002, 237–323. The submission was filed by Petitioner’s lead counsel, Mr. Hyun Jin In, on behalf of the third-party. *Id.* at 318, 319, 321. The submission disclosed four references, including Kutscher¹⁰ and Draper.¹¹ *Id.* at 238. Mr. In argued that Kutscher and Draper disclosed a single fan over a plurality of bundles. *See, e.g., id.* at 239.

On June 20, 2019, the Examiner issued a Final Office Action maintaining the rejection based on Vouche and Nobel. Ex. 1002, 206–09. The Examiner provided an annotated version of Vouche Figure 1 showing the components mapped to the claim elements. *Id.* at 208. Notably, the Examiner’s mapping included unreferenced condenser bundles between the annotated second and third bundles and between the annotated third and fourth bundles. *Id.*

¹⁰ US 6,378,605 B1, issued April 30, 2002 (Ex. 2002).

¹¹ US 4,470,271, issued September 11, 1984 (Ex. 2003).

The Applicant responded on July 10, 2019, by amending claim 1 to recite that the second and third condensate headers are adjacent to each other. Ex. 1002, 183–84. The Applicant argued that Vouche failed to disclose such adjacent condensate headers. *Id.* at 188–92. The Applicant also repeated the previous arguments regarding Nobel. *Id.* at 193–97. The Examiner issued an Advisory Action on July 30, 2019, maintaining the prior rejections. *Id.* at 172–73.

The Applicant filed a Request for Continued Examination on September 10, 2019, amending claim 1 by deleting the requirement for the second and third condensate headers to be adjacent to each other and adding requirements that condenser bundles are “consecutive to” each other. Ex. 1002, 155–56. The Applicant argued that the condenser bundles identified by the Examiner were not consecutive due to intervening bundles between the second and third condenser bundles and between the third and fourth condenser bundles. *Id.* at 165–66. The Applicant reproduced the Examiner’s annotated version of Vouche Figure 1, further annotated to identify the intervening bundles. *Id.* at 166. The Applicant further amended claim 1 to recite that the tubes of the condenser bundles have two ends with one end being lower than the other and connected to the respective condensate header. *Id.* at 155–56. The Applicant also added several new claims, including claims 15, 22, and 25. *Id.* at 158–63. Claim 15 depended directly from claim 1 and added requirements that the condensate headers are substantially horizontal and the second and third condenser bundles are angled approximately 20°–30° on opposite sides of a vertical axis. *Id.* at 158. Claim 22 depended indirectly from added independent claim 20 and added recitations of first and second manifolds positioned in particular

locations with the first and second condensate headers positioned between and vertically below the manifolds. *Id.* at 161. Claim 25 was independent and contained recitations similar to those of claim 1, but requiring certain ends of certain tubes to converge toward each other. *Id.* at 162–63.

On September 30, 2019, the Examiner issued an Office Action rejecting claim 1 as obvious over Vouche in view of Nobel and Kutscher. Ex. 1002, 109–15. The Examiner relied on Vouche in a similar manner as with previous Office Actions and, additionally, to teach “consecutive” condenser bundles because “all the bundles are back-to-back/sequent/straight to one another.” *Id.* at 109–11. The Examiner provided an annotated version of Vouche Figure 1 showing the components mapped to the claim elements. *Id.* at 111. The Examiner relied on Nobel to teach a single fan positioned to create a draft over four condenser bundles. *Id.* at 111–12. The Examiner relied on Kutscher to teach lower tube ends connected to condensate headers. *Id.* at 113–15. The Examiner indicated that claims 15–19 and 22–24 contained allowable subject matter. *Id.* at 103.

The Applicant responded on October 21, 2019, by, *inter alia*, amending each of claim 15 and claim 22 to be in independent form, canceling certain claims, and amending certain other claims to depend from one of claims 15 and 22. Ex. 1002, 60–70. The Applicant also amended claim 25 to recite first and second manifolds with the first and second condensate headers positioned between and vertically below the manifolds and an additional “converging” requirement. *Id.* at 67–68.

On November 29, 2019, the Examiner issued a Notice of Allowance. Ex. 1002, 21–30. The Examiner’s rationale for allowing the claims is not readily apparent. *See id.* at 26–28. The Examiner appeared to indicate that

having two tube bundles arranged at the same angle on either side of a vertical axis was the reason for allowance. *Id.* (providing findings regarding the disclosure of the cited references). Notably, this reason for allowance appears to refer to the language of claim 15. *See id.* at 158. The Examiner issued a corrected Notice of Allowance on December 12, 2019, to indicate that the third-party submission had been considered. *Id.* at 11–15. Claim 22 issued as independent claim 1, claim 25 issued as independent claim 12, and claim 15 issued as independent claim 20. *Id.* at 36.

3. Analysis

a. Whether the Same or Substantially the Same Art Was Presented to the Office

Applying the *Advanced Bionics* framework, we first determine whether the same or substantially the same art or arguments were presented previously to the Office. Petitioner asserts five references in challenging the claims of the '126 patent here: EPRI, Schulenberg, Kröger, Schabosky, and O'Kane. *E.g.*, Pet. 1. Patent Owner argues that three of these references are substantially the same as art that previously was before the Office: EPRI, Schulenberg, and Kröger. Prelim. Resp. 10–34. For the reasons discussed below, we agree in part with Patent Owner.

i. EPRI

Patent Owner argues that EPRI contains substantially the same disclosure as Vouche. Prelim. Resp. 16–19, 24. According to Patent Owner, Petitioner relies on EPRI to disclose the same air cooled condenser structure as disclosed in Vouche. *Id.* at 16–19. Patent Owner also argues that Petitioner presents substantially the same arguments as did the Examiner during prosecution of the '126 patent. *Id.* at 25–28.

