

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

DEVELOPMENTAL TECHNOLOGIES, LLC,
Petitioner,

v.

E. M. P. ENTERPRISES, INC.,
Patent Owner.

Case IPR2021-01560
Patent 10,085,391 B2

Before JAMES A. TARTAL, RICHARD H. MARSCHALL, and
MATTHEW S. MEYERS, *Administrative Patent Judges*.

MARSCHALL, *Administrative Patent Judge*.

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

Petitioner, Developmental Technologies, Inc. (“Petitioner”), filed a Petition requesting *inter partes* review of claims 1–19 (the “challenged claims”) of U.S. Patent No. 10,085,391 B2 (Ex. 1001, “the ’391 patent”). Paper 2 (“Pet.”). E. M. P.¹ Enterprises, Inc. (“Patent Owner”) filed a Preliminary Response. Paper 12 (“Prelim. Resp.”).² With our authorization, Petitioner filed a Preliminary Reply (Paper 14, “Reply”) and Patent Owner filed a Preliminary Sur-reply (Paper 15, “Sur-reply”).

We have authority to determine whether to institute *inter partes* review. *See* 35 U.S.C. § 314 (2018); 37 C.F.R. § 42.4(a) (2021). *Inter partes* review may not be instituted “unless . . . the information presented in the petition . . . 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). Upon consideration of the evidence and arguments in the record, we decline to institute *inter partes* review of the ’391 patent.

¹ According to Patent Owner’s statements during a conference call and its updated mandatory notices, the correct corporate entity is “E. M. P.” Enterprises, Inc. rather than “EMP” Enterprises, Inc., and we have updated the caption to reflect the correct nomenclature. *See* Ex. 1025, 9:22–10:3; Paper 11, 2.

² We granted Patent Owner’s request for an extension of time to file its Preliminary Response for the reasons provided by Patent Owner during a conference call addressing the issue. *See* Ex. 1025, 12:2–18:2, 31:25–35:3, 37:24–38:17 (transcript of conference call); Ex. 3002 (February 11, 2022 email to parties indicating that the Panel “granted Patent Owner’s request for an extension of time to file a Patent Owner Preliminary Response to March 4, 2022”).

BACKGROUND

A. Related Proceedings

Patent Owner identifies IPR2021-01534 as a related matter involving a related patent. Paper 11 (Patent Owner's Updated Mandatory Notice) at 2.

B. The '391 Patent

The '391 patent relates to “an irrigation mat for supplying fluids to the root region of plants.” Ex. 1001, 1:15–16. The '391 patent describes prior art irrigation mats as including two layers bound together by seam-like connections, and including pockets for tubing between the layers. *Id.* at 1:28–46. According to the '391 patent, the seam-like connections used in the prior art can come loose, causing slippage between the two layers and complications when placing the mats. *Id.* at 1:45–55. To alleviate these issues, the '391 patent describes a “needling” technique that pierces the two layers together, and emphasizes needling over the entire area of the mat between the tubes alleviates these and other problems. *Id.* at 2:33–64.

Figure 1 is reproduced below:

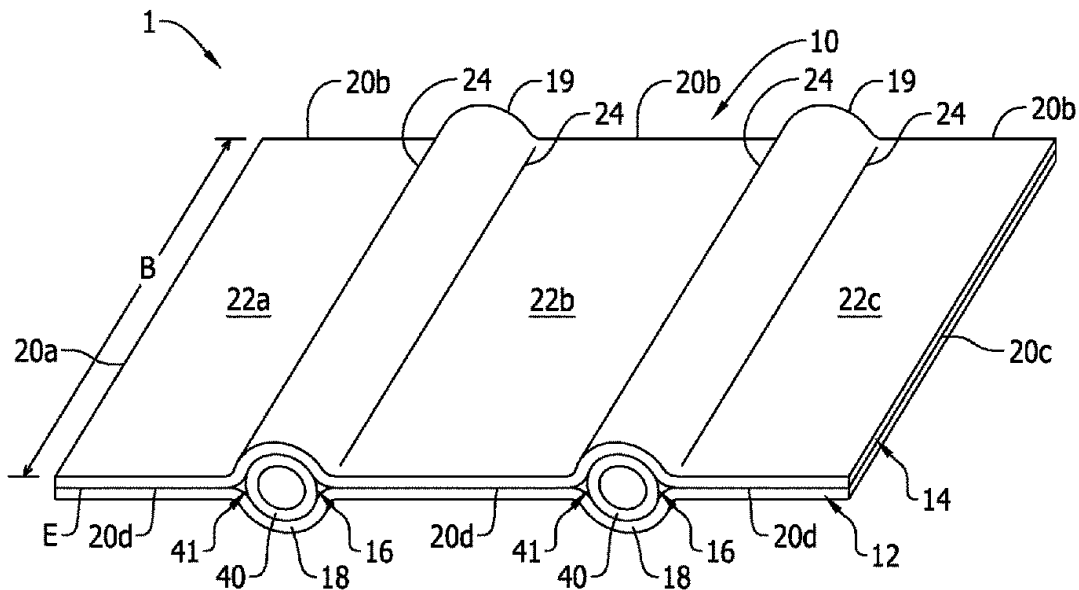


Figure 1 “shows an irrigation system with an irrigation mat equipped with two tubes.” Ex. 1001, 5:35–36. More specifically, Figure 1 depicts irrigation mat 10 having lower layer 12 and upper layer 14 and two tubes 40 disposed within two tunnels 16 formed at folds 18, 19 between layers 12, 14. *Id.* at 5:55–58, 5:63–66. Layers 12, 14 are composed of textile fabric, and the ’391 patent notes that if the two layers 12, 14 are “composed of an identical material” then the irrigation mat can “be laid so that the positions of the lower layer 12 and the upper layer 14 are reversed,” easing handling of the irrigation mat. *Id.* at 3:3–9, 5:56–58, 6:4–7. Figure 1 also depicts regions 22a, 22b, and 22c between edges 24 of folds 18, 19 and edges 20a through 20d of the irrigation mat. *Id.* at 6:17–20. The ’391 patent describes regions 22a, 22b, and 22c as joined together using the needling technique over their entire area. *Id.* at 6:24–27. According to the ’391 patent, the needling technique causes the fibers of layers 12, 14 resting against each other to loop or felt with each other, largely eliminating the dividing line between layers 12, 14 and forming a single matrix as a result of the needling process. *Id.* at 6:34–39.

C. Challenged Claims

Petitioner challenges claims 1–19 (all claims) of the ’391 patent, of which claims 1 and 13 are independent. Independent claim 1 is reproduced below:

1. An irrigation mat for supplying fluid for a root region of plants, the irrigation mat comprising:
 - at least one lower layer and at least one upper layer that are each comprised of a textile fabric,
 - a first tunnel and a second tunnel disposed between the at least one lower layer and the at least one upper layer, and

a first mat region comprising a large, planar region extending from the first tunnel to the second tunnel, and from a first edge of the at least one lower layer and the at least one upper layer to a second edge of the at least one lower layer and the at least one upper layer, the at least one lower layer and the at least one upper layer being attached to each other over the entire large, planar region of the first mat region by needling throughout the first mat region from the first tunnel to the second tunnel and from the first edge to the second edge, wherein the needling causes adjacent fibers of the at least one upper layer and the at least one lower layer to become intertwined to substantially eliminate a dividing line between the at least one upper layer and the at least one lower layer forming a uniform, largely homogeneous textile fabric in the first mat region.

Ex. 1001, 7:22–44.

D. Asserted Grounds of Unpatentability

Petitioner challenges claims 1–19 on the following grounds (Pet. 3–4):

Claim(s) Challenged	35 U.S.C. §	Reference(s)/Basis
1–3, 12, 13, 18, 19	102	Durkheim ³
1–4, 5, 12–15, 18, 19	103	Durkheim
6–8	103	Durkheim, Robertson ⁴
9	103	Durkheim, Robertson, Muthiah ⁵
10, 11	103	Durkheim, Akpo ⁶

³ U.S. Pub. No. 2013/0292343, published Nov. 7, 2013 (“Durkheim,” Ex. 1012).

