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Paper No. 12
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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

NEVRO CORP.,
Petitioner,

v.

BOSTON SCIENTIFIC NEUROMODULATION CORP.,
Patent Owner.

Case IPR2017-01920
Patent 6,895,280 B2

Before HUBERT C. LORIN, MICHAEL W. KIM, and AMANDA F. WIEKER, *Administrative Patent Judges*.

WIEKER, *Administrative Patent Judge*.

DECISION
Institution of *Inter Partes* Review
37 C.F.R. § 42.108

I. INTRODUCTION

A. Background

On August 11, 2017, Nevro Corp. ("Petitioner") filed a Petition requesting an *inter partes* review of claims 8, 18, 22–24, and 27 ("the challenged claims") of U.S. Patent No. 6,895,280 B2 (Ex. 1001, "the '280 patent"). Paper 1 ("Pet."). Boston Scientific Neuromodulation Corp. ("Patent Owner") filed a Preliminary Response. Paper 10 ("Prelim. Resp.").

We have authority under 35 U.S.C. § 314, which provides that an *inter partes* review may not be instituted unless the information presented in the Petition and the Preliminary 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; *see also* 37 C.F.R § 42.4(a) ("The Board institutes the trial on behalf of the Director."). Taking into account the arguments presented in the Preliminary Response, we conclude that the information presented in the Petition establishes a reasonable likelihood that Petitioner would prevail with respect to challenged claim 27, but not with respect to challenged claims 8, 18, or 22–24.

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

B. Related Proceedings

The parties represent that the '280 patent is at issue in *Boston Scientific Corp. and Boston Scientific Neuromodulation Corp. v. Nevro Corp.*, Case No. 1:16-cv-01163-GMS (D. Del). Pet. 80; Paper 6, 2.

The parties also represent that the ’280 patent is the subject of IPR2017-01811 and IPR2017-01812, both filed on July 21, 2017. Pet. 80; Paper 6, 2.

C. The ’280 Patent

The ’280 patent is titled “Rechargeable Spinal Cord Stimulator System,” and issued on May 17, 2005 from U.S. Application No. 10/307,098, filed Nov. 27, 2002. Ex. 1001, (21), (22), (45), (54).

The ’280 patent explains that spinal cord stimulation is used to reduce a patient’s pain by providing electrical pulses to electrodes implanted at the patient’s spinal cord. *Id.* at 1:23–32. Figure 1 of the ’280 patent is reproduced below.

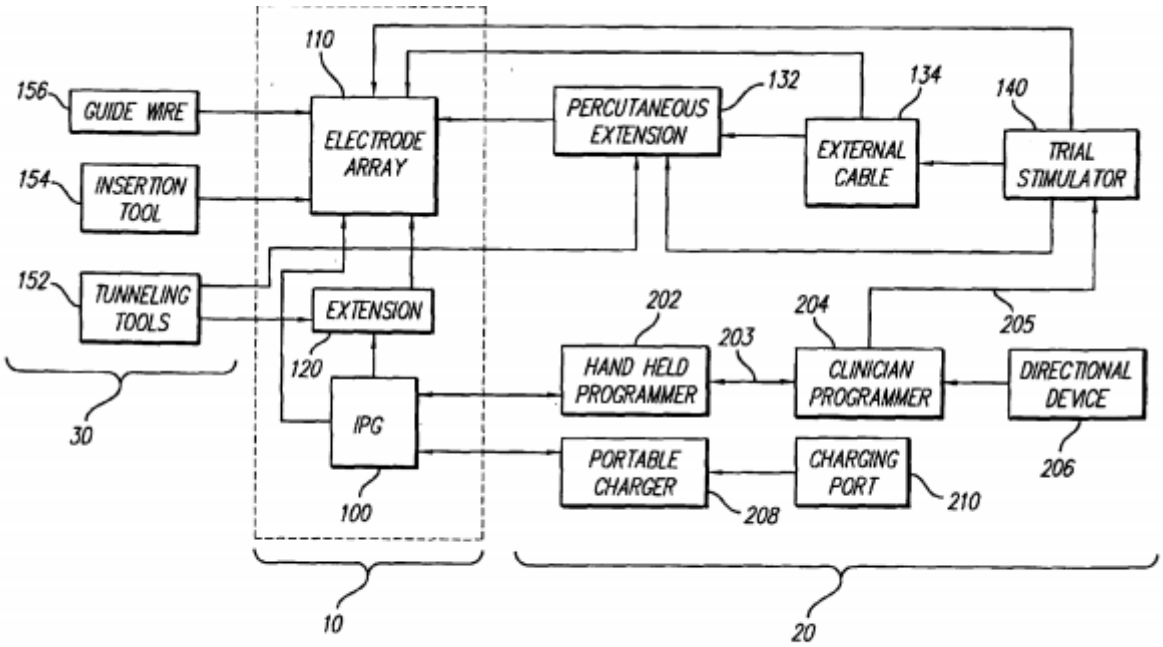

FIG. 1

Figure 1 depicts a block diagram of a spinal cord stimulation system, and identifies its implantable, external, and surgical components. *Id.* at 7:3–5, 8:33–35. Implantable components 10 of the system include implantable pulse generator (IPG) 100, electrode array 110, and lead extension 120. *Id.* at 4:13–18, 8:38–41. These elements are implanted in the patient through use of surgical components 30.

Id. at 35–38. External components 20 include, for example, various programmers 202, 204, external battery charger 208, and trial stimulator 140. *Id.* at Fig. 1, 4:18–21.