Petitioner argues that the references relied upon in the Petition “were not cited during prosecution” and are “materially different from and not cumulative of the prior art of record.” Prelim. Reply 1. Petitioner argues that EPRI is materially different from Vouche because Vouche’s headers are coupled to non-consecutive condenser bundles and Petitioner relies on EPRI to disclose or teach “distinct first/second/third/fourth condensate headers.” *Id.* at 4–7.

Patent Owner argues that, during prosecution, the Examiner consistently found Vouche to disclose consecutive bundle panels. Prelim. Sur-reply 5–6 (citing Ex. 1002, 27).

Initially, we note that the fact that a reference asserted in the Petition was not cited during prosecution or relied upon to reject a claim (*see* Prelim. Reply 1–3) is of no moment, as Patent Owner argues not that the *same* references relied upon in the Petition were cited or considered by the Examiner, but that the Petition’s references are *substantially the same* as the references that were before the Examiner during prosecution. *See, e.g.*, Prelim. Resp. 11 (“the asserted art in the Petition is substantially the same as art previously considered by the Office”); Prelim. Sur-reply 1.

Regarding the difference asserted by Petitioner, we note that, during prosecution, the Applicant made substantially the same argument Petitioner advances here. *See* Ex. 1002, 165–66 (arguing that Vouche’s condenser bundles identified by the Examiner were not consecutive due to intervening bundles). The Examiner rejected this argument, finding Vouche to teach “consecutive” condenser bundles because “all the bundles are back-to-back/sequent/straight to one another.” *Id.* at 109–11. Furthermore, regarding Petitioner’s “distinct” condensate headers argument, Petitioner

relies on an asserted modification in which EPRI's condenser "could be modified" to contain multiple pairs of condenser bundles with individual condensate headers. *E.g.* Pet. 15–16. Petitioner, however, does not explain adequately why making the same modification to Vouche's condenser also would not have been obvious.

Moreover, Petitioner relies on EPRI to disclose a condenser having four condenser bundles, four condensate headers, and a support frame in substantially the same manner that the Examiner relied on Vouche to disclose the same. *Compare* Pet. 11–23, with Ex. 1002, 109–10; *see also* Prelim. Resp. 17 (presenting EPRI Figure 2-6 and Vouche Figure 1 annotated to illustrate similar components), 18–19 (arguing that EPRI's condenser and Vouche's condenser operate in "nearly identical" manners).

Accordingly, we agree with Patent Owner that EPRI is substantially the same as Vouche.

ii. Schulenberg

Patent Owner argues that Schulenberg contains substantially the same disclosure as Schulenberg '806¹² (Prelim. Resp. 12–16, 24) and Vouche (*id.* at 16–19, 24). According to Patent Owner, Schulenberg "is substantially identical" to Schulenberg '806, disclosing "an ACC with like features in substantially identical arrangements . . . using nearly identical language" that operates in "nearly identical" manner. *Id.* at 12–16. Patent Owner argues that Petitioner relies on Schulenberg to disclose the same air-cooled condenser structure as disclosed in Vouche. *Id.* at 16–19. Patent Owner

¹² GB 908,806, published October 24, 1962. *See* Ex. 1002, 414–26.

also argues that Petitioner presents substantially the same arguments as did the Examiner during prosecution of the '126 patent. *Id.* at 25–28.

Petitioner argues that the Examiner did not rely on Schulenberg '806 during prosecution and that we should not exercise our discretion to deny institution merely because Schulenberg '806 was cited on an information disclosure statement submitted to the Office during prosecution. Prelim. Reply 2–3. Petitioner argues that Schulenberg is materially different from Vouche because Vouche's headers are coupled to non-consecutive condenser bundles and Petitioner relies on EPRI to disclose or teach "distinct first/second/third/fourth condensate headers." *Id.* at 4–7.

Patent Owner argues that, during prosecution, the Examiner consistently found Vouche to disclose consecutive bundle panels. Prelim. Sur-reply 5–6 (citing Ex. 1002, 27). Additionally, Patent Owner argues that "the Examiner signed and considered the [information disclosure statement]" disclosing Schulenberg '806. Prelim. Sur-reply 3–4. Moreover, Patent Owner argues, "[Schulenberg] is duplicative of *Vouche*, which was repeatedly applied in multiple Office Actions during prosecution." *Id.* at 4 (citing Prelim. Resp. 16–19).

Subsequent to filing the '840 application but prior to the issuance of the initial Office Action, the Applicant submitted an Information Disclosure Statement disclosing Schulenberg '806. Ex. 1002, 390, 414–26. The Examiner indicated that Schulenberg '806 was considered. *Id.* at 379 (stating "ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /K. .T./"). No references were lined-through. "K. .T." appears to be the Examiner's initials. Our precedent establishes that "[p]reviously presented art includes . . . art provided to the Office by an applicant, such as

on an Information Disclosure Statement (IDS), in the prosecution history of the challenged patent.” *Advanced Bionics*, Paper 6 at 7–8; *see also Cultec, Inc. v. StormTech LLC*, IPR2017-00777, Paper 7 at 10 (PTAB Aug. 22, 2017) (designated informative) (relying on an Examiner’s signature on a third-party submission to indicate the Examiner considered the submitted references). The prior Board decisions cited by Petitioner (*see* Prelim. Reply 2–3) are consistent with this precedent, as institution was granted in those cases despite the references previously having been presented to the Office. *See Navistar, Inc. v. Fatigue Fracture Tech. LLC*, IPR2018-00853, Paper 13 at 16–18 (PTAB Sept. 12, 2018) (determining that the relevant “references were before the Examiner during examination of the ’915 patent,” but declining to exercise discretion to deny institution upon consideration of *Becton, Dickinson* factors (c), (d), and (f)); *Vudu, Inc. v. Ideahub, Inc.*, IPR2020-01689, Paper 16 at 19–20 (PTAB Apr. 19, 2021) (declining to exercise discretion to deny institution under the second part of the *Advanced Bionics* framework); *Amazon.com, Inc. v. M2M Sols. LLC*, IPR2019-01205, Paper 14 at 16 (PTAB Jan. 27, 2020) (stating “the Examiner erred by failing to follow, or at least[] provide reasons for allowance distinguishing, the ’1892 IPR institution decision”). Thus, we agree with Patent Owner that Schulenberg ’806 previously was presented to the Office.