⁴ U.S. Patent No. 5,226,255, issued Jul. 13, 1993 (“Robertson,” Ex. 1005).

⁵ U.S. Pub. No. 2004/0133176, published Jul. 8, 2004 (“Muthiah,” Ex. 1018).

⁶ U.S. Pub. No. 2013/0117877, published May 9, 2013 (“Akpo,” Ex. 1013).

Claim(s) Challenged	35 U.S.C. §	Reference(s)/Basis
16, 17	103	Durkheim, Roess ⁷

Petitioner supports its challenges with declarations from Dr. Barry R. Christopher (Ex. 1023) and Dr. Hannah Mary Mathers (Ex. 1024).

ANALYSIS

A. The 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.*

Petitioner contends, with accompanying declaration testimony, that a person having ordinary skill in the art “would likely have had at least a Bachelor of Science (BSc) in Material Sciences, or a Master of Science (MSc) in Horticulture/Plant Science, or a BSc in Civil Engineering and practical experience in water management.” Pet. 17 (citing Ex. 1024, 2–3). Petitioner also asserts that a person having ordinary skill in the art “would have had at least general knowledge about plant stress physiology, soil

⁷ U.S. Pub. No. 2013/0074400, published Mar. 28, 2013 (“Roess,” Ex. 1014).

science, subsurface irrigation tubing materials, emitter technologies, geotextile mats, irrigation mats, hydrophilic material properties, wicking material properties, plant root systems, root zone factors that impact plant health, and irrigation installation and management.” *Id.*

Patent Owner does not address or dispute Petitioner’s proposed definition of the level of ordinary skill in the art, which appears consistent with the record at this stage of the proceeding, including the prior art. *See GPAC Inc.*, 57 F.3d at 1579. We adopt the definition of the level of ordinary skill in the art proposed by Petitioner.

B. Claim Construction

In *inter partes* reviews, the Board interprets claim language using the same claim construction standard that would be used in a civil action under 35 U.S.C. § 282(b), as described in *Phillips v. AWH Corp.*, 415 F.3d 1303 (Fed. Cir. 2005) (en banc). *See* 37 C.F.R. § 42.100(b). Under that standard, we generally give claim terms their ordinary and customary meaning, as would be understood by a person of ordinary skill in the art at the time of the invention, in light of the language of the claims, the specification, and the prosecution history. *See Phillips*, 415 F.3d at 1313–14. Although extrinsic evidence, when available, may also be useful when construing claim terms under this standard, extrinsic evidence should be considered in the context of the intrinsic evidence. *See id.* at 1317–19.

Petitioner proposes constructions for the terms “tunnel,” “fold,” and “elastic” and asserts that other claim terms “should be given ordinary meaning.” Pet. 8, 10. Patent Owner agrees with Petitioner’s proposed constructions “[o]nly for the limited purpose of determining whether to institute the *inter partes* review.” Prelim. Resp. 7. At this stage of the

proceeding and based on the current record, we do not discern a need to construe explicitly any claim terms because doing so would not change the outcome of the analysis below. *See Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017) (stating that “we need only construe 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))).

C. Challenges Based on Durkheim

Petitioner argues that Durkheim anticipates independent claims 1 and 13. Pet. 3, 23–25, 31–33. Each claim requires an irrigation mat comprising at least one lower and one upper layer, with each layer made of textile fabric, and where the layers are “attached to each other over the entire large, planar region of the first mat region by needling, . . . wherein the needling causes adjacent fibers of the at least one upper layer and the at least one lower layer to become intertwined to substantially eliminate a dividing line between the at least one upper layer and the at least one lower layer forming a uniform, largely homogeneous textile fabric.” Ex. 1001, 7:24–44, 8:23–45. Petitioner contends that Durkheim discloses every limitation in the body of independent claims 1 and 13, including these limitations. Pet. 3–4, 23–25, 31–33; Reply 1–5.