The spinal cord stimulation system disclosed in the ’280 patent purports to provide several advantages over prior art systems including, *inter alia*, the ability to provide unique stimulation parameters across multiple channels of electrodes (*id.* at 2:47–51, 3:16–20), the ability to non-invasively recharge the power source of the implanted components with charger 208 (*id.* at 2:54–58, 3:30–58), and the ability to perform a temporary evaluation of stimulus levels, through use of external trial stimulator 140, prior to implantation of the IPG (*id.* at 6:6–16). The disclosed system also “offers a simple connection scheme for detachably connecting a lead system thereto.” *Id.* at 2:62–64. The ’280 patent explains that although “the lead system [(comprising lead extension 120 and electrode array 110)] is intended to be permanent, the IPG may be replaced should its power source fail, or for other reasons.” *Id.* at 27:26–38. Accordingly, a detachable connection is beneficial. *Id.* at 27:31–33; *see also id.* at 8:46–52 (electrode array 110 or lead extension 120 is “detachably secured, i.e., electrically connected,” to IPG 100).

D. Illustrative Claims

Of the challenged claims, claims 8, 18, 22, and 27 are independent claims, with challenged claims 23 and 24 depending directly or indirectly from claim 22. Claims 18 and 27 are illustrative and are reproduced below, with additional formatting and emphasis added.

22. A spinal cord stimulation system comprising:

a multi-channel implantable pulse generator (IPG) having a replenishable power source, the IPG having a housing which contains IPG processing circuitry;

an implantable electrode array detachably connected to the IPG, the electrode array having a multiplicity of n electrodes (En) thereon; and

a multiplicity of m stimulation channels provided by the IPG, wherein each stimulation channel is independently programmable with different stimulation parameters,

wherein m is equal to or less than n, and m is 2 or greater; and

wherein the IPG contains a soft ramping circuit that ramps up the stimulation pulse magnitude at the beginning of a burst of stimulation pulses in at least one channel.

27. A method of charging a rechargeable battery contained within an implantable pulse generator (IPG), which IPG is connected to an implanted, secondary coil antenna, the method employing an external battery charger, which charger contains a rechargeable battery electrically connected to an external, primary antenna coil, the method comprising:

(a) charging the rechargeable battery in the external battery charger using an external power source;

(b) aligning the primary antenna coil with the implanted secondary coil;

(c) broadcasting electromagnetic energy through the primary antenna coil;

(d) receiving the broadcast electromagnetic energy through the secondary antenna coil, whereby an alternating current is produced in the secondary coil;

(e) rectifying the induced, alternating current received by the secondary coil;

(f) charging the rechargeable battery carried within the IPG, while monitoring the charging current or voltage across the battery as the battery is being charged to prevent overcharging; and

(g) stopping the charging at the battery charger when the current or voltage at the battery in the IPG reaches a prescribed level.

Ex. 1001, 54:54–55:3, 57:37–58:20.

E. Applied References

Petitioner relies upon the following references, and the Declaration of Dr. Mark W. Kroll ("the Kroll Declaration," Ex. 1003). Pet. 1–2, 10–11.

Reference	Patent No.	Relevant Dates	Exhibit No.
Munshi	U.S. Patent 5,411,537	Filed Oct. 29, 1993 Issued May 2, 1995	Ex. 1005
Rutecki	U.S. Patent 5,330,515	Filed June 17, 1992 Issued July 19, 1994	Ex. 1007
Schulman	U.S. Patent 6,185,452	Filed Feb. 25, 1998 Issued Feb. 6, 2001	Ex. 1012
Loeb	U.S. Patent 5,571,148	Filed Aug. 10, 1994 Issued Nov. 5, 1996	Ex. 1017
Wang	U.S. Patent 5,702,431	Filed Sept. 17, 1996 Issued Dec. 20, 1997	Ex. 1018

F. Asserted Grounds of Unpatentability

Petitioner challenges the patentability of claims 8, 18, 22–24, and 27 of the '280 patent based on the following grounds. Pet. 1–2.

References	Basis	Claim(s) Challenged
Schulman and Loeb	§ 103	18 and 27
Schulman, Loeb, and Rutecki	§ 103	8
Schulman, Loeb, Munshi, and Wang	§ 103	22–24

II. DISCUSSION

A. Claim Construction

In an *inter partes* review, claim terms in an unexpired patent are given their broadest reasonable interpretation in light of the specification of the patent in which they appear. 37 C.F.R. § 42.100(b); *Cuozzo Speed Tech., LLC v. Lee*, 136 S. Ct. 2131, 2144–46 (2016). Under that standard, we generally give claim terms their ordinary and customary meaning, as understood by a person of ordinary skill

in the art in the context of the entire patent disclosure. *In re Translogic Tech., Inc.*, 504 F.3d 1249, 1257 (Fed. Cir. 2007).

Petitioner proposes, for construction, the claim phrase "multi-channel implantable pulse generator (IPG)." Pet. 11–15. Patent Owner proposes, for construction, *inter alia*, "external trial stimulator," "[a] spinal cord stimulation system," and "telemetry/back telemetry receiver." Prelim. Resp. 22–29.

We determine that these claim phrases do not require express construction for purposes of this Decision. *Vivid Techs., Inc. v. Am. Sci. & Eng'g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999).

Patent Owner also proposes, for construction, the claim phrases "alignment between the primary and secondary coils" and "aligning the primary antenna coil with the implanted secondary coil," which appear in claims 22 and 27, respectively. Prelim. Resp. 24–25. According to Patent Owner, these phrases should be construed as "obtaining proper positioning between the primary and secondary coils such that reflected impedance is at a minimum." *Id.* at 24. Patent Owner asserts the '280 patent specification refers to "proper" alignment, which is described as occurring when reflected impedance is at a minimum. *Id.* at 24–25 (citing Ex. 1001, 41:14–17, 42:40–42, 44:18–24, 6:60–64). Petitioner does not offer an express construction for this language. *See generally* Pet.