We further agree that Schulenberg is substantially the same as Schulenberg ’806, which Petitioner does not contest (*see* Prelim. Reply 2–3). We are persuaded by Patent Owner’s analysis demonstrating numerous similarities between the references. Prelim. Resp. 12–15. For example, Schulenberg’s Figure 3, upon which Petitioner relies heavily (*see* Pet. 66–81

(reproducing Figure 3 14 times)) appears to be the same as Figure 3 of Schulenberg '806. *Compare* Ex. 1004, Fig. 3, *with* Ex. 1002, 425.

Regarding Vouche, Petitioner presents the same arguments advanced for EPRI. Prelim. Reply 3–7 (discussing EPRI and Schulenberg collectively). With Schulenberg, however, Petitioner relies on Schulenberg to disclose (rather than being modified to include) a separate condensate header connected to each tube bundle. *See id.* at 7. Accordingly, we are not persuaded that Schulenberg is substantially the same as Vouche.

iii. Kröger

Patent Owner argues that Kröger contains substantially the same disclosure as Kutscher and Draper. Prelim. Resp. 20–23. According to Patent Owner, Petitioner relies on Kröger to disclose the same structure of four heat exchanger bundles being cooled by a single fan as disclosed in Kutscher and Draper. *Id.* at 28–29. Patent Owner asserts that the Petition presents the same rationale for incorporating the teachings of Kröger as stated by the Examiner during prosecution. *Id.* at 29 (citing Ex. 1002, 112). Patent Owner also argues that Petitioner presents substantially the same arguments as did the Examiner during prosecution of the '126 patent. *Id.*

Petitioner argues that the Examiner relied on Nobel, not Kutscher or Draper, for the single fan feature and “the teachings of Kutscher and Draper are vastly different from those of [Kröger]” because neither Kutscher nor Draper discloses an air-cooled condenser. Prelim. Reply 3 (citing Prelim. Resp. 8). Petitioner argues that “Nobel . . . has a fan that creates a draft over just a single condenser pair” and “[Kröger] includes a single fan that . . . is positioned to create a draft to flow over first/second/third/fourth condenser bundle panels.” *Id.* at 8.

Patent Owner replies that “Petitioner’s own IPR counsel submitted Kutscher and Draper to the Examiner for disclosure of the ‘single fan’ feature” during prosecution of the ’126 patent, and Petitioner relies on Kröger in the same manner. Prelim. Sur-reply 1 (emphasis omitted). According to Patent Owner, “[t]he prosecution history here thus epitomizes what § 325(d) seeks to avoid: rehashing old arguments based on substantially the same prior art—especially by the same party.” *Id.* at 2. According to Patent Owner, Petitioner relies on Kröger to teach the “‘single fan’ limitation” in the same manner that Petitioner’s lead counsel argued Kutscher and Draper disclosed this limitation in the third-party submission filed during prosecution. Prelim. Sur-reply 7–8. Patent Owner argues that “[t]he Examiner fully considered Petitioner’s counsel’s claim chart.” *Id.* at 8 (citing Ex. 1002, 109).

Patent Owner also argues that the Examiner’s reliance on Nobel is irrelevant as to whether Kutscher and Draper are substantially the same as Kröger. Prelim. Sur-reply 3. Patent Owner argues that Petitioner’s assertion that Kutscher and Draper are distinct from Kröger is unpersuasive because Kröger also does not disclose an air-cooled condenser. *Id.*

Initially, we disagree with Patent Owner’s assertion that Kröger fails to disclose an air-cooled condenser. See Prelim. Sur-reply 3. Patent Owner appears to rely on the “wet” aspect of Kröger’s auxiliary dry/wet cooling cell. *Id.* (arguing that Kröger’s cell “uses ‘water ... deluged from above’” (alteration in original)). However, Patent Owner ignores the “dry” aspect of Kröger’s cell, in which “heat exchanger bundles [are] arranged in a V- configuration below an axial flow fan.” Ex. 1006, 30.

Petitioner's noted difference between Kröger and Kutscher or Draper (disclosure of an air-cooled condenser) is immaterial because the relied-upon teaching (use of a single fan to cool condenser bundles) is the same for each reference. See Prelim. Reply 3. Moreover, Petitioner's lead counsel previously argued that Kutscher and Draper disclose such an arrangement. As noted above, during prosecution a third-party submission was filed. Ex. 1002, 237–323. The third-party submission was filed by Petitioner's lead counsel in this proceeding. See *id.* at 318 (showing the submission was electronically filed by “Hyun Jin In” having registration number “70014”). The submission disclosed four references, including Kutscher and Draper. *Id.* at 238. Mr. In argued that each of Kutscher and Draper “discloses a single fan over a plurality of bundles.” *Id.* at 239. Mr. In provided a detailed analysis mapping the claim recitations, including a recitation substantially the same as the “single fan” recitation, to each of Kutscher and Draper. *Id.* at 259–61. The Petition relies on Kröger to disclose a single fan over a plurality of bundles in the same manner. See, e.g., Pet. 23–24. Accordingly, we agree with Patent Owner that Kröger is substantially the same as Kutscher and Draper.

b. Whether the Office Erred in a Manner Material to Patentability

Having determined that the first part of the *Advanced Bionics* framework is satisfied, we turn to the second part of the framework where we consider whether Petitioner has demonstrated that the Office erred in a manner material to the patentability of the challenged claims. Petitioner argues that the Examiner erred in a manner material to the patentability by not considering the references relied upon in the Petition. Prelim. Reply 10.