Patent Owner argues that Durkheim fails to disclose two layers that, once attached together by needling, form a “uniform, largely homogeneous textile fabric” because Durkheim’s layers have a different pore size. Prelim. Resp. 12–21; Sur-reply 1–5. For the reasons set forth below, we agree with Patent Owner. Because Petitioner relies solely on Durkheim as to the “uniform, largely homogeneous textile fabric” limitation as part of its

anticipation challenge, and does not argue that the limitation would have been obvious as part of any other challenge in the Petition, Petitioner's failure to establish that Durkheim necessarily discloses the limitation requires denial of *inter partes* review. *See* Pet. 23–25, 31–33. We need not address any other limitations or arguments raised by Patent Owner. We begin with an overview of Durkheim and the parties' positions, followed by our discussion of the arguments.

1. Overview of Durkheim

Durkheim discloses a system and method for collecting chemical compounds from soils.⁸ Ex. 1012, codes (54), (57), ¶ 1. Durkheim's Figure 3 is reproduced below.

⁸ Although the claims are directed to an irrigation application, Petitioner contends that Durkheim's collection or "drainage" system discloses all of the claimed structures, or, in the alternative, that it would have been common knowledge and obvious to use Durkheim's system in an irrigation application. *See* Pet. 3–4, 13, 23, 31. We need not reach the merits of these arguments.

Figure 3

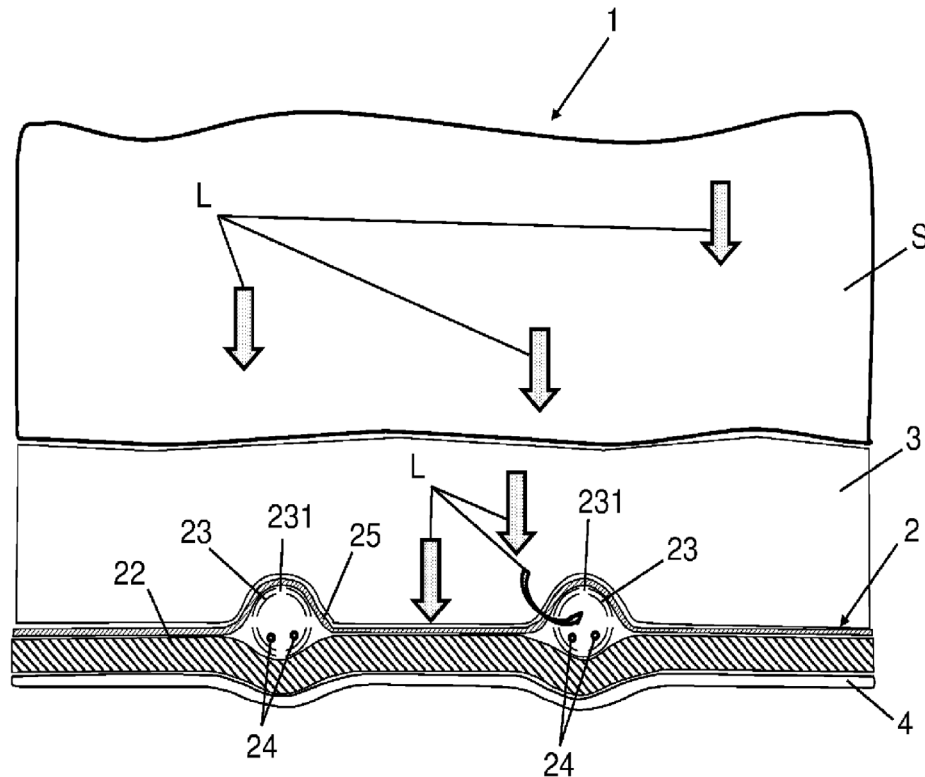


Figure 3 depicts “a sectional view of part of a geocomposite, covered by a granulate and aggregates.” Ex. 1012 ¶ 33. Figure 3 shows liquid L passing through aggregates S toward geocomposite 2. *Id.* ¶ 39. Geocomposite 2 includes filtering layer 25 and draining layer 22. *Id.* ¶¶ 39, 46. Perforated mini-drains 23 located between filtering layer 25 and draining layer 22 collect chemical-laden fluids. *Id.* ¶¶ 39, 45. Each mini-drain 23 includes at least one fixing filament wire 24 that includes a chemical compound, such that chemicals in the fluid passing the wire fix or attach to wire 24. *Id.* ¶ 39.