We have reviewed the '280 patent specification, including those portions cited by Patent Owner. On this record, and at this stage of the proceeding, we determine that the broadest reasonable interpretation of this language does not require that reflected impedance be at a minimum, as Patent Owner proposes. Although the '280 patent indicates that "[r]eflected impedance is at a minimum when proper alignment has been obtained," we are not persuaded that this is a definition of "alignment" generally. *See id.* at 44:21–22. This disclosure simply

indicates that minimized reflected impedance is one characteristic of "proper alignment." *Id.* Moreover, the '280 patent also explains that steady-state voltage is at a minimum, and coupling is at a maximum, when proper alignment is achieved. *Id.* at 44:21–26. We consider minimized steady-state voltage and maximized coupling also to be characteristics of "proper alignment," but not defining features of "alignment" generally.

At this stage of the proceeding, we determine that additional express construction of this language is not required. *Vivid Techs*, 200 F.3d at 803. The parties are encouraged to develop further the record regarding the proper construction and application of these limitations. *See infra*, Section II.D.4.

B. Principles of Law

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

"In an [*inter partes* review], the petitioner has the burden from the onset to show with particularity why the patent it challenges is unpatentable." *Harmonic Inc. v. Avid Tech., Inc.*, 815 F.3d 1356, 1363 (Fed. Cir. 2016). The burden of persuasion never shifts to Patent Owner. *Dynamic Drinkware, LLC v. Nat'l Graphics, Inc.*, 800 F.3d 1375, 1378 (Fed. Cir. 2015).

We analyze the challenges presented in the Petition in accordance with the above-stated principles.

C. Level of Ordinary Skill in the Art

Petitioner contends that a person of ordinary skill in the art "would have had at least (1) a bachelor's degree in electrical or biomedical engineering, or equivalent coursework, and (2) at least one year of experience researching or developing implantable medical devices." Pet. 10 (citing Ex. 1003 ¶¶ 12–18). Patent Owner does not provide an assessment of the appropriate level of skill in the art. *See generally* Prelim. Resp.

At this stage of the proceeding, we are persuaded that the assessment proposed by Petitioner is correct. Further, in this case, the applied prior art reflects the appropriate level of skill at the time of the claimed invention. *See Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001).

D. Obviousness over the Combined Teachings of Schulman and Loeb

Petitioner contends that claims 18 and 27 of the '280 patent are unpatentable over the combined teachings of Schulman and Loeb. Pet. 26–52. For reasons that follow, we determine Petitioner has demonstrated a reasonable likelihood of prevailing as to claim 27, but has not demonstrated a reasonable likelihood of prevailing as to claim 18.

1. Overview of Schulman (Ex. 1012)

Schulman is a U.S. Patent titled "Battery-Powered Patient Implantable Device," which performs, e.g., nerve or muscle stimulation. Ex. 1012, (54), (57). Schulman's Figure 2 is reproduced below.

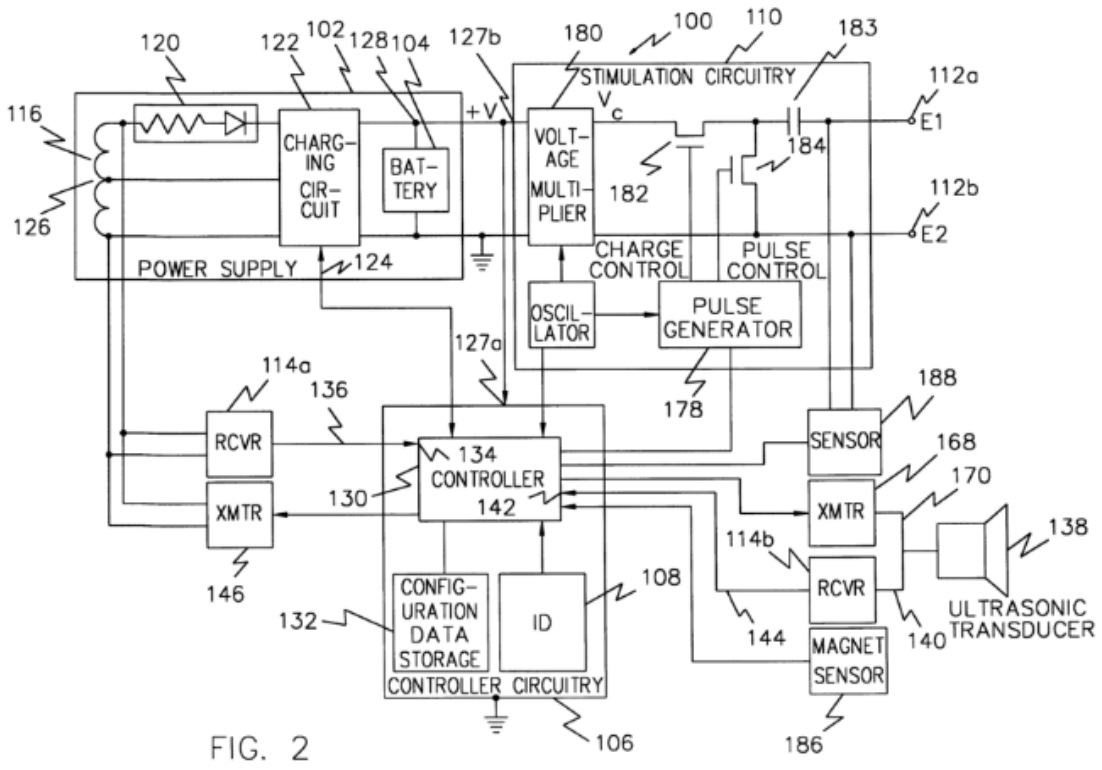

FIG. 2

Figure 2 depicts a block diagram of implantable device 100 (i.e., microstimulator 100), which includes rechargeable battery 104 for powering the device, and stimulation circuitry 110 for providing drive pulses to one or more electrodes 112. *Id.* at 2:37–40, 3:32–4:16. A plurality of devices 100 may be implanted under the skin of a patient. *Id.* at 4:40–42.