Patent Owner argues that the Examiner did not err by failing to consider the references asserted in the Petition because these references “merely teach substantially the same ACC structure as Vouche and [Schulenberg ’806] and substantially the same ‘single fan’ structure as Kutscher and Draper.”

Prelim. Sur-reply 9 (emphasis omitted). For the reasons discussed below, we find that the Examiner materially erred.

As noted above, the Examiner’s rationale for allowing the claims is not readily apparent. *See* Ex. 1002, 26–28. The Examiner found Vouche and Kutscher to disclose four consecutive condensate bundle panels with tubes having one end lower than the other, four condensate headers, a shroud housing a single fan, and a support frame. *Id.* at 27–28. The Examiner then stated what he considered this combination failed to disclose. *Id.* at 28. In doing so, the Examiner repeated many of the recitations he previously stated Vouche and Kutscher to disclose. *Id.* In the statement of reasons for allowance, the Examiner referenced the second and third condenser bundles being arranged at the same angle on either side of a vertical axis. *Id.* at 28. However, this recitation is met by any condenser system having two pairs of condenser bundles with the same dimensions, which references considered by the Examiner disclose. *See, e.g.,* Ex. 2001 ¶ 23 (describing “a series of angled condenser tube coil structures 28”), Fig. 1 (illustrating the same); Ex. 2002, Fig. 1; Ex. 1002, 416 (explaining that “cooling elements 7, 7a, form the sides of a substantially equilateral triangle in cross section”), Fig. 3 (illustrating the same).

We additionally note that, as explained in detail below, the references asserted in the Petition also show these features, as well as the other recitations of the challenged claims.

Accordingly, by not fully considering the applicability to the claims of these example disclosures of the references that were before the Office during prosecution, as well as the references asserted in the Petition, we determine that the Examiner erred in a material manner during prosecution of the application resulting in the '126 patent.

4. Conclusion

After considering the framework set forth in *Advanced Bionics* and the underlying *Becton, Dickinson* factors, we determine that discretionary denial under § 325(d) is not appropriate under the facts before us.

F. Asserted Obviousness in View of EPRI and Kröger

Petitioner argues that claims 1–20 would have been obvious over the combination of EPRI and Kröger. Pet. 5–56. In support of its showing, Petitioner relies upon the Jacobi Declaration. *Id.* (citing Ex. 1003). We have reviewed Petitioner’s assertions and supporting evidence. For the reasons discussed below, and based on the record before us, we determine that Petitioner demonstrates a reasonable likelihood of prevailing in showing these claims would have been obvious over the combination of EPRI and Kröger.

1. Independent Claim 1

Petitioner relies on EPRI to disclose a condenser substantially as recited in claim 1, and relies on Kröger to teach a shroud and fan. Pet. 11–25. Petitioner argues that “EPRI discloses air-cooled heat exchangers arranged in an A-frame (or delta) configuration where each cell consists of several bundles of finned tubes arranged in parallel, and large

axial-flow fans are located in the floor of the cells, providing forced-draft air cooling to the finned-tube heat exchangers.” *Id.* at 11 (citing Ex. 1005, 2-5, Figs. 2-5, 2-6, 4-1; Ex. 1003 ¶ 45). Petitioner argues that it would have been obvious to include additional A-frames next to each other in EPRI’s condenser system and maps bundles of adjacent A-frames to the recited first condenser pair. *Id.* at 12 (citing Ex. 1005, 2-5, Figs. 2-5, 2-6, 4-1; Ex. 1003 ¶ 46). Petitioner maps EPRI’s steam distribution manifold to the recited first manifold. *Id.* at 13–14 (citing Ex. 1005, 2-5, Figs. 2-6, 4-1; Ex. 1003 ¶ 48). Petitioner maps bundles on adjacent ones of EPRI’s A-frames to the recited first and second condenser bundle panels and condensate headers at the bottom of the bundles to the recited first and second condensate headers. *Id.* at 12–18 (citing Ex. 1005, 2-5, Figs. 2-4, 2-5, 2-6, 4-1; Ex. 1003 ¶¶ 46–53). Petitioner reproduces copies of EPRI’s Figure 2-6 annotated to identify these mappings. *Id.* Petitioner maps other bundles of adjacent A-frames to the recited second condenser pair, second manifold, third and fourth condenser bundle panels, and third and fourth condensate headers in a similar manner as with the first condenser pair. *Id.* at 17–23 (citations omitted).

Patent Owner does not contest this aspect of the Petition. *See generally* Prelim. Resp.

On this record, EPRI appears to support Petitioner’s contentions. EPRI discloses that its air-cooled condenser includes “a row of finned-tube, air-cooled heat exchangers arranged in an A-frame (or delta) configuration.” Ex. 1005, 2-5. The row “consists of several cells,” and “[e]ach cell consists of several bundles of finned tubes arranged in parallel, inclined rows in both walls of the A-frame cell.” *Id.* A condensate header is connected to the lower ends of the tubes on both walls of the A-frame cell. *Id.* at 2-5,

Fig. 2-6. The ends of adjacent bundles converge toward each other. *E.g., id.* at Fig. 4-1. Additionally, “[a] typical full-scale ACC consists of several . . . rows” of A-frame heat exchanger bundles. *Id.* at 2-5. Petitioner’s declarant testifies that a person having ordinary skill in the art would understand that such additional rows would contain two condensate headers, one header connected to the bottoms of the tubes on either side of the A-frame.

Ex. 1003 ¶ 51.