Durkheim states that appropriate selection of the porometry of filtering layer 25 and draining layer 22 ensures that filtering layer 25 protects the draining layer 22 from clogging by fine particles. *Id.* ¶ 46. In addition, the filtration opening of filtering layer 25 and/or the drainage

opening of draining layer 22 controls the speed of fluid through geocomposite 2, with the speed chosen based on the speed of fixing the chemical compounds to wire 24. *Id.* ¶¶ 49–50. Durkheim describes the dimensioning of the openings in the layers as “decisive for flow and for collection of compounds” in the system. *Id.* ¶ 50. Because filtering layer 25 filters fluid and calibrates particles that enter geocomposite 2, while draining layer 22 provides “easier circulation of the fluid in the geocomposite,” the “two layers will therefore have different openings, adapted respectively to their function.” *Id.*

2. The Parties’ Positions

In the Petition, Petitioner argues that Durkheim expressly discloses “entangling of needled filaments,” with the connection applied to the whole mass rather than a few points in the structure. Pet. 25 (citing Ex. 1012 ¶¶ 47, 57–58), 33 (same). Petitioner also argues that

it is inherent that needling described in Durkheim, e.g., at Para [0057], would cause adjacent fibers of the at least one upper layer (25) and the at least one lower layer (22) to become intertwined to substantially eliminate a dividing line between the at least one upper layer (25) and the at least one lower layer (22) forming a uniform, largely homogeneous textile fabric in the first mat region of geocomposite (2).

Id. at 25 (citing Ex. 1023 ¶ 2; Ex. 1005)), 33 (same). In its Reply addressing Patent Owner’s argument that Durkheim fails to disclose the “uniform, largely homogeneous” aspect of the needling limitations, Petitioner argues that Patent Owner relies on an implicit and incorrect construction of “homogeneous” by requiring the same opening or pore size in each layer. Reply 1–2. Petitioner contends that the intrinsic evidence shows that needling alone forms the resulting homogeneous fabric, and that any

requirement of equal pore size goes to material selection of the layers, not needling. *Id.* at 2–3. Petitioner further argues that extrinsic evidence in the form of testimony from Petitioner’s expert supports its approach because the expert opines that Durkheim discloses the limitations at issue. *Id.* at 4–5.

Patent Owner argues that Durkheim fails to disclose the “uniform, largely homogeneous textile fabric” because “Durkheim is silent with respect to the homogeneity of the final needled areas” and Durkheim’s chemical collection system teaches distinct layers with different pore sizes and distinct functionalities. Prelim. Resp. 12–15. Patent Owner relies on Durkheim’s emphasis on the importance of different pore sizes in the layers of its fabric and argues that Durkheim teaches away from using the same pore size and creating a uniform, largely homogeneous fabric. *Id.* at 13–14 (citing Ex. 1012 ¶¶ 45, 50). Patent Owner further argues that Durkheim does not inherently disclose such a fabric, and the “conclusory” expert testimony in support of Petitioner’s argument does not establish that Durkheim’s needling technique forms a uniform, largely homogeneous fabric. *Id.* at 17–18 (citing Pet. 25; Ex. 1023, 7).

As to Petitioner’s claim construction arguments in Petitioner’s Reply, Patent Owner argues that the “uniform, largely homogeneous” limitation should be given its plain and ordinary meaning and requires no construction. Sur-reply 1–2. Patent Owner argues that the specification supports its position by referring to the resulting fabric as a “single matrix” and “symmetrical” about the line between the layers. *Id.* at 2. Patent Owner further argues that “the claim requires more than just needling” and Petitioner’s approach gives no weight to the “uniform, largely homogeneous” limitation by focusing only on the needling technique that

intertwines the layers. *Id.* at 2–3. According to Patent Owner, Petitioner’s attempt to read the limitation on Durkheim’s layers with different pore sizes conflicts with the plain and ordinary meaning of “homogeneous,” which a dictionary describes as a “uniform structure or composition throughout.” *Id.* (citing <https://www.merriam-webster.com/dictionary/homogeneous>). Patent Owner further contends that Durkheim’s use of needling to merely interconnect the layers does not inherently disclose the “extensive needling” referred to in the ’391 patent. *Id.* at 3–4 (citing Ex. 1001, 6:34–37). As to Petitioner’s expert testimony, Patent Owner argues that Petitioner’s reliance “on extrinsic evidence is improper where the intrinsic record unambiguously” defines the claim scope and further argues that expert testimony cannot be used to fill the gaps in the prior art. *Id.* at 4–5.

