

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

APPLE INC.
Petitioner,

v.

VALENCELL, INC.
Patent Owner.

IPR2017-00316
Patent 8,989,830 B2

Before BRIAN J. McNAMARA, JAMES B. ARPIN, and
SHEILA F. McSHANE, *Administrative Patent Judges*.

McSHANE, *Administrative Patent Judge*.

DECISION
Denying Institution of *Inter Partes* Review
35 U.S.C. § 314(a) and 37 C.F.R. § 42.108

I. INTRODUCTION

A. Background

Apple Inc. (“Petitioner”) filed a Petition requesting *inter partes* review of claims 1–6, 8–16, and 18–20 (“the challenged claims”) of U.S. Patent No. 8,989,830 B2 (Ex. 1001, “the ’830 patent”) pursuant to 35 U.S.C. §§ 311–319. Paper 2 (“Pet.”). Valencell, Inc. (“Patent Owner”) filed a Preliminary Response to the Petition. Paper 6 (“Prelim. Resp.”).

Under 35 U.S.C. § 314(a), an *inter partes* review may not be instituted unless the information presented in the Petition shows “there is a reasonable likelihood that the petitioner would prevail with respect to at least 1 of the claims challenged in the petition.” Taking into account Patent Owner’s Preliminary Response, and for the reasons that follow, we conclude that the information presented in the Petition does not establish that there is a reasonable likelihood that Petitioner will prevail in challenging claims 1–6, 8–16, and 18–20 as unpatentable under 35 U.S.C. § 103(a). Pursuant to 35 U.S.C. § 314, we hereby decline to institute an *inter partes* review of any challenged claim of the ’830 patent.

B. Related Proceedings

The parties indicate that the ’830 patent is at issue in *Valencell, Inc. v. Apple Inc.*, Case No. 5:16-cv-00001 (E.D.N.C), and *Valencell, Inc. v. Fitbit, Inc.*, Case No. 5:16-cv-00002 (E.D.N.C). Pet. 3; Paper 5, 1. Patent Owner indicates the ’830 patent is also at issue in *Valencell, Inc. v. Bragi Store, LLC*, Case No. 5:16-cv-00895 (E.D.N.C.). Paper 5, 1.

In addition to this Petition, Petitioner indicates that it filed another *inter partes* review petition challenging claims of the ’830 patent (IPR2017-00317), and also filed another *inter partes* review petition (IPR2017-00318)

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challenging claims of U.S. Patent No. 8,886,269 B2, which is the parent of the '830 patent. Pet. 3.

C. The '830 Patent

The '830 patent is entitled “Wearable Light-Guiding Devices For Physiological Monitoring” and issued on March 24, 2015 from an application filed on September 12, 2014. Ex. 1001, [22], [45], [54]. The '830 patent claims priority to U.S. Patent Application No. 14/184,364, filed on February 19, 2014 (now U.S. Patent No. 8,886,269 B2), and U.S. Patent Application No. 12/691,388, filed on January 21, 2010 (now U.S. Patent 8,700,111 B2). *Id.* at [63].

The '830 patent is directed to monitoring devices configured to be attached to the body of a subject. Ex. 1001, Abstract. The monitoring devices may include physiological sensors to measure, for example, heart rate, pulse rate, breathing rate, and a variety of other physical parameters. *Id.* at 4:33–67. The sensors, for example, may be photoplethysmography (“PPG”) sensors for measuring blood flow properties, such as blood oxygen level. *Id.* at 3:67–4:5. The '830 patent discloses various embodiments of the monitoring devices, such as that depicted in Figures 22A and 22B, reproduced below.