Petitioner argues that “[Kröger] . . . discloses auxiliary dry/wet cooling cells where the heat exchange bundles are arranged in a V-configuration below a single axial-flow fan,” wherein the cell “includes a fan shroud that serves four heat exchanger bundles.” Pet. 23 (citing Ex. 1006, 30, Fig. 1.3.3; Ex. 1003 ¶ 63). Petitioner reproduces a copy of Kröger’s Figure 1.3.3 annotated to identify these mappings. *Id.* at 24. Petitioner argues that it would have been obvious to modify EPRI’s condenser system to use “a single fan positioned to create a draft to flow over the first, second, third, and fourth condenser bundle panels” in order to “generat[e] the same volumetric flow rate but by using just one fan operating at a lower speed,” thereby reducing noise, vibration, complexity, and cost. *Id.* at 9–10 (citing Ex. 1003 ¶ 43). Petitioner argues that the combination “does not change the hallmark aspects of either . . . reference[]” and “[t]he respective teachings would work together in combination just as they did apart.” *Id.* at 10–11 (citing Ex. 1003 ¶ 44). Petitioner also argues that “[t]he use of a single large fan in place of multiple smaller ones would have been a matter of simple design choice” and “was common practice well before the Critical Date.” *Id.* at 11 (citing Ex. 1003 ¶ 44).

Patent Owner argues that Petitioner does not explain adequately why an ordinarily skilled artisan would use a single, larger fan in the EPRI system. Prelim. Resp. 36–41. Patent Owner argues that the Petition improperly “rel[ies] on prior art from food refrigerators (Ex. 1016) and computer servers (Ex. 1017),” which, Patent Owner argues, fails to provide reasoning to double the size of a fan in an ACC system. *Id.* at 36–37 (citing Pet. 9–11, 64–65). Patent Owner argues that Petitioner’s assertions of energy efficiency, cost reduction, and noise level reduction are unsupported. *Id.* at 38–40.

Initially, we note that the Petition does not propose doubling the size of the EPRI fan. Petitioner mentions doubling the fan diameter in an example to illustrate reduction in noise and vibration. Pet. 9–10. But the modification set forth in the Petition is to use Kröger’s fan in the EPRI air-cooled condenser. *Id.* at 9 (“[A] POSITA would have been motivated and found it obvious to combine EPRI with [Kröger] to provide a single fan positioned to create a draft to flow over the first, second, third, and fourth condenser bundle panels . . .”). Petitioner’s assertions of the benefits resulting from this modification are supported by the testimony of its declarant. *Id.* at 9–10 (citing Ex. 1003 ¶¶ 43–44). Notably, Patent Owner does not submit the declaration of an opposing expert witness. *See generally* Prelim. Resp.

Moreover, Petitioner’s mention of Exhibits 1016 and 1017 is in noting references cited by its declarant, Dr. Jacobi. *See, e.g.*, Pet. 9 (citing Ex. 1003 ¶ 43), 11 (citing Ex. 1003 ¶ 44). Dr. Jacobi testifies that using a single fan, rather than multiple fans, to create a draft over multiple condenser bundles “would have provided the benefit of generating the same volumetric flow

rate but by using just one fan operating at a lower speed.” Ex. 1003 ¶ 43. Dr. Jacobi also testifies that using a single fan operating at a lower speed would provide “several potential benefits,” including the “reduction of noise and vibration.” *Id.* (citing Ex. 1016 ¶ 73). Dr. Jacobi testifies that reducing the number of fans would reduce the complexity of the system, which “often results in overall cost reduction of the ACC system, which a POSITA would have found to be desirable.” *Id.* (citing Ex. 1016 ¶ 73). Dr. Jacobi opines that “the ’126 patent does not disclose any apparent (not obvious) advantage of using a single large fan over multiple smaller ones,” and testifies that “using a single large fan as opposed to using multiple smaller fans, as evidenced by Kröger, Paradis [(Exhibit 1016)], and Sankar [(Exhibit 1017)] to name a few, was common practice well before the Critical Date.” *Id.* ¶ 44.

Thus, Dr. Jacobi relies on Paradis and Sankar to provide supplemental reasons explaining why it would have been obvious to use a single fan to cool multiple condenser bundles and condensate headers in EPRI’s condenser system. Patent Owner’s arguments, which are not supported by expert testimony, do not persuade us to disregard Dr. Jacobi’s testimony. We note that Patent Owner will have the opportunity to depose Dr. Jacobi and submit testimony of its own declarant during trial. Whether the Petition sets forth adequate reasoning to modify the EPRI condenser system to use a single fan is an issue that ultimately will be decided in view of a fully developed record.

Patent Owner also argues that Petitioner fails to assert that an ordinarily skilled artisan would have a reasonable expectation of success in modifying the EPRI system to use a single fan. Prelim. Resp. 42–43. Patent

Owner argues that the modification would result in an “enormous fan [that] exceeds the outer bounds of any reported ACC fan” and EPRI “teaches against taking such risks in designing and installing such abnormally large fans.” *Id.* at 42.

Petitioner asserts that the modification of EPRI’s condenser system would be “the predictable result . . . of combining known prior art elements according to known methods.” Pet. 10 (citing Ex. 1003 ¶ 44; KSR, 550 U.S. at 405). Continuing, the Petition asserts:

The POSITA would have appreciated that the EPRI-[Kröger] combination does not change the hallmark aspects of either of these references. EVAPCO-1003, ¶44. The respective teachings would work together in combination just as they did apart, with [Kröger’s] suggestions merely improving/adding to EPRI’s air-cooled condenser by providing that a larger fan is used as opposed to multiple smaller ones.

Id. at 10–11. These assertions are supported by the testimony of Dr. Jacobi. Ex. 1003 ¶ 44. Although the Petition does not specifically address an “expectation of success” *ipsis verbis*, on this preliminary record, these assertions and the corresponding testimony of Petitioner’s declarant fairly set forth that a person having ordinary skill in the art would have had an expectation of success in modifying EPRI’s condenser system as set forth in the Petition. Notably, Patent Owner does not rely on any expert testimony.

