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Paper No. 42
Date: September 22, 2021

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

AXONICS, INC.,
Petitioner,

v.

MEDTRONIC, INC.,
Patent Owner.

IPR2020-00712
Patent 8,738,148 B2

Before JAMES A. TARTAL, ERIC C. JESCHKE, and ALYSSA A. FINAMORE, *Administrative Patent Judges.*

TARTAL, *Administrative Patent Judge*.

JUDGMENT
Final Written Decision
Determining No Challenged Claims Unpatentable
35 U.S.C. § 318(a)

We have jurisdiction to conduct this *inter partes* review under 35 U.S.C. § 6. This Final Written Decision is issued pursuant to 35 U.S.C. § 318(a) (2018) and 37 C.F.R. § 42.73 (2019). For the reasons discussed below, we determine Petitioner has not shown by a preponderance of the evidence the unpatentability of any of claims 3–6, 9–12, and 15–18 of U.S. Patent No. 8,738,148 B2 (Ex. 1001, "the '148 patent").

I. INTRODUCTION

A. Summary of Procedural History

Axonics, Inc. ("Petitioner")[1] filed a Petition pursuant to 35 U.S.C. §§ 311–319 requesting an *inter partes* review of claims 1–18 ("the Challenged Claims") of the '148 patent. Paper 1 ("Pet."). We instituted an *inter partes* review of the Challenged Claims on all grounds of unpatentability asserted in the Petition. Paper 8 ("Inst. Dec."). Medtronic, Inc. ("Patent Owner")[2] filed a Patent Owner Response. Paper 15 ("PO Resp."). In its Response, Patent Owner states that it has disclaimed claims 1, 2, 7, 8, 13, and 14. PO Resp. 1 (citing Ex. 2007 (a copy of a "Disclaimer in Patent Under 37 CFR 1.321(a)" providing that the patentee, Medtronic, Inc., disclaims claims 1, 2, 7, 8, 13, and 14 of the '148 patent, dated December 22, 2020) (the "Disclaimer")).

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[1] During the trial, the name of Petitioner when the Petition was filed, Axonics Modulation Technologies, Inc., was changed to Axonics, Inc. *See* Paper 32 (mislabeled as Paper 31). Petitioner identifies no additional real parties in interest. Pet. 96.

[2] Patent Owner states that it is the real party in interest, that "Medtronic plc is the ultimate parent of Medtronic, Inc.," and that "Medtronic, Inc. has granted certain rights with respect to the patent-at-issue to Medtronic Puerto Rico Operations Co., which in-turn has granted certain rights to Medtronic Logistics, LLC, which in-turn has granted certain rights to Medtronic USA, Inc." Paper 4, 1 n.1.

Petitioner filed a Reply to the Patent Owner Response (Paper 19, "Pet. Reply"), and Patent Owner filed a Sur-reply (Paper 34, "PO Sur-reply"). Patent Owner filed a list of allegedly improper arguments and evidence from Petitioner's Reply (Paper 23), to which Petitioner responded (Paper 26).

Oral argument was held and a transcript of the hearing appears in the record. Paper 41 ("Tr."). Petitioner bears the burden of proving unpatentability of each claim challenged by a preponderance of the evidence, and the burden of persuasion never shifts to Patent Owner. *See* 35 U.S.C. § 316(e); 37 C.F.R. § 42.1(d); *Dynamic Drinkware, LLC v. Nat'l Graphics, Inc*., 800 F.3d 1375, 1378 (Fed. Cir. 2015).

B. Related Proceedings

The parties identify the '148 patent as a subject of *Medtronic, Inc. v. Axonics Modulation Technologies, Inc.*, Case No. 8:19-cv-02115-DOC-JDE (C.D. Cal.). Pet. 97; Paper 4, 2. The parties also identify as related matters IPR2020-00678, concerning U.S. Patent No. 7,774,069 B2 ("the '069 patent"), and IPR2020-00680, concerning U.S. Patent No. 8,457,758 B2 ("the '758 patent"). Pet. 97; Paper 4, 2. The '148 patent issued from an application that was a continuation of an application that issued as the '758 patent. Ex. 1001, code (60). The '758 patent issued from an application that was a continuation of an application that was a division of an application that issued as the '069 patent. *Id.* The oral argument in this proceeding was consolidated with oral argument in IPR2020-00678 and IPR2020-00680. Tr. 4:9–15.