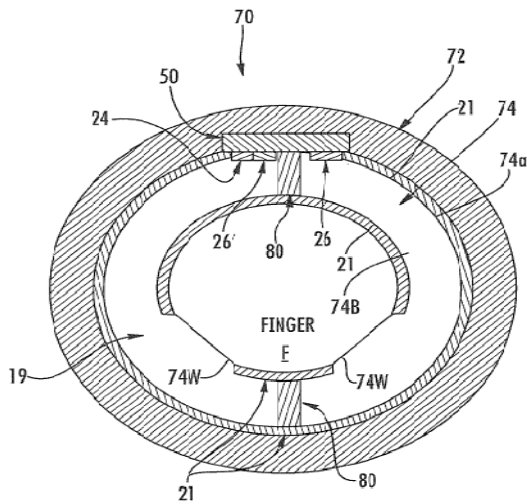


FIG. 22B

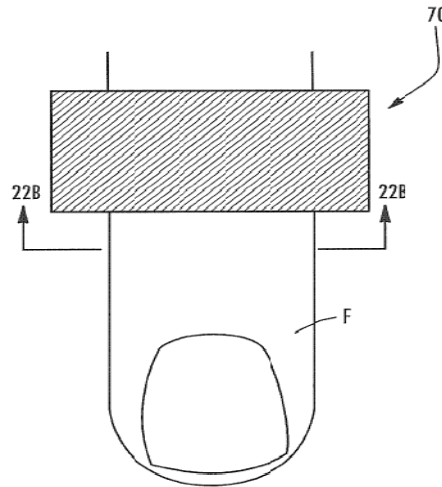


FIG. 22A

Figure 22A is a top plan of an embodiment of monitoring device configured to be attached to the finger of a subject, and Figure 22B is a cross-sectional view of the monitoring device. Ex. 1001, 8:16–20. The monitoring device that fits over the finger in these figures has outer body portion 72 that may include a flex circuit, and base 50 secured to inner body portion 74 and outer body portion 72. *Id.* at 28:1–10, 28:15–16. Base 50 supports optical emitter 24, optical detector 26, and optical noise detector 26'. *Id.* at 28:19–21. Layer of cladding material 21 is applied to (or near) outer surface 74a of inner body portion 74, as well as inner surface 74b, to serve as a light guide to deliver light from optical emitter 24 to the finger and collect light from the finger and deliver it to optical detectors 26, 26'. *Id.* at 28:30–38. “[W]indows 74w are formed in the cladding material 21 and serve as light-guiding interfaces to the finger.” *Id.* at 28:44–46. The device also may be embodied in “a patch, such as a bandage that sticks on a person’s body.” *Id.* at 11:53–58.

The ’830 patent discloses an embodiment of the invention illustrated in Figure 3, reproduced below.

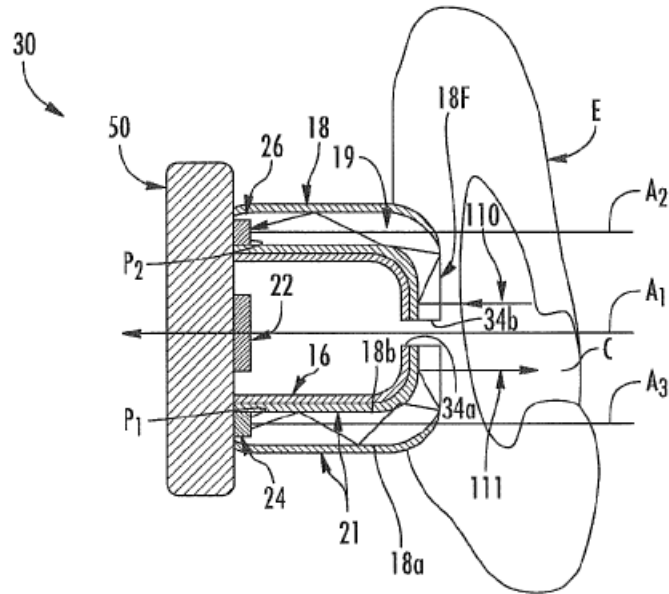


FIG. 3

Figure 3 depicts an embodiment of monitoring device showing a side section view of a headset with a light-guiding earbud. Ex. 1001, 7:19–21. Earbud 30 includes optical detector 26 and optical emitter 24. *Id.* at 14:52–53. Cladding material 21 is used to confine light within light guiding region 19. *Id.* at 14:60–63.

Claim 1, reproduced below, is illustrative of the challenged claims of the '830 patent.

1. A monitoring device configured to be attached to the body of a subject, comprising:
 - an outer layer and an inner layer secured together, the inner layer comprising light transmissive material, and having inner and outer surfaces;
 - a base secured to at least one of the outer and inner layers and comprising at least one optical emitter and at least one optical detector;
 - a layer of cladding material near the outer surface of the inner layer; and
 - at least one window formed in the layer of cladding material that serves as a light-guiding interface to the body of the

subject, wherein the light transmissive material is in optical communication with the at least one optical emitter and the at least one optical detector, wherein the light transmissive material is configured to deliver light from the at least one optical emitter to the body of the subject along a first direction and to collect light from the body of the subject and deliver the collected light in a second direction to the at least one optical detector, wherein the first and second directions are substantially parallel.