Petitioner argues that EPRI discloses a support frame that supports multiple condenser bundles. Pet. 24–25 (citing Ex. 1005, Figs. 2-4, 2-5, 2-6; Ex. 1003 ¶ 65). Patent Owner does not contest this aspect of the Petition. *See generally* Prelim. Resp. On this preliminary record, we find the cited portions of EPRI support Petitioner’s contentions.

Accordingly, at this stage of the proceeding, we determine that Petitioner has established a reasonable likelihood of prevailing on its assertion that claim 1 would have been obvious over the combination of EPRI and Kröger.

2. Independent Claim 12

Independent claim 12 recites an air-cooled condenser that is similar to that of claim 1. Ex. 1001, 8:45–9:29. With claim 12, however, the top ends of the condenser bundles of each condenser pair converge toward each other (rather than the bottom ends, as in claim 1). *Id.*

In challenging claim 12, Petitioner relies on EPRI to disclose a condenser substantially as recited and relies on Kröger to teach a shroud and fan. Pet. 34–46. Petitioner largely relies on assertions similar to those made regarding claim 1. *Id.* However, Petitioner maps the two bundles of a single one of EPRI’s A-frames to each recited pair of condenser bundles. *See id.* at 34–35, 40–41 (citations omitted).

Patent Owner does not present arguments contesting Petitioner’s challenge to claim 12 separate from the arguments advanced for claim 1 discussed above. *See* Prelim. Resp. 34–43. Our analysis regarding claim 1 applies equally to claim 12.

Accordingly, at this stage of the proceeding, we determine that Petitioner has established a reasonable likelihood of prevailing on its assertion that claim 12 would have been obvious over the combination of EPRI and Kröger.

3. Independent Claim 20

Independent claim 20 recites an air-cooled condenser that is similar to that of claims 1 and 12. Ex. 1001, 10:12–11:2. Claim 20, however, does not recite any converging of tube bundles, but does recite that the second and third condenser bundles are symmetrically angled approximately 20°–30° from vertical. *Id.*

In challenging claim 20, Petitioner relies on EPRI and Kröger in substantially the same manner as with claim 1. Pet. 50–56. Petitioner relies on EPRI to disclose the recited second and third bundle angles of approximately 20° to approximately 30°. *Id.* at 54–55 (citing Ex. 1005, Fig. 4-1; Ex. 1003 ¶ 123); *see also id.* at 29–30 (citing Ex. 1005, Fig. 4-1; Ex. 1003 ¶ 79) (discussing a similar recitation of claim 8).

Patent Owner does not present arguments contesting Petitioner’s challenge to claim 20 separate from the arguments advanced for claim 1 discussed above. *See* Prelim. Resp. 34–43. Our analysis regarding claim 1 applies equally to claim 20.

Accordingly, at this stage of the proceeding, we determine that Petitioner has established a reasonable likelihood of prevailing on its assertion that claim 20 would have been obvious over the combination of EPRI and Kröger.

G. Asserted Obviousness in View of EPRI, Kröger, Schabosky, and O’Kane

Petitioner argues that claims 5, 6, and 15 would have been obvious over the combination of EPRI, Kröger, Schabosky, and O’Kane. Pet. 56–62. In support of its showing, Petitioner relies upon the Jacobi Declaration. *Id.* (citing Ex. 1003). We have reviewed Petitioner’s assertions and supporting

evidence. For the reasons discussed below, and based on the record before us, we determine that Petitioner demonstrates a reasonable likelihood of prevailing in showing these claims would have been obvious over the combination of EPRI, Kröger, Schabosky, and O’Kane.

Claim 5 depends indirectly from claim 1 through claim 2 and further recites “wherein the tubes of the first set of tubes and the tubes of the second set of tubes have a length equal to approximately two meters.” Ex. 1001, 8:7–10. Claim 6 depends indirectly from claim 1 through claim 2 and further recites “wherein the tubes of the third set of tubes and the tubes of the fourth set of tubes have a length equal to approximately two meters.” *Id.* at 8:11–14. Claim 15 depends indirectly from claim 12 through claim 13 and further recites “wherein the tubes of the first set of tubes, the tubes of the second set of tubes, the tubes of the third set of tubes, and the tubes of the fourth set of tubes have a length equal to approximately two meters.” *Id.* at 9:55–59.

Petitioner relies on Schabosky to teach using pre-assembled pipe bundles for ease of assembly at a job site. Pet. 58–59. Petitioner relies on O’Kane to teach the size of a standard freight container. *Id.* at 59–60.

Petitioner argues,

to fit a single large condenser bundle as per Schabosky (for simplified assembly) into a standard 40-foot shipping container, which has the dimensions of approximately 12.2 m x 2.4 m x 2.4 m, as per O’Kane (for ease of shipping), a POSITA would have expected the condenser bundles to have a length of approximately twelve meter[s] and a width or height of approximately two meters.

Id. at 60 (citing Ex. 1007; Ex. 1009, 9:5–18; Ex. 1003 ¶ 133). Continuing, Petitioner asserts “[t]his would lead to the length of the tubes, which would

be the width or height of the condenser bundle[,] to be approximately two meters.” *Id.* at 61 (citing Ex. 1003 ¶ 134). Petitioner’s arguments are supported by the testimony of its declarant. *See* Ex. 1003 ¶¶ 133–134.

Patent Owner argues that “shorten[ing] the length of *EPRI*’s tubes from 9-12 meters down to 2 meters . . . only makes sense if Petitioner’s enormous fan is no longer used.” Prelim. Resp. 41 n.7. However, Patent Owner does not support its assertions with expert testimony or address the testimony of Petitioner’s declarant.