To charge rechargeable battery 104, Schulman explains that "coil 116 receives power in the form of an alternating magnetic field generated from an external power source 118 . . . and responsively supplies an AC current to a rectifier 120 which is passed as a rectified DC current to a charging circuit 122," which monitors the voltage of battery 104. *Id.* at 4:27–35.

> [O]nce the charging circuit 122 determines that battery 104 has been sufficiently charged, the charging circuit preferably detunes coil . . . and thus minimizes any heat generation in the charging circuit 122 or in the battery 104 from overcharging. Thus, the external power source 118 can continue to provide charging power via an alternating magnetic field indefinitely. However in one preferred embodiment, the external

> power source periodically polls the implanted devices for status information and continues to provide charging power until it has received status information from each of the implanted devices 100 that its battery 104 is charged.

Id. at 4:43–56; *see also id.* at 6:2–16.

2. Overview of Loeb (Ex. 1017)

Loeb is a U.S. Patent titled "Implantable Multichannel Stimulator." Ex. 1017, [54]. Loeb's Figure 2A is reproduced below.

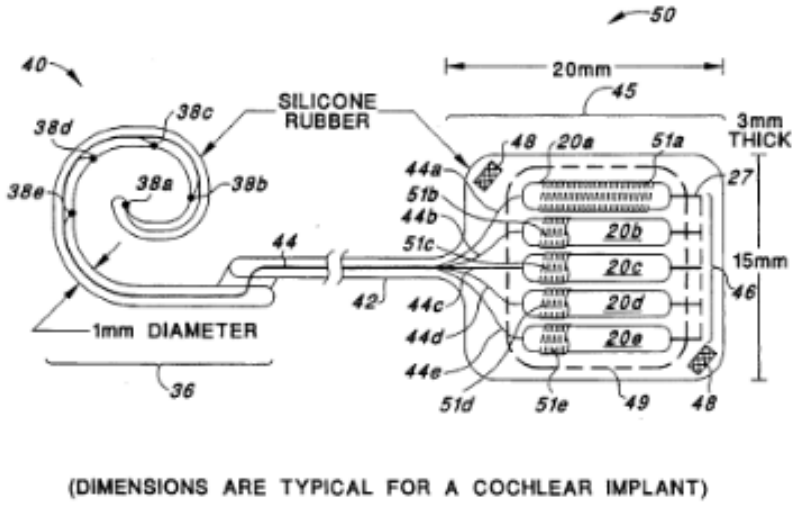

FIG. 2A

Figure 2A depicts an implantable multichannel stimulator that includes microstimulator array 45 (comprising a plurality of microstimulators 20a–e) and electrode array 36 (comprising a plurality of electrode contacts 38a–n). *Id.* at 6:24–28, 8:7–12, 8:17–20. Each electrode contact 38a–n of array 36 "is in electrical contact with one or more of the electrodes 26 or 27 that protrude out from the ends of each microstimulator 20 through respective conductive wires 44*a*, 44*b*, 44*c*, . . . 44*n*." *Id.* at 8:12–25.

Loeb describes that electrode array 36 and microstimulator array 45 are "sealed or molded in a body compatible material," for example, silicone rubber, "to

form an integral implantable multichannel stimulator unit 50." *Id.* at 8:66–9:5. According to Loeb, "conductive wires [44*a*–*n*] form a cable that is also encapsulated within the silicone rubber, which . . . adds physical strength to the wires and prevents the electrode array 36 from breaking or disconnecting itself from the microstimulator array 45." *Id.* at 9:11–16.

In Loeb's system, power is supplied to microstimulator array 45 through inductive coupling with an external power source. *Id.* at 9:33–58. Loeb explains that stimulator 50 includes "alignment means, such as a magnet or marker 48, that helps align the implanted microstimulator array 45, and more particularly the coils 30 . . . of the implanted microstimulator arrays, with an external coil . . . connected to an external source that generates the modulated power signal." *Id.* at 20–27. According to Loeb, "[o]ptimum inductive coupling occurs between the internal coils 30 and the external coil when good alignment is achieved. Hence, maintaining proper alignment allows the modulated power signal to be a relatively low power signal." *Id.* at 9:27–32.

3. Analysis of Claims 18 and 27

As applicable to both claim 18 and claim 27, Pet. 20–25, Petitioner contends that it would have been obvious to have "arrange[d] a plurality of Schulman's microstimulators into the microstimulator array arrangement taught by Loeb," because an array arrangement would be less likely to migrate from an implant site, would allow more efficient charging of the implanted batteries, and would provide better control in stimulating the targeted area. *Id.* at 22.

i. Claim 18

Petitioner contends that claim 18 would have been obvious based on the combined teachings of Schulman and Loeb. Pet. 26–41. Patent Owner disputes Petitioner's contentions. Prelim. Resp. 34–41. Patent Owner argues, *inter alia*,

that Schulman and Loeb do not suggest or render obvious the claimed "implantable electrode array detachably connected to the IPG." *Id.*

After considering the parties' arguments and evidence, we determine that Petitioner has not demonstrated a reasonable likelihood of prevailing with respect to this claim.