Ex. 1001, 30:35–55.

D. Asserted Grounds of Unpatentability

Petitioner asserts the following grounds of unpatentability:

Ground	Claim(s)	Reference(s)
§ 103	1–4, 8–14, 18–20	Haahr ¹
§ 103	5, 15	Haahr and Hicks ²
§ 103	6, 16	Haahr, Hannula ³ , and Asada ⁴

Pet. 6.

II. ANALYSIS

A. Claim Construction

In an *inter partes* review, the Board interprets claim terms in an unexpired patent according to the broadest reasonable construction in light

¹ Rasmus G. Haahr, *A Wearable “Electronic Patch” for Wireless Continuous Monitoring of Chronically Diseased Patients*, PROCEEDINGS OF THE 5TH INTERNATIONAL WORKSHOP ON WEARABLE AND IMPLANTABLE BODY SENSOR NETWORKS, JUNE 1–3, 2008 (Ex. 1020).

² U.S. Patent No. 6,745,061 B1 (issued June 1, 2004) (Ex. 1008).

³ U.S. Patent No. 7,190,986 B1 (issued March 13, 2007) (Ex. 1009).

⁴ H. Harry Asada, *Mobile Monitoring with Wearable Photoplethysmographic Biosensors*, IEEE ENGINEERING IN MEDICINE AND BIOLOGY MAGAZINE, Vol. 22, Issue 3, May-June 2003. (Ex. 1005).

of the specification of the patent in which they appear. 37 C.F.R.

§ 42.100(b); *Cuozzo Speed Techs., LLC v. Lee*, 136 S. Ct. 2131, 2144–46 (2016) (upholding the use of the broadest reasonable interpretation approach). Under that standard, and absent any special definitions, we give claim terms their ordinary and customary meaning, as they would be understood by one of ordinary skill in the art at the time of the invention. *In re Translogic Tech., Inc.*, 504 F.3d 1249, 1257 (Fed. Cir. 2007).

Although the parties propose claim constructions for some terms, at this juncture of the proceeding, we determine that it is not necessary to provide an express interpretation of any term of the claims.

B. Alleged Obviousness of Claims 1–4, 8–14, and 18–20 over Haahr

Petitioner contends that claims 1–4, 8–14, and 18–20 would have been obvious over Haahr. Pet. 25–43. To support its contentions, Petitioner provides explanations as to how the prior art discloses each claim limitation. *Id.* Petitioner also relies upon the Declaration of Brian W. Anthony, Ph.D. (Ex. 1003) to support its positions. Patent Owner counters that Petitioner does not establish and sufficiently support that the prior art teaches some claim limitations. Prelim. Resp. 24–32. Based on the evidence of record, we are not persuaded that the Petition is sufficient to account for the teaching of all the limitations of the claims.

We begin our discussion with a brief summary of Haahr, and then address the evidence and the basis for the contentions and arguments.

1. Haahr (Ex. 1020)

Haahr generally discloses an optical biosensor for wireless monitoring of physiological signals. Ex. 1020, 54 (Abstract). The optical biosensor is in the form of an electronic patch. *Id.* The biosensor has a printed circuit

board (“PCB”) which has sensors, electronics, and radio communications components. *Id.* at 55. Figures 3, 4, and 5 are reproduced below.

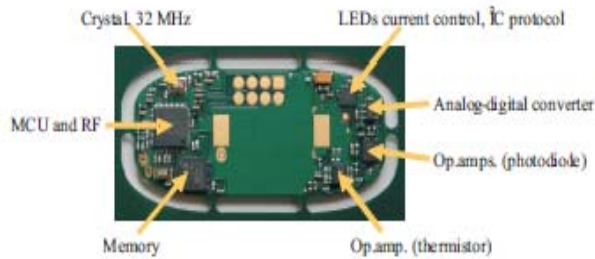


Fig. 3. Top side of the PCB showing the types of electronic components which is utilized in the pulse oximetry version of the Electronic Patch.