C. Effect of the Disclaimer

After institution of *inter partes* review, Patent Owner filed the Disclaimer disclaiming claims 1, 2, 7, 8, 13, and 14 of the '148 patent. PO Resp. 1; Ex. 2007; *see also* 35 U.S.C. § 253(a) (providing that a patentee

may "make disclaimer of any complete claim" in writing with the Patent and Trademark Office, and such disclaimer "shall thereafter be considered as part of the original patent"). Patent Owner asserts that in light of the Disclaimer, claims 1, 2, 7, 8, 13, and 14 are to be "treated as though they never existed." PO Resp. 15 n.4 (citations omitted). Patent Owner further argues that we should "not address the disclaimed claims in the Final Written Decision." *Id.* Petitioner does not dispute the effect of the Disclaimer. *See* Pet. Reply 11–25 (arguing that the Challenged Claims not disclaimed are unpatentable).

We agree with Patent Owner that we should not address the patentability of claims 1, 2, 7, 8, 13, and 14 in this Decision. *See* PO Resp. 15 n.4. Rather, we treat claims 1, 2, 7, 8, 13, and 14 as if they never existed. *See Gunn v. Kopf*, 96 F.3d 1419, 1422 (Fed. Cir. 1996) ("A statutory disclaimer under 35 U.S.C. § 253 has the effect of canceling the claims from the patent and the patent is viewed as though the disclaimed claims had never existed in the patent."). We address the patentability only of the Challenged Claims not disclaimed. *See Intel Corp. v. VLSI Tech. LLC*, IPR2018-01040, Paper 36, 16 (PTAB Feb. 12, 2020) ("Consistent with other Board decisions in which some, but not all, challenged claims have been disclaimed after institution, we address the patentability only of the remaining claims." (collecting decisions)).

D. The '148 Patent

The '148 patent issued May 27, 2014, from an application filed on March 15, 2013, and is directed to a "[s]ystem for transcutaneous energy transfer." Ex. 1001, codes (22), (45), (57). As background to the invention, the '148 patent explains that "[s]everal systems and methods have been used for transcutaneously inductively recharging a rechargeable used in an

implantable medical device," including "the use of inductive coupling involv[ing] the placement of two coils positioned in close proximity to each other on opposite sides of the cutaneous boundary." *Id.* at 2:1–3, 2:20–23. According to the '148 patent, "[f]or implanted medical devices, the efficiency at which energy is transcutaneously transferred is crucial." *Id.* at 3:3–4. The '148 patent further explains that inductive coupling "has a tendency to heat surrounding components and tissue," which limits "the amount of energy transfer which can be accomplished per unit time"; that a patient's mobility is impaired during charging; and that the amount of charging "can be limited by the amount of time required for charging," thereby limiting "the size of the internal power source." *Id.* at 3:4–26.

The '148 patent states that "[a]lignment of an external primary coil with the internal secondary coil is important in achieving efficiency in transcutaneous energy transfer," and that "it is not always easy for the user to know when the primary and secondary coils are properly aligned," *Id.* at 3:37–41. The '148 patent further states that, even when aligned, "the physical package containing the primary coil with the protrusion of the implanted medical device may not result in optimum alignment of the primary and secondary coils," because the coils may not be centered in the package and "even perfect alignment of the packages may result in actual misalignment of the primary and secondary coils." *Id.* at 3:41–52. According to Patent Owner, the '148 patent solved the problem of proper alignment "through an inventive system including an external power source that, among other things, automatically varies the power output of the external charging device to generate a predetermined current through the internal power source as a function of a value associated with the current

passing through the internal power source." PO Resp. 3–4 (citing Ex. 1001, 3:56–4:15, 20:65–22:18, Fig. 19).

Figure 3 of the '148 patent is reproduced below.