Independent claim 18 recites, *inter alia*, "an implantable electrode array detachably connected to the IPG." Ex. 1001, 54:59–60. Petitioner contends that although Schulman does not disclose this limitation expressly, "it would have been obvious to simply substitute in Schulman's rechargeable microstimulators for Loeb's microstimulators such that Schulman's microstimulators are connected in a microstimulator array, as taught by Loeb." Pet. 33. According to Petitioner, Loeb discloses that its microstimulators are connected mechanically to an electrode array. *Id.* In Petitioner's view, although Loeb discloses that these elements are sealed together, "it would have been a matter of mere design choice to instead use a detachable version of flexible body 42, which connects the electrode array 36 to the microstimulator array 45 and functions as a lead." *Id.* at 34 (citing Ex. 1003 ¶ 86). Petitioner contends that the '280 patent recognizes that "many different types of leads were known in the art and could be used with the same IPG," and that "it was well-known at the time that leads can be attached and detached to IPGs . . . [for] flexibility to select the type of lead that best suits the patient's particular stimulation needs and so malfunctioning leads could be replaced without having to replace the entire IPG." *Id.* (citing Ex. 1001, 9:8–11, 10:19–24; Ex. 1003 ¶ 87; Ex. 1016, Abstract, 2:66–3:2).

Patent Owner argues that Loeb's electrode array 36 is not detachable from microstimulator array 45. According to Patent Owner, Loeb explains that these elements are "sealed or molded" together for the express purpose of preventing

disconnection. *Id.* at 35–36 (citing Ex. 1017, 4:38–43, 8:66–9:15, 16:45–48). In light of this disclosure, Patent Owner also argues that the Petition does not support adequately its position that it would have been "a matter of mere design choice" to make Loeb's connection detachable. *Id.* at 36–40.

We have considered the parties' arguments and cited evidence, and we determine that the Petition does not demonstrate sufficiently that this limitation would have been obvious over the combined teachings of Schulman and Loeb. The cited evidence supports Patent Owner's argument that Loeb's electrode array 36 and microstimulator array 45 are not detachable. For example, Loeb specifies that wires 44*a–n*, which connect these components, are encapsulated within a "sealed or molded," integral silicon rubber body. Ex. 1017, 8:66–9:13, 4:38–43, 16:44–47. Indeed, Loeb specifies that this arrangement "prevents the electrode array 36 from . . . disconnecting itself from the microstimulator array 45." *Id.* at 9:13–15. Thus, we agree with Patent Owner that Loeb does not disclose an electrode array "detachably connected" to a stimulator.

We also are unpersuaded by Petitioner's contention that it would have been "a matter of mere design choice to instead use a detachable version of flexible body 42, which connects the electrode array 36 to the microstimulator array 45." Pet. 34. We agree with Patent Owner that Petitioner presents only a conclusory analysis to support its position. Prelim. Resp. 37–41. As Patent Owner correctly notes, the Petition must provide a reasonable explanation as to why a proposed modification would have been obvious. *See, e.g., Cutsforth, Inc. v. MotivePower, Inc.*, 636 F. App'x 575, 578 (Fed. Cir. Jan. 22, 2016) (non-precedential) (explaining that "[m]erely stating that a particular placement of an element is a design choice does not make it obvious," and instead requiring "a reason for why a

person of ordinary skill in the art would have made the specific design choice" proposed). The Petition fails to do so.

First, neither the Petition nor the cited portions of the Kroll Declaration persuasively show that a person of ordinary skill in the art would have made such a modification in light of Loeb's clear preference that the connection *not* be detachable. Pet. 33–34; Ex. 1003 ¶¶ 85–87. Indeed, Loeb suggests that such a modification would not have been desirable to a person of ordinary skill in the art, because Loeb's encapsulated body ensures that electrode array 36 will *not* be detached. Ex. 1017, 9:13–15. Dr. Kroll does not explain why such a modification would have been obvious, nonetheless, other than to note that such a feature was well-known. Ex. 1003 ¶ 86.

Petitioner's citation to the challenged '280 patent, and another prior art reference, also fails to provide sufficient reasoning to modify the prior art as Petitioner proposes. *See* Pet. 34 (citing Ex. 1001, 9:8–11, 10:19–24; Ex. 1016, Abstract, 2:66–3:2). Although cited Exhibit 1016 discloses a "sealable connector" that couples a lead to an implantable pulse generator, the cited portions of the Exhibit do not explain that this connector is detachable, and do not suggest why detachability would have been desirable to a person of ordinary skill in the art, in the proposed combination of Schulman and Loeb. Ex. 1016, Abstract, 2:66–3:2. Likewise, Exhibit 1008, cited by Dr. Kroll, fails to suggest any reason why one skilled in the art would have been motivated to modify the applied prior art to include a detachable lead connector. Ex. 1003 ¶ 86 (citing Ex. 1008, 7:34–41). Petitioner's reliance on this evidence is insufficient, without persuasive explanation as to why a person of ordinary skill in the art would have been motivated to modify Loeb in a manner contrary to its express teachings.

Accordingly, we determine that Petitioner has not demonstrated a reasonable likelihood of prevailing in demonstrating the unpatentability of claim 18 over the combined teachings of Schulman and Loeb.

ii. Claim 27

Petitioner contends that claim 27 would have been obvious over Schulman and Loeb. Pet. 41–52. Patent Owner disputes Petitioner's contentions regarding steps (b) and (g) of claim 27. Prelim. Resp. 41–45.

a) Steps (a) and (c)–(f)

Petitioner shows sufficiently, for purposes of institution, that Schulman and Loeb would have taught or suggested steps (a) and (c)–(f) of claim 27. Pet. 41–51. At this stage of the proceeding, Patent Owner does not dispute the teachings of the prior art regarding these limitations. Prelim. Resp. 41–45.