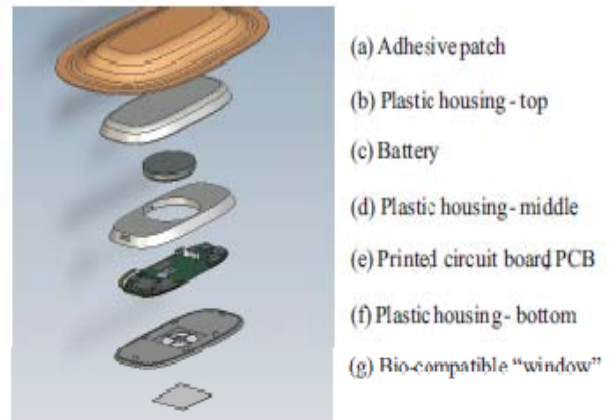


Fig. 4. CAD drawing of the parts in the electronic patch and how they are assembled.



Fig. 5. The assembled patch with a pulse oximetry sensor made as a concentric photodiode around two LEDs placed in the center. The little square frame around the LEDs is to prevent light going directly from the LEDs into the photodiode.

Figure 3 depicts a PCB, Figure 4 depicts a disassembled parts view, and Figure 5 depicts an assembled patch. Ex. 1020, 56. Haahr’s biosensor has two light-emitting diodes (“LEDs”) in the center and a circular photodiode (depicted in blue in Figure 5). *Id.* at 55. A frame around the LEDs prevents light from travelling directly from the LEDs into the photodiode. *Id.*

2. Analysis

Petitioner contends that Haahr discloses a monitoring device as claimed, and refers to Fig. 4 of Haahr, as annotated, to show the correspondence of the recited limitations to Haahr’s structures. *See* Pet. 16, 25–37. Annotated Figure 4 of Haahr is reproduced below.

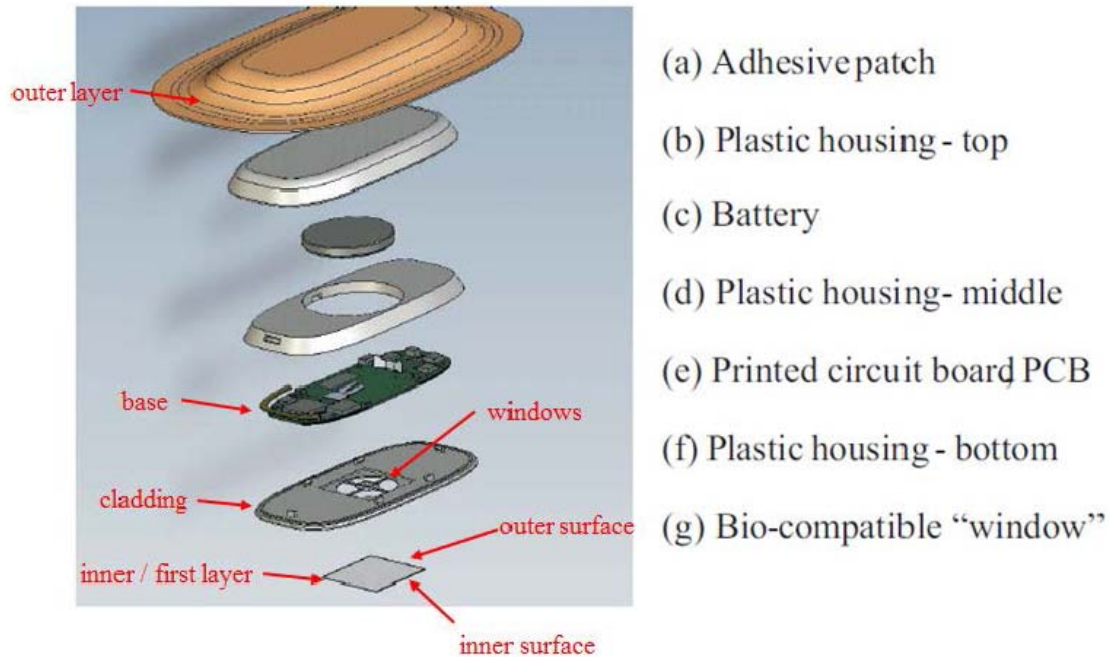


Fig. 4. CAD drawing of the parts in the electronic patch and how they are assembled.