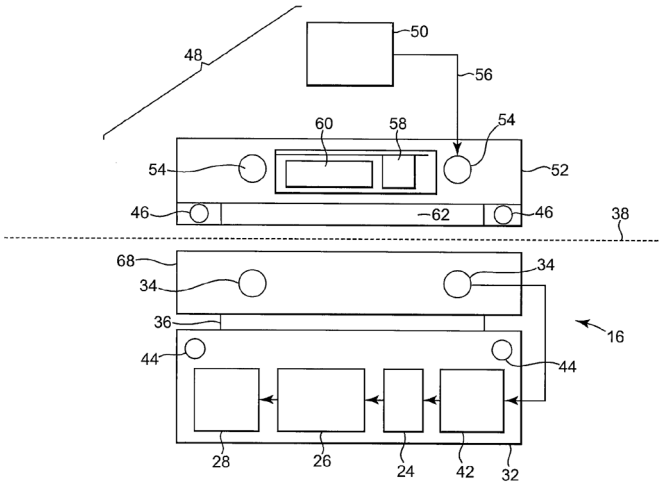

Fig. 3

Figure 3 illustrates implantable medical device 16 situated under cutaneous boundary 38, and associated external charging device 48. *Id.* at 6:2–5, 7:57–58, 8:21–23. Implantable medical device 16 includes rechargeable power source 24, which powers electronics 26 and therapy module 28 "in a conventional manner," charging regulation module 42, and internal telemetry coil 44. *Id.* at 7:33–36, 7:60–8:3. External charging device 48, including external telemetry unit 46, charging unit 50, and external antenna 52, is used to charge rechargeable power source 24 of implantable medical device 16 while implantable medical device 16 is in place in a patient. *Id.* at 7:63–8:3, 8:21–8:25. "[I]nternal telemetry coil 44 [is] configured in [a] conventional manner to communicate through external telemetry coil 46 to an external programming device (not shown), charging unit 50 or other device in a conventional manner in order to both program and control [the] implantable medical device and to externally obtain information from implantable medical device 16 once implantable medical

device has been implanted." *Id.* at 7:63–8:3. "Charging unit 50 contains the electronics necessary to drive primary coil 54 with an oscillating current in order to induce current in secondary coil 34 when primary coil 54 is placed in the proximity of secondary coil 34." *Id.* at 8:25–28.

Figure 19 of the '148 patent is reproduced below.

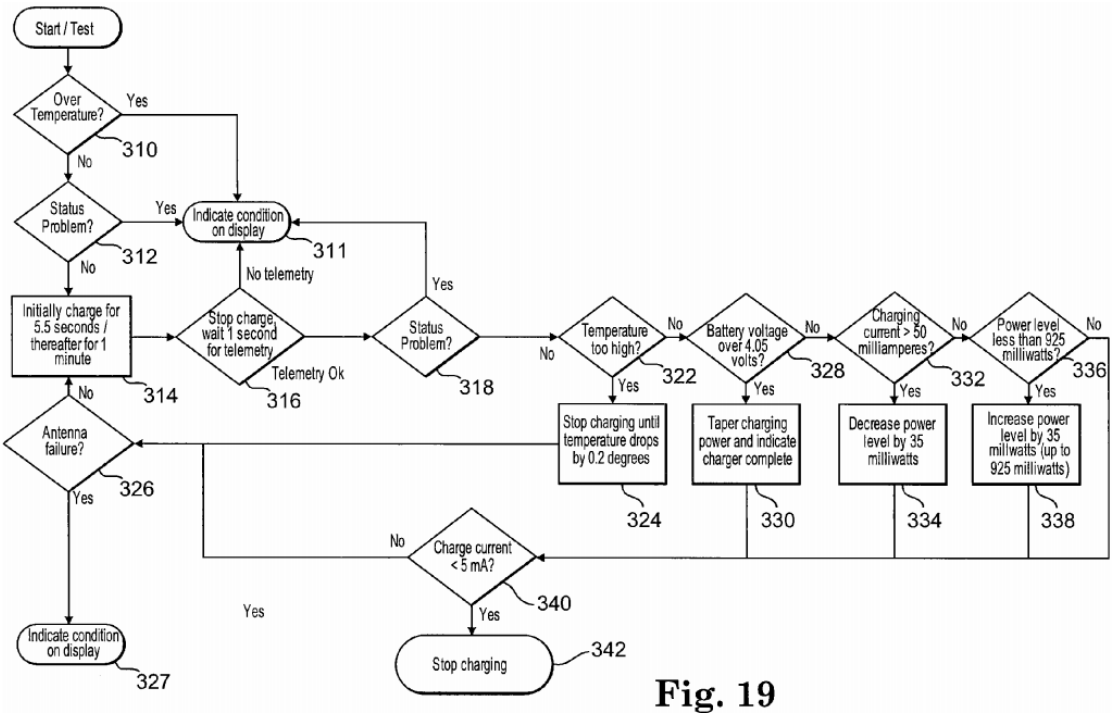

Fig. 19

Figure 19 is a flow chart illustrating the operation of charging unit 50 to charge an implantable medical device. *Id.* at 6:42–43, 21:27–28. The steps shown in Figure 19 are described in the '148 patent as follows:

- at step 310, charging unit 50 determines "whether external antenna 52 is over the temperature limit set for charging operation," where the "temperature limit can help prevent patient 18 from being exposed to temperatures that are higher than desired";
- at steps 311 to 313, "[i]f external antenna 52 of charging unit 50 is over temperature, an alert condition is indicated," "[i]f external antenna [52] is not over the temperature limit, charging unit 50 then

checks . . . for a status problem with charging unit 50," and "[i]f a status problem is found, an alert condition is indicated";

● at steps 314 and 316, "[i]f a status problem is not found, charging unit 50 initially charges . . . rechargeable power source 24 of implantable medical device 16 for 5.5 seconds," and "[c]harging unit 50 then stops charging and waits . . . one second to check for reception of a telemetry signal from implantable medical device 16," such as "the value of the current flowing through secondary coil 34," and "[i]f no telemetry signal is detected, an alert condition is indicated," returning the operation to step 311;

● at step 318, "[i]f telemetry is received, charging unit 50 then checks . . . for a status problem with implantable medical device 16," and "[i]f a status problem is detected, an alert condition is indicated," returning the operation to step 311;

● at step 322, "[i]f no status problem exists, charging unit 50 checks . . . to determine if the temperature is too high," and "[i]f an over temperature condition is detected, charging is stopped and a status indication is displayed until the temperature drops below a predetermined level";

● at step 328, "[i]f no over temperature condition exists, charging unit 50 checks . . . to determine if the voltage across rechargeable power source 24 is over a voltage at which the charging rate should begin to decrease, e.g., 4.05 volts";

● at steps 330 and 332, "[i]f the voltage across rechargeable power 24 is greater than 4.05 volts, then charging unit 50 begins to taper charging power," but "[i]f the voltage across rechargeable power source 24 is not over 4.05 volts, charging unit 50 checks . . . to determine whether the

charging current through rechargeable power source 24 is over a current rate that is not desirable, e.g., 50 milliamperes";

- at step 334, "[i]f the charging current is over 50 milliamperes, then the charging power level is decreased . . . by an appropriate [amount], e.g., by 35 milliwatts";
- at steps 336 and 338, "[i]f the charging current is not over 50 milliamperes, charging unit 50 checks . . . to determine if the charging power level is less than [an] appropriate amount, e.g., 925 milliwatts," and "[i]f the power level is less than 925 milliwatts, the charging power level is increased . . . by 35 milliwatts, up to a maximum of 925 milliwatts";
- at steps 340 and 342, "[i]f the charge current is below . . . five (5) milliamperes, then charging unit 50 stops . . . charging and indicates that charging is complete, e.g., by lighting the charging complete indicator light," and "[i]f not, [operation returns to step 314 and] charging unit 50 then charges . . . rechargeable power source for one (1) minute and then conducts the aforementioned tests, checks and actions as performed after the initial 5.5 second charge."

Id. at 21:28–22:17.

E. Illustrative Claim of the '148 Patent

Each of claims 3, 6, 9, 12, 15, and 18 is independent. Ex. 1001, 22:50–23:3, 23:12–33, 23:55–24:6, 24:15–34, 24:52–65, 25:9–25. Claims 4 and 5 depend from claim 3, claims 10 and 11 depend from claim 9, and claims 16 and 17 depend from claim 15. *Id.* at 23:4–11, 24:7–14, 25:1–8. Claims 3–6 are directed to a "system for transcutaneous energy transfer," claims 9–12 are directed to an "external power source," and claims 15–18 are directed to a "method of transcutaneous energy transfer." *Id.* at 22:50–

23:33, 23:55–24:34, 24:52–25:25. Claim 3 is illustrative of the claimed subject matter and is reproduced below.

> 3. A system for transcutaneous energy transfer, comprising:
> an implantable medical device having componentry for providing a therapeutic output, said implantable medical device having an internal battery and a secondary coil operatively coupled to said internal battery, said implantable medical device adapted to be implanted in a patient; and
> an external power source having a primary coil of said external power source providing energy to said implantable medical device when said primary coil said external power source is placed in proximity of said secondary coil of said implantable medical device and thereby generating a current, having a value, passing through said internal battery;
> wherein said external power source automatically varies its power output based on a value associated with said current passing through said internal battery; and
> wherein said external power source automatically varies its power output based on a signal proportional to said current passing through said internal battery.