3. Discussion

To determine whether Petitioner establishes anticipation, we must determine whether Durkheim inherently discloses the limitation requiring a “uniform, largely homogeneous” fabric. *See* Pet. 25, 33. Petitioner does not dispute that Durkheim requires two layers with different pore size to meet the needs of Durkheim’s system, and we need only determine whether the resulting fabric necessarily discloses the “uniform, largely homogeneous” requirement of independent claims 1 and 13. *See* Reply 1–3. Although the parties dispute the scope of the limitation, neither party proposes a formal construction and we need not formulate our own construction to resolve the issues here.

We agree with Patent Owner that Petitioner fails to sufficiently show that merely needling two layers together with different pore sizes in each layer, as disclosed by Durkheim, necessarily creates a “uniform, largely

homogeneous” fabric. Petitioner’s approach assumes that the act of needling two layers together, standing alone, creates a uniform, largely homogeneous fabric regardless of any physical differences, such as pore size, between the layers prior to needling. *See* Reply 1–3. The mere fact that the claim language and one passage from the specification of the ’391 patent states that the “needling causes” a number of things, including connecting the two layers together to create a resulting “uniform, largely homogeneous” fabric, does not resolve the issue. *See id.* at 2–3. The specification supports this reading, as it notes in several places that using fabric layers made from the same material allows for simplified production and placement of the resulting fabric. *See* Ex. 1001, 3:3–9 (“The irrigation mat has a symmetrical design with regard to the dividing plane between the upper and lower layers so that during placement, it is not necessary to pay attention to which layer must be on top or the bottom, unless, for example, different materials are used for the top and bottom layers.”), 3:28–30 (describing fabric where both layers are made from same material, “which simplifies the production”), 5:56–60 (describing two layers as made of textile fabric with same weight), 6:4–7 (“If the two layers 12, 14 are identical, i.e. are in particular composed of an identical material, then the irrigation mat [] 10 can also be laid so that the positions of the lower layer 12 and the upper layer 14 are reversed.”). Petitioner has not sufficiently shown that reading the “uniform, largely homogeneous” limitation so broad as to include layers of substantially different compositions, as disclosed by Durkheim, is supported by the preferred embodiment or otherwise within the scope of the challenged claims.

Petitioner's expert testimony broadly asserts that Durkheim discloses the needling limitations via the needling process, but the testimony does not even acknowledge that Durkheim's layers have different pore size.

Ex. 1023, 7. The testimony therefore sheds little light on the key issue here. In fact, neither the Petition nor the supporting declarations acknowledge this aspect of Durkheim or consider that the "uniform, largely homogeneous" limitation may require something more than what the claim already requires prior to this limitation—needling the layers together by intertwining the fabric layers in a manner that largely eliminates the dividing line between the layers. *See* Pet. 25, 33; Ex. 1023, 6–7. To the extent the testimony implicitly addresses the issues, we find it lacking detail and support and not supportive of Petitioner's reading of the claims and specification.

Based on the foregoing, we determine that Petitioner has not established sufficiently that Durkheim anticipates the independent claims simply because it discloses needling together two layers of fabric in a manner that forms a "uniform, largely homogeneous" fabric. Accordingly, because each ground in the Petition depends upon this assertion, Petitioner has not demonstrated a reasonable likelihood of establishing the unpatentability of any challenged claim.

CONCLUSION

For the reasons above, we deny institution of *inter partes* review.

ORDER

Accordingly, it is hereby:

ORDERED that the Petition is denied as to all challenged claims, and no *inter partes* review is instituted.

IPR2021-01560
Patent 10,085,391 B2

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