We credit the testimony of Petitioner’s declarant and, accordingly, at this stage of the proceeding, we determine that Petitioner has established a reasonable likelihood of prevailing on its assertion that claims 5, 6, and 15 would have been obvious over the combination of *EPRI*, Kröger, Schabosky, and O’Kane.

H. Asserted Obviousness in View of Schulenberg and Kröger

Petitioner argues that claims 1–20 would have been obvious over the combination of Schulenberg and Kröger. Pet. 62–113. In support of its showing, Petitioner relies upon the Jacobi Declaration. *Id.* (citing Ex. 1003). We have reviewed Petitioner’s assertions and supporting evidence. For the reasons discussed below, and based on the record before us, we determine that Petitioner demonstrates a reasonable likelihood of prevailing in showing these claims would have been obvious over the combination of Schulenberg and Kröger.

1. Independent Claim 1

Petitioner relies on Schulenberg to disclose a condenser substantially as recited in claim 1, and relies on Kröger to teach a shroud and fan.

Pet. 66–81. Petitioner argues that “Schulenberg discloses a surface condenser with a plurality of condenser elements connected in parallel as regard to the steam to be condensed and cooled externally by a current of air, in which each condenser element has at least two rows of condenser tubes arranged substantially parallel to each other.” *Id.* at 66 (citing Ex. 1004, 1:9–17, Fig. 3). Petitioner maps adjacent ones of Schulenberg’s condenser elements 7, 7a, containing ribbed tubes 13, to the recited first and second condenser bundle panels of the first condenser pair. *Id.* at 66–68 (citing Ex. 1004, 3:65–69, Fig. 3; Ex. 1003 ¶¶ 141–42), 70–71 (citing Ex. 1004, 3:65–4:4, Fig. 3; Ex. 1003 ¶ 145). Petitioner maps Schulenberg’s steam distribution conduit 6 to the recited first manifold and condenser collecting conduits 8, 8a to the recited first and second condensate headers. *Id.* at 68–70 (citing Ex. 1004, 3:63–74, Fig. 3; Ex. 1003 ¶¶ 143–144), 71–72 (citing Ex. 1004, 1:9–17, 3:65–4:4, 4:31–34, Fig. 3; Ex. 1003 ¶ 146). Petitioner reproduces copies of Schulenberg’s Figure 3 annotated to identify these mappings. *Id.* at 66–72. Petitioner maps corresponding elements to the recited second condenser pair, second manifold, third and fourth condenser bundle panels, and third and fourth condensate headers in a similar manner as with the first condenser pair. *Id.* at 72–78 (citations omitted).

Patent Owner does not contest this aspect of the Petition. *See generally* Prelim. Resp.

On this record, Schulenberg appears to support Petitioner’s contentions. Schulenberg discloses four sets of condenser elements 7, 7a, comprised of ribbed tubes 13, arranged in roof-shape to form an equilateral triangle with lower ends connected to condenser collecting conduits 8, 8a.

Ex. 1004, 3:68–4:2, 4:45–51, Fig. 3. The sets appear to be evenly distributed. *Id.* at Fig. 3. Steam enters the condenser via steam distribution conduits 6 and passes into condenser elements 7, 7a. *Id.* at 3:49–67, Fig. 1.

Petitioner argues that it would have been obvious to modify Schulenberg’s system to use a single large fan in place of multiple smaller fans for substantially the same reasons asserted for claim 1 and discussed above. Pet. 62–65, 78–80 (citations omitted).

Patent Owner contests Petitioner’s showing, in large part, with the same arguments advanced for the combination of EPRI and Kröger and discussed above. Prelim. Resp. 34–43 (citations omitted). These arguments do not persuade us to deny institution for the same reasons explained above.

Patent Owner also argues that Schulenberg teaches away from using a single fan with multiple sets of tubes because the modification would eliminate Schulenberg’s disclosed ability to control a tube set’s fan independently of fans used for other tubes. Prelim. Resp. 40 (citing Ex. 1004, 1:54–68, 2:3–4, 4:4–15).

Schulenberg discloses that its blowers can be independently regulated and the angle of induced air flow for each blower can be adjusted. Ex. 1004, 4:4–15. Although independent control is one benefit, Petitioner’s declarant identifies benefits that would result from replacing Schulenberg’s fans with a single fan, including allowing the fan to be operated at a lower speed, reducing noise and vibration, reducing complexity of the system, and reducing cost. Ex. 1003 ¶ 138. “The fact that the motivating benefit comes at the expense of another benefit . . . should not nullify its use as a basis to modify the disclosure of one reference with the teachings of another. Instead, the benefits, both lost and gained, should be weighed against one

another.” *Winner Int’l Royalty Corp. v. Wang*, 202 F.3d 1340, 1349 n.8 (Fed. Cir. 2000). Furthermore, a “teaching away” requires a reference to actually criticize, discredit, or otherwise discourage the claimed solution. *See In re Fulton*, 391 F.3d 1195, 1201 (Fed. Cir. 2004). On this preliminary record, we are not persuaded that Schulenberg teaches away from the modification proposed by Petitioner.

Petitioner argues that Schulenberg discloses a support frame that supports multiple condenser bundles. Pet. 80–81 (citing Ex. 1004, Figs. 1–3; Ex. 1003 ¶ 156). Patent Owner does not contest this aspect of the Petition. *See generally* Prelim. Resp. On this preliminary record, we find the cited portions of Schulenberg support Petitioner’s contentions.

Accordingly, at this stage of the proceeding, we determine that Petitioner has established a reasonable likelihood of prevailing on its assertion that claim 1 would have been obvious over the combination of Schulenberg and Kröger.