With respect to the preamble of claim 27, the cited evidence shows that Schulman discloses a method of charging rechargeable battery 104 within microstimulator 100 through a magnetic field generated from external power source 118. *See, e.g.*, Ex. 1012, 4:26–56, Figs. 2, 3A (cited Pet. 41–43). Schulman's method utilizes external coil (a "primary" coil), in external charger 118, and implanted coil 116 (a "secondary" coil), in microstimulator 100. *Id.* At this stage of the proceeding, we are persuaded sufficiently that it would have been obvious to use Loeb's external rechargeable battery 68, as a power source for Schulman's external charger 118, to improve the portability of the charger. *See* Pet. 43–45 (citing Ex. 1003 ¶¶ 99–100; Ex. 1017, Abstract, 4:25–31, 10:61–64, 11:9–12, 11:40–43 (rechargeable battery "render[s] the processor 60 portable"), Fig. 4B). This evidence is sufficient for purposes of institution.

With respect to claim step 27(a), Loeb discloses that its external power source includes rechargeable battery 68. *See, e.g.*, Ex. 1017, 4:25–31, 11:9–12,

11:35–43, Fig. 4B (cited Pet. 25). At this stage of the proceeding, we credit Dr. Kroll's testimony that this battery necessarily is charged from an external source prior to transferring energy to Loeb's implanted microstimulator. Ex. 1003 ¶ 101 (cited Pet. 25). This evidence is sufficient for purposes of institution.

With respect to claim step 27(c), Schulman discloses transferring an alternating magnetic field from external charger 118 to implanted coil 116 of the microstimulator. *See, e.g.*, Ex. 1012, 2:4–6, 4:27–32, 4:39–44, 4:49–51, 6:2–4, Fig. 3A (cited Pet. 48). This evidence is sufficient for purposes of institution.

With respect to claim steps 27(d)–(e), Schulman discloses that implanted coil 116 receives power from external charger 118 and "responsively supplies an AC current to a rectifier 120 which is passed as a rectified DC current to a charging circuit 122." Ex. 1012, 4:27–31 (cited Pet. 49–50). This evidence is sufficient for purposes of institution.

With respect to claim step 27(f), Schulman discloses that while battery 104 is being recharged, charging circuit 122 "monitors the voltage V on battery 104 and charges it according to its defined charging characteristics (current and voltage)." *See, e.g.*, Ex. 1012, 4:32–35 (cited Pet. 24). Schulman also discloses two mechanisms by which the recharging process is terminated "once the charging circuit 122 determines that battery 104 has been sufficiently charged." *Id.* at 4:44–49 (cited Pet. 24). Charging circuit 122, thus, "avoid[s] any potentially damaging . . . overcharge." *Id.* at 10:60–64 (cited Pet. 24). This evidence is sufficient for purposes of institution.

b) Step (b)

With respect to claim step 27(b), Petitioner contends that Schulman discloses transmitting power through an inductive link, and explains that prior art microstimulators were "mounted proximate" their complimentary inductive coils.

Pet. 46 (citing, *e.g.*, Ex. 1012, 1: 26–34, 4:39–44). Petitioner also contends that Loeb discloses that optimum inductive coupling occurs when proper alignment is reached, which allows use of a "relatively low power signal." *Id.* at 46–47 (citing Ex. 1017, 9:28–32, 9:21–25 (alignment means), Figs. 4A–4B). Thus, Petitioner contends that in the proposed combination, in which a plurality of Schulman's microstimulators form a multichannel stimulation device connected to an electrode array, as taught by Loeb, it would have been obvious to charge the implanted microstimulator batteries "using the alignment technique shown in Loeb." *Id.* at 46–47 (citing Ex. 1003 ¶¶ 104–105). According to Petitioner, this would have optimized inductive coupling and preserved the charger's battery. *Id.* at 47–48 (citing Ex. 1003 ¶¶ 104–105).

Patent Owner argues that neither Schulman nor Loeb disclose minimizing reflected impedance. Prelim. Resp. 41–42. Patent Owner also argues that it would not have been obvious to incorporate Loeb's alignment features into Schulman, because Loeb teaches an alternate mechanism for increasing coupling efficiency, e.g., use of a "focusing coil." *Id.* at 43 (citing Ex. 1017, 9:32–35).

We have considered Patent Owner's arguments, however, on this record, we are persuaded that Petitioner's cited evidence supports adequately its contentions regarding step (b). First, as discussed in Section II.A *supra*, we determine this the broadest reasonable interpretation of the claim language does not require that reflected impedance be minimized. As such, Patent Owner's first argument is not commensurate with the properly construed claim scope.

We also are unpersuaded by Patent Owner's second argument. Loeb explicitly confirms that providing proper alignment allows "[o]ptimum inductive coupling" to occur, which allows use of a "relatively low power signal." *See, e.g.*, Ex. 1017, 9:20–32 (cited Pet. 46–47). Even if Loeb also teaches use of a "focusing

coil" to increase coupling efficiency, *see* Prelim. Resp. 43, we do not discern that this is in conflict with Loeb's explicit teaching that energy transmission is more efficient when the coils are properly aligned; indeed, we discern the two are complementary. Accordingly, we are persuaded sufficiently that a person of ordinary skill in the art would have been motivated to modify Schulman in light of Loeb's teachings to optimize inductive coupling and preserve the charger's battery. *See, e.g.*, Ex. 1003 ¶¶ 104–105; Ex. 1017, 9:20–32. This evidence is sufficient for purposes of institution.

c) Step (g)

With respect to claim step 27(g), Petitioner contends that Schulman discloses, *inter alia*, that the external power source will continue providing power to the microstimulators "until it has received status information from each of the implanted devices 100 that its battery 104 is charged." Pet. 51–52 (citing Ex. 1012, 4:32–35, 4:44–56, 5:55–66, 6:14–17; Ex. 1003 ¶ 111).