Figure 4 (annotated) is a view of a CAD drawing of Haahr with Petitioner's annotations shown in red. Pet. 16 (citing Ex. 1020, Fig. 4; Ex. 1003 ¶ 52).

As depicted, Petitioner asserts that the "cladding" limitation of claim 1 is taught by layer (f) of Haahr. Pet. 27. Petitioner also asserts the "first" layer is layer (g), with its "inner" and "outer" surfaces on either side, and layer (g) teaches the "light transmissive material" of claim 1. *Id.* at 25–26, 31. Petitioner contends that the PCB is the claimed "base," and the "optical emitter" and "optical detector" are Haahr's LEDs and concentric photodiode, respectively. *Id.* at 26–27. Petitioner relies upon Haahr's disclosure of the multiple windows in the plastic housing bottom portion to serve as "at least one window formed in the layer of cladding material that serves as a light-guiding interface to the body of the subject." *Id.* at 28 (citing Ex. 1020, 68).

The Petition relies upon Figures 4 and 5 of Haahr for the teaching that its LEDs and photodiode are in optical communication by the transmission of light from the LEDs into the body of a subject in one direction, and with reflected light passing through the window above the photodiode in a second direction. Pet. 29 (citing Ex. 1003 ¶ 76). Petitioner further asserts that:

A POSA would have understood that in Haahr's device, at least some of the light emitted from the LEDs through the bio-compatible window into the body in the first direction is reflected back through the bio-compatible window from the body to the photodiode in a second direction that is "substantially parallel" to the first direction. ([Ex. 1003] ¶77.) *By way of example, some of the light emitted from the LEDs in Haahr will be emitted in a direction that is orthogonal to the PCB on which the sensor, which includes the LEDs and photodiode, is mounted. (See [Ex.] 1020, Figures 2, 4, and 5; [Ex. 1003] ¶ 77.)* As the emitted light is reflected and refracted within the patient's body—often multiple times—some of the emitted light will be received back at the photodiode along a path that is also orthogonal to the PCB, but in the opposite direction as the light emitted from the LEDs into the body. ([Ex. 1003] ¶ 77.) *These opposite forward and reflected orthogonal directions are, by their very nature, parallel. (Id.)* A POSA would have understood that some light emitted from the LEDs is emitted at an angle that is nearly orthogonal to the sensor and that some light received at the photodiode is received in the opposite direction at an angle that is also nearly orthogonal to the sensor. (*Id.*) *The directions of the emitted and received light are thus "substantially parallel," as recited in claim 1. (Id.)*

Pet. 29–30 (emphases added).

Dr. Anthony states that PPG measurements may be performed using either transmission or reflective modes, one of ordinary skill in the art would have been familiar with these modes, and that one mode could be adapted for use with the other. Ex. 1003 ¶ 75 (citing Ex. 1013, 7–8; Ex. 1014, 405; Ex. 1015, 912). Petitioner asserts that a person of ordinary skill in the art

“would have understood that Haahr describes the reflection mode, where the LED(s) and photodetector are both mounted facing the same side of the vascular bed.” *Id.* (citing Ex. 1013, 8; Ex. 1014, 405; Ex. 1015, 912). It is further stated that, “[i]n reflection mode, only a small fraction of the incident light is backscattered by the subcutaneous layers. [] The backscattered light intensity reaching the skin surface is typically distributed over a relatively large area surrounding the LEDs.” *Id.* (citing Ex. 1015, 914).

Patent Owner contends that institution should be denied because Haahr fails to teach the claim 1 limitation that light delivered to the optical detector is substantially parallel to the emitted light. Prelim. Resp. 16–18, 25–32. Patent Owner argues that the Petition’s argument that “some” light that is collected and delivered to the photodiode in a direction that “may” be parallel is insufficient to meet the standard for institution of *inter partes* review, that is, the evidence provided by Petitioner is insufficient to establish a reasonable likelihood that Haahr teaches the claim limitation. *Id.* at 26. Patent Owner avers that Haahr’s square frames prevent the light going from the LEDs into the photodiode, and its concentric photodiode is optimized to collect backscattered light from the LEDs, but there is no disclosure of a light guide or other means in Haahr that delivers light in directions that are substantially parallel to the direction light was emitted because “backscattered light . . . is collected by the photodiode from all directions without any configuration that guides light in any direction.” *Id.* at 26–27. Patent Owner thus argues that Haahr is not configured in a manner to collect and deliver light in the manner recited in the challenged claims, and “[i]nstead, Haahr collects as much backscattered light as it can without regard to the angle at which it was collected and delivered to the photodiode.” *Id.* at 28–29. Patent Owner further alleges that, although