2. Independent Claim 12

As noted above, independent claim 12 recites an air-cooled condenser that is similar to that of claim 1, but recites the top ends of the condenser bundles of each condenser pair converge toward each other (rather than the bottom ends, as in claim 1). Ex. 1001, 8:45–9:29.

In challenging claim 12, Petitioner relies on Schulenberg to disclose a condenser substantially as recited and relies on Kröger to teach a shroud and fan. Pet. 92–103. Petitioner largely relies on assertions similar to those made regarding claim 1. *Id.* However, Petitioner maps the recited condenser pairs to bundles on the same row. *E.g., id.* at 92–93, 97–98 (citations omitted).

Patent Owner does not present arguments contesting Petitioner's challenge to claim 12 separate from the arguments advanced for claim 1 discussed above. *See* Prelim. Resp. 34–43. Our analysis regarding claim 1 applies equally to claim 12.

Accordingly, at this stage of the proceeding, we determine that Petitioner has established a reasonable likelihood of prevailing on its assertion that claim 12 would have been obvious over the combination of Schulenberg and Kröger.

3. Independent Claim 20

As noted above, independent claim 20 recites an air-cooled condenser that is similar to that of claims 1 and 12, but recites that the second and third condenser bundles are symmetrically angled approximately 20°–30° from vertical and does not recite any converging of tube bundles. Ex. 1001, 10:12–11:2.

In challenging claim 20, Petitioner relies on Schulenberg and Kröger in substantially the same manner as with claim 1. Pet. 106–13. Petitioner relies on Schulenberg to disclose the recited second and third bundle angles of approximately 20° to approximately 30°. *Id.* at 110–11 (citing Ex. 1004, 3:76–4:2; Ex. 1003 ¶ 211); *see also id.* at 87–88 (citing Ex. 1004, 3:76–4:2, Fig. 3; Ex. 1003 ¶¶ 170–171) (discussing a similar recitation of claim 8).

Patent Owner does not present arguments contesting Petitioner's challenge to claim 20 separate from the arguments advanced for claim 1 discussed above. *See* Prelim. Resp. 34–43. Our analysis regarding claim 1 applies equally to claim 20.

Accordingly, at this stage of the proceeding, we determine that Petitioner has established a reasonable likelihood of prevailing on its

assertion that claim 20 would have been obvious over the combination of Schulenberg and Kröger.

I. Asserted Obviousness in View of Schulenberg, Kröger, Schabosky, and O’Kane

Petitioner argues that claims 5, 6, and 15 would have been obvious over the combination of Schulenberg, Kröger, Schabosky, and O’Kane. Pet. 113–17. In support of its showing, Petitioner relies upon the Jacobi Declaration. *Id.* (citing Ex. 1003). We have reviewed Petitioner’s assertions and supporting evidence. For the reasons discussed below, and based on the record before us, we determine that Petitioner demonstrates a reasonable likelihood of prevailing in showing these claims would have been obvious over the combination of Schulenberg, Kröger, Schabosky, and O’Kane.

Claim 5 depends indirectly from claim 1 through claim 2 and further recites “wherein the tubes of the first set of tubes and the tubes of the second set of tubes have a length equal to approximately two meters.” Ex. 1001, 8:7–10. Claim 6 depends indirectly from claim 1 through claim 2 and further recites “wherein the tubes of the third set of tubes and the tubes of the fourth set of tubes have a length equal to approximately two meters.” *Id.* at 8:11–14. Claim 15 depends indirectly from claim 12 through claim 13 and further recites “wherein the tubes of the first set of tubes, the tubes of the second set of tubes, the tubes of the third set of tubes, and the tubes of the fourth set of tubes have a length equal to approximately two meters.” *Id.* at 9:55–59.

Petitioner relies on Schabosky and O’Kane in substantially the same manner asserted for the challenge based on EPRI and discussed above. Pet. 113–17 (citations omitted).

Patent Owner does not present arguments contesting Petitioner's challenge to these claims separate from the arguments advanced for the challenge based on EPRI and discussed above. *See* Prelim. Resp. 41 n.7. Our analysis regarding the challenge based on EPRI applies equally here.

Accordingly, at this stage of the proceeding, we determine that Petitioner has established a reasonable likelihood of prevailing on its assertion that claims 5, 6, and 15 would have been obvious over the combination of *Schulenberg*, *Kröger*, *Schabosky*, and *O'Kane*.

III. CONCLUSION

For the foregoing reasons, we determine that the information presented establishes a reasonable likelihood that Petitioner would prevail in showing that at least one of the challenged claims of the '126 patent is unpatentable. Further, we decide not to invoke our discretion under 35 U.S.C. § 325(d) to deny institution of review. At this preliminary stage, we have not made a final determination with respect to the patentability of the challenged claims or any underlying factual and legal issues. *See TriVascular, Inc. v. Samuels*, 812 F.3d 1056, 1068 (Fed. Cir. 2016) (noting that “there is a significant difference between a petitioner's burden to establish a ‘reasonable likelihood of success’ at institution, and actually proving invalidity by a preponderance of the evidence at trial”).

Accordingly, *inter partes* review is instituted as to all claims and all proposed grounds of unpatentability. *See SAS*, 138 S. Ct. at 1359–60; *see also PGS Geophysical AS v. Iancu*, 891 F.3d 1354, 1360 (Fed. Cir. 2018) (interpreting the statute to require “a simple yes-or-no institution choice respecting a petition, embracing all challenges included in the petition”);

CTPG 64 (“The Board will not institute on fewer than all claims or all challenges in a petition.”).

IV. ORDER

Accordingly, it is:

ORDERED that pursuant to 35 U.S.C. § 314(a), an *inter partes* review of claims 1–20 of the ’126 patent is instituted with respect to all grounds set forth 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 commences on the entry date of this decision.

IPR2021-00687
Patent 10,551,126 B2

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