Patent Owner argues that, in this disclosed embodiment, "the Schulman battery charger stops charging not when the battery reaches the prescribed level or charge, but rather at some time thereafter when a periodic poll, not itself triggered by battery status, detects the specified battery charge." Prelim. Resp. 45. According to Patent Owner, "[t]his method requires a predetermined period of time to pass before each act of polling is performed to detect the status of battery charging." *Id.*

We have considered Patent Owner's arguments, however, on this record, we are persuaded that Petitioner's cited evidence supports adequately its contentions regarding step (g). The plain language of this limitation requires "stopping the charging at the battery charger *when* the current or voltage level at the battery in the IPG reaches a prescribed level." Ex. 1001, 58:18–20 (emphasis added). At

this stage of the proceeding, we are not persuaded that this language includes the immediate temporal or causal requirement that Patent Owner's argument presumes. In other words, on this record, Patent Owner has not shown that "when" should be construed as, e.g., "immediately when." Schulman's disclosure that charger 118 "provid[es] charging power *until* it has received status information from each of the implanted devices 100 that its battery 104 is charged" is sufficient to satisfy the claim language, at this stage, because it conveys that charging is stopped at charger 118 *when* a subsequent poll reports that all batteries are completely charged. Ex. 1012, 4:52–56. Patent Owner has not shown that the passage of a time period, between battery re-charge and termination of power at the charger, does not meet the plain language of the claim. Accordingly, this evidence is sufficient for purposes of institution.

Accordingly, we determine that Petitioner has demonstrated a reasonable likelihood of prevailing in demonstrating the unpatentability of claim 27 over the combined teachings of Schulman and Loeb.

E. Obviousness over the Combined Teachings of Schulman, Loeb, and Rutecki

Petitioner contends that claim 8 of the '280 patent is unpatentable over the combined teachings of Schulman, Loeb, and Rutecki. Pet. 52–56. For reasons that follow, we determine Petitioner has not demonstrated a reasonable likelihood of prevailing as to the challenged claims.

1. Overview of Rutecki (Ex. 1007)

Rutecki is a U.S. Patent titled "Treatment of Pain by Vagal Afferent Stimulation," and discloses applying programmable pulse waveforms to an implanted lead to treat pain. Ex. 1007, [54], [57].

2. Analysis of Claim 8

Independent claim 8 includes an identical limitation as discussed with respect to claim 18, i.e., "an implantable electrode array detachably connected to the IPG." Ex. 1001, 53:7–8.

In this asserted ground of unpatentability, Petitioner contends that Schulman and Loeb render obvious this limitation, relying on its contentions presented with respect to claim 18. Pet. 54. Petitioner does not rely on Rutecki. *Id.*

Accordingly, for the same reasons discussed above in Section II.D.3.i, we determine that Petitioner has not demonstrated a reasonable likelihood of prevailing in demonstrating the unpatentability of claim 8.

F. Obviousness over the Combined Teachings of Schulman, Loeb, Munshi, and Wang

Petitioner contends that claims 22–24 of the '280 patent are unpatentable as obvious over Schulman, Loeb, Munshi, and Wang. Pet. 56–78. For reasons that follow, we determine Petitioner has not demonstrated a reasonable likelihood of prevailing as to the challenged claims.

3. Overview of Munshi (Ex. 1005)

Munshi is a U.S. Patent titled "Rechargeable Biomedical Battery Powered Devices with Recharging and Control System Therefore," and discloses an implantable device with a power source that is recharged by magnetic induction. Ex. 1005, [54], [57].

4. Overview of Wang (Ex. 1018)

Wang is a U.S. Patent titled "Enhanced Transcutaneous Recharging System for Battery Powered Implantable Medical Device." Ex. 1018, [54]. Wang discloses that an external inductor "forms a primary coil of a transformer in which current is induced in a secondary coil attached to an implanted medical device" to

recharge the battery of the implanted device. *Id.* at 4:37–41. According to Wang, "[t]he coils of the external energy transmission device and the implanted medical device must be properly aligned for efficient energy transmission." *Id.* at 5:13–15. To that end, Wang discloses an alignment circuit and alignment indicator that indicate proper alignment. *Id.* at 5:15–17.

5. Analysis of Claims 22–24

Independent claim 22 recites, *inter alia*, "an implantable electrode array detachably connected to the IPG." Ex. 1001, 55:65–66. Through their dependency on claim 22, dependent claims 23 and 24 also recite this limitation. *Id.* at 56:22–31.

In this asserted ground of unpatentability, Petitioner contends that Schulman and Loeb render obvious this limitation, relying on its contentions presented with respect to claim 18. Pet. 59–60. Petitioner does not rely on Munshi or Wang. *Id.*

Accordingly, for the same reasons discussed above in Section II.D.3.i, we determine that Petitioner has not demonstrated a reasonable likelihood of prevailing in demonstrating the unpatentability of claims 22–24.

G. Discretion to Deny Institution

1. Redundancy

Patent Owner argues that Petitioner advances several redundant grounds across this Petition and the petitions presented in Cases IPR2017-01811 and IPR2017-01812. Prelim. Resp. 30–32 (citing *Liberty Mut. Ins. Co. v. Progressive Cas. Ins. Co.*, Case CBM2013-00003, at *1 (PTAB Oct. 25, 2012)). Because we determine that Petitioner has not demonstrated a reasonable likelihood it would prevail with respect to claims 8, 18, and 22–24, on the merits of each asserted ground, *see supra* Sections II.D–F, we need not address Patent Owner's argument

regarding those claims. We address Patent Owner's arguments with respect to claim 27, for which we determine Petitioner has met its burden for institution.