Petitioner assumes that “some of the emitted light will be received back at the photodiode along a path that is also orthogonal to the PCB, but in the opposite direction as the light emitted from the LEDs into the body,” there is no further explanation or evidence provided in support of this short of Petitioner’s declarant referring to the emitted light being reflected and refracted multiple times—but this does not necessarily mean that light will be delivered in an orthogonal direction. *Id.* at 30–31.

On this record, we are not persuaded that Petitioner presents sufficient evidence to support a finding that Haahr discloses a device where “the light transmissive material is configured to deliver light from the at least one optical emitter to the body of the subject along a first direction and to collect light from the body of the subject and deliver the collected light in a second direction to the at least one optical detector, wherein the first and second directions are substantially parallel,” as required by independent claims 1 and 11. Here, even assuming that some of the light emitted from the LEDs is in an orthogonal direction, Petitioner’s declarant fails to provide supporting evidence or persuasive explanation why some of the backscattered light would also be delivered to the photodiode in an orthogonal direction. Dr. Anthony refers to the emitted light being reflected and refracted and changing direction within a patient’s body, but provides only a conclusory view that one of ordinary skill in the art would know that some of the light would be received by the photodiode in an orthogonal angle. *See Ex. 1003 ¶ 77.* Speculation alone is insufficient to support a finding of a reasonable likelihood of prevailing in showing obviousness.

Accordingly, in light of Petitioner’s failure to demonstrate a reasonable likelihood of prevailing on its assertion that independent claims 1

and 11 are obvious over Haahr, the obviousness challenges to dependent claims 2–4, 8–10, 12–14, and 18–20 also fail.

C. Alleged Obviousness of Claims 5 and 15 over Haahr and Hicks

Petitioner contends that claims 5 and 15 are unpatentable under 35 U.S.C. § 103(a) over Haahr and Hicks. Pet. 44–46. Claim 5 depends directly from claim 1, and claim 15 depends directly from claim 11. Ex. 1001, 30:66–31:2, 32:14–17. As discussed above in the ground based on Haahr alone, Petitioner has not shown sufficiently that Haahr discloses the “substantially parallel” limitation of claims 1 and 11. Petitioner does not allege that Hicks teaches this limitation, but rather relies upon Hicks to teach the additional limitations recited in claims 5 and 15. Pet. 45–46. In light of Petitioner’s failure to demonstrate a reasonable likelihood of prevailing on its assertion that claims 1 and 11 are obvious over Haahr, the obviousness ground also based, in part, on Haahr, that challenges dependent claims 5 and 15 also fails.

D. Alleged Obviousness of Claims 6 and 16 over Haahr, Asada, and Hannula

Petitioner contends that claims 6 and 16 are unpatentable under 35 U.S.C. § 103(a) over Haahr, Asada, and Hannula. Pet. 46–53. Claim 6 depends directly from claim 1, and claim 16 depends directly from claim 11. Ex. 1001, 31:3–12, 32:18–27. As discussed above for the ground based on Haahr alone, Petitioner has not shown sufficiently that Haahr discloses the “substantially parallel” limitation of claims 1 and 11. Petitioner does not allege that Asada or Hannula teaches this limitation of claims 1 and 11, but rather relies upon Asada and Hannula to teach the additional limitations recited in claims 5 and 15. Pet. 49–53. In light of Petitioner’s failure to demonstrate a reasonable likelihood of prevailing on its assertion that claims

1 and 11 are obvious over Haahr, the obviousness ground also based, in part, on Haahr, that challenges dependent claims 6 and 16 also fails.

III. CONCLUSION

For the foregoing reasons, the information presented in the Petition does not demonstrate that there is a reasonable likelihood that Petitioner would prevail in challenging claims 1–6, 8–16, and 18–20 as unpatentable under 35 U.S.C § 103(a).

IV. ORDER

Accordingly, it is:

ORDERED that the Petition is *denied* as to claims 1–6, 8–16, and 18–20 of the '830 patent; and

FURTHER ORDERED that no *inter partes* review is instituted.

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