Patent Owner contends that Petitioner presents horizontally redundant grounds against claim 27 based on (1) Schulman and Loeb, (2) Barreras (as presented in IPR2017-01812), and (3) Barreras and Wang (as presented in IPR2017-01812). Prelim. Resp. 31. According to Patent Owner, "Petitioner nowhere explains why it offers multiple references or grounds," and instead "shifts the burden to the Board and Patent Owner to decipher their litany of grounds, references, and conclusory explanations for why the challenged claims are invalid." *Id.* Thus, Patent Owner contends that trial should not be instituted on these asserted grounds.

We have considered Patent Owner's argument, but decline to exercise our discretion to deny institution of the grounds presented in this Petition. In determining whether to institute an *inter partes* review, the Board may "deny some or all grounds for unpatentability for some or all of the challenged claims." *See* 37 C.F.R. § 42.108(b); *see also* 35 U.S.C. § 314(a) (authorizing, but not mandating, institution). Our discretionary determination of whether to institute review is guided in part by 35 U.S.C. § 325(d), which states that, "[i]n determining whether to institute or order a proceeding . . . , 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." The statutory language gives the Director the authority not to institute review on the basis that the same or substantially the same prior art or arguments were presented previously to the Office, but does not require that result.

Here, we do not exercise our discretion to deny the Petition under, *inter alia*, 37 C.F.R. § 42.108(b) or 35 U.S.C. § 325(d). As discussed above, Petitioner has

shown a reasonable likelihood that it will prevail in showing unpatentability of claim 27 based on Schulman and Loeb. *Harmonic*, 815 F.3d at 1363. Schulman and Loeb were not considered during prosecution of the '280 patent. *See* Ex. 1001, (56). Additionally, neither reference is at issue with respect to claim 27 in IPR2017-01812. Thus, we are not persuaded that the analysis in the Petition is substantially the same as that presented previously to the Office, either during prosecution or in IPR2017-01812. Although we are mindful of the burden on Patent Owner and the Office in hearing two challenges to the '280 patent, based on the particular facts of these proceedings, we determine that conducting trial in this case and in IPR2017-01812 would not implicate the policy considerations reflected in 35 U.S.C. § 325(d), and does not persuade us to exercise discretion to deny institution in this proceeding. Furthermore, the Board retains discretion to coordinate multiple proceedings, if it deems it appropriate. *See* 35 U.S.C. § 315(d).

2. 35 U.S.C. § 314(a)

Patent Owner also argues that we should deny institution because: (1) Petitioner already challenged these claims in prior petitions; (2) Petitioner knew of the applied prior art when filing the prior petitions; (3) Petitioner did not explain sufficiently the delay between filing its prior petitions and this Petition; and (4) institution would be an inefficient use of Board resources and would complicate the Board's ability to complete review in the time prescribed by statute. Prelim. Resp. 32–33 (citing, *e.g.*, *Gen. Plastic Indus. Co. v. Canon Kabushiki Kaisha*, IPR2016-00134 (PTAB May 4, 2016)).

On the facts of this case, we are not persuaded to exercise our discretion to deny institution. Institution of an *inter partes* review is discretionary, (*see* 35 U.S.C. § 314(a); 37 C.F.R. § 42.108(a)), and there is no *per se* rule precluding the

filing of additional petitions. *Gen. Plastic Indus. Co. v. Canon Kabushiki Kaisha*, IPR2016-00137, Paper 19, slip op. at 15 (PTAB Sept. 6, 2017) (precedential). "The Board consistently has considered a number of factors in determining whether to exercise that discretion," several of which Patent Owner addresses in its Preliminary Response. *Id.* at 15–16; Prelim. Resp. 32–33. After considering the factors discussed in *General Plastics*, we decline to exercise our discretion.

Although Petitioner previously filed two petitions directed to these claims (Factor 1), and apparently knew of the applied prior art at that time (Factor 2), only 21 days elapsed between filing of the initial petitions and that presented here (Factor 4). Pet. 2; Prelim. Resp. 32. Moreover, Petitioner contends that the time elapsed between filings is due to Patent Owner's decision to narrow the claims asserted in co-pending district court litigation (Factor 5). Pet. 2. Additionally, at the time this Petition was filed, Petitioner had not received Patent Owner's Preliminary Responses, or our Decisions on Institution in the prior cases (Factor 3). Pet. 2. Thus, considering these factors as a whole, we determine that they do not support denial of institution. In particular, we determine that Patent Owner's decision to narrow the claims asserted in district court provides a reasonable explanation for Petitioner's desire to present a more narrowly tailored challenge in this Petition, especially given that the time period between filing was only three weeks, and Petitioner did not benefit from receiving the positions of Patent Owner or the Board during that time. Pet. 2.

Finally, as discussed above, we determine that Petitioner met its burden in this proceeding with respect to only one claim. As such, we are not persuaded that institution, in this case, would tax unduly the resources of the Board, or would complicate our ability to render a final determination within one year of institution (Factors 6–7).

III. CONCLUSION

For the foregoing reasons, we determine Petitioner has demonstrated a reasonable likelihood it would prevail in establishing the unpatentability of challenged claim 27 of the ’280 patent, and we institute an *inter partes* review of that claim. We determine also that Petitioner has not demonstrated a reasonable likelihood it would prevail in establishing the unpatentability of challenged claims 8, 18, or 22–24.

At this stage of the proceeding, we have not made a final determination as to the patentability of any challenged claim or as to the construction of any claim term.

IV. ORDER

For the reasons given, it is:

ORDERED that, pursuant to 35 U.S.C. § 314(a), an *inter partes* review is hereby instituted as to claim 27 of the ’280 patent on the following asserted ground:

> Claim 27 under 35 U.S.C. § 103(a) as unpatentable over Schulman and Loeb.

FURTHER ORDERED that the trial is limited to the ground identified above, and no other grounds are authorized;

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, the trial commencing on the entry date of this Decision.

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