Id. at 22:50–23:3.

F. References and Testimony

Below we provide an abbreviated summary of the qualifications of Dr. Dorin Panescu, who provides testimony in support of Petitioner, and Dr. Richard T. Mihran, who provides testimony in support of Patent Owner. We also provide a table identifying the primary references relied upon by Petitioner, as well as the exhibits corresponding to the declarations and deposition testimony in the record for Dr. Panescu and Dr. Mihran.[3]

[3] The table provided identifies only a select number of documents. A complete identification of the papers and exhibits that form the record of this case is available in the docket of this proceeding.

Petitioner's contentions are primarily supported by Dr. Panescu.[4] Dr. Panescu has a Bachelor of Science degree in Electronics and Telecommunications, as well as Master of Science and Doctorate degrees in Electrical and Computer Engineering. Ex. 1003 ¶ 4; Ex. 1004 (*curriculum vitae* of Dr. Panescu). Dr. Panescu is Chief Scientific Engineer at Biotronik and indicates his work there concerns the "[d]evelopment of novel catheters and systems for treatment of cardiac arrhythmias." Ex. 1004, 1. Dr. Panescu states that he has "over 25 years of direct technical experience in electrical medical device technology including systems with implantable medical devices"; that he is "an inventor on over 175 issued U.S. patents," including over 20 patents related to medical implants; and that he is "the author of over 200 industry publications." Ex. 1003 ¶¶ 4, 5; Ex. 1004, 1–9.

Patent Owner's arguments are primarily supported by Dr. Mihran. Dr. Mihran has a Bachelor of Science degree in Electrical Engineering and Applied Physics, a Master of Science degree in Electrical and Computer Engineering, and a Doctorate in Electrical Engineering. Ex. 2002 ¶ 8; Ex. 2003 (*curriculum vitae* of Dr. Mihran). Dr. Mihran states that he is "a Professor Adjunct in the Department of Electrical, Computer and Energy Engineering at the University of Colorado at Boulder," where he has "been on the faculty since 1990." Ex. 2002 ¶ 6. Dr. Mihran further states that he has taught and performed research "pertaining to the development of electronic, optical and ultrasonic devices and systems for medical and other applications for over 35 years"; that he has "authored numerous publications addressing cardiac and nerve cell electrophysiology"; and that he has

[4] Petitioner also provides a Declaration of Rachel J. Watters (Ex. 1008) concerning the availability of Exhibit 1006.

"consulted extensively in the area of inductively-powered RFID devices and networks for over twenty-five years." *Id.* ¶¶ 6, 9, 13. Dr. Mihran also states that he has "served as an expert witness in many patent litigation matters in the areas of implantable medical devices, including spinal cord stimulation, vagal nerve stimulation, pacemakers, implantable cardioverter/defibrillators (ICDs), syringe-implantable RFID devices, orthopedic implants, RF tissue ablation, and stereotactic medical imaging" as well as "other technology areas, including wired and wireless telecommunications, radio frequency identification systems, power management in portable devices, computers and computer networks, and others." *Id.* ¶ 14.

References and Witness Testimony	Date	Ex. No.
U.S. Patent No. 3,942,535 ("Schulman")	Mar. 9, 1976	Ex. 1005
Fischell et al., *A Long-Lived, Reliable, Rechargeable Cardiac Pacemaker*, *Engineering in Medicine*, 357 (Schaldach et al. eds., 1975) ("Fischell Article")	1975	Ex. 1006
U.S. Patent No. 3,888,260 ("Fischell '260")	Jun. 10, 1975	Ex. 1007
Declaration of Dorin Panescu	Mar. 2, 2020	Ex. 1003
Supplemental Declaration of Dorin Panescu	Mar. 19, 2021	Ex. 1012
Deposition Transcript of Dorin Panescu	Nov. 19, 2020	Ex. 2004
Declaration of Richard T. Mihran	Dec. 22, 2020	Ex. 2002
Deposition Transcript of Richard T. Mihran	Feb. 25, 2021	Ex. 2008

G. Asserted Grounds of Unpatentability

Subsequent to the Disclaimer as applied to claims 1, 2, 7, 8, 13, and 14, Petitioner alleges unpatentability of claims 3–6, 9–12, and 15–18 on the following grounds:

Claim(s) Challenged	35 U.S.C. §	Reference(s)/Basis
3–6, 9–12, 15–18	102	Schulman
3, 4, 9, 10, 15, 16	102	Fischell Article
5, 6, 11, 12, 17, 18	103	Fischell Article, Fischell '260

Pet. 10–11.[5]

II. ANALYSIS OF PATENTABILITY

A. Principles of Law

Petitioner contends under two grounds that claims of the '148 patent are unpatentable based on anticipation. Pet. 10–11. A claim is anticipated if a single prior art reference either expressly or inherently discloses every limitation of the claim. *Orion IP, LLC v. Hyundai Motor Am.*, 605 F.3d 967, 975 (Fed. Cir. 2010). "A single prior art reference may anticipate without disclosing a feature of the claimed invention if such feature is necessarily present, or inherent, in that reference." *Allergan, Inc. v. Apotex Inc.*, 754 F.3d 952, 958 (Fed. Cir. 2014) (citing *Schering Corp. v. Geneva Pharm.*, 339 F.3d 1373, 1377 (Fed. Cir. 2003)).

[5] The Leahy-Smith America Invents Act ("AIA") included revisions to 35 U.S.C. §§ 102, 103 that became effective on March 16, 2013. Pub. L. No. 112-29, §§ 3(b)–3(c), 3(n)(1), 125 Stat. 284, 285–87, 293 (2011). Because there is no dispute that the '148 patent claims have an effective filing date before March 16, 2013, we apply the pre-AIA versions of these statutes.

Petitioner contends under one ground that claims of the '148 patent are unpatentable based on obviousness. Pet. 11. As set forth in 35 U.S.C. § 103(a),

> [a] patent may not be obtained . . . 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.

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 ordinary skill in the art; and (4) when in evidence, objective evidence of nonobviousness. *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966). An obviousness analysis "need not seek out precise teachings directed to the specific subject matter of the challenged claim, for a court can take account of the inferences and creative steps that a person of ordinary skill in the art would employ." *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 418 (2007); *accord In re Translogic Tech., Inc.*, 504 F.3d 1249, 1259 (Fed. Cir. 2007). However, Petitioner cannot satisfy its burden of proving obviousness by employing "mere conclusory statements." *In re Magnum Oil Tools Int'l, Ltd.*, 829 F.3d 1364, 1380 (Fed. Cir. 2016). Instead, Petitioner must articulate a reason why a person of ordinary skill in the art would have combined the prior art references. *In re NuVasive*, 842 F.3d 1376, 1382 (Fed. Cir. 2016).

B. Level of Ordinary Skill in the Art

In determining whether an invention would have been obvious at the time it was made, 35 U.S.C. § 103 requires us to resolve the level of ordinary skill in the pertinent art at the time of the invention. *Graham*,

383 U.S. at 17. The person of ordinary skill in the art is a hypothetical person who is 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, various factors may be considered, 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.* (citation omitted).

Petitioner contends that a person of ordinary skill in the art at the time of the invention "would have had at least a bachelor's degree in electrical engineering or an equivalent as well as at least five years of experience in the industry working with implantable medical devices such as cardiac pacemakers or defibrillators." Pet. 8. Patent Owner argues that a person of ordinary skill "would have had at least a bachelor's degree in a relevant field (e.g., electrical, mechanical, or biomedical engineering) with at least two years of experience with the design of components (e.g., circuitry) for implantable medical devices and associated external devices (e.g., a charging unit)," and that "[m]ore education can substitute for practical experience and *vice versa*." PO Resp. 4–5 (citing Ex. 2002 ¶¶ 21–22). Patent Owner further disagrees with Petitioner's proposed level of skill because it does not specify "experience and background with electronics and circuitry." *Id.* at 5. Patent Owner, however, further concedes that the result of this proceeding "would not be different even if Petitioner's level of skill were to apply." *Id.* (citing Ex. 2002 ¶¶ 23–24). The parties did not further address this issue at trial. *See generally* Pet. Reply; PO Sur-reply.

Patent Owner fails to provide any rational explanation or support to show that Petitioner's proposed level of ordinary skill—a person having a

"bachelor's degree in electrical engineering or an equivalent as well as at least five years of experience in the industry working with implantable medical devices such as cardiac pacemakers or defibrillators" —corresponds to a person who lacks "experience and background with electronics and circuitry." Further, we discern no substantial difference between the parties' proposed definitions of a person of ordinary skill in the art that impacts our determination in this Decision. We, therefore, agree with Patent Owner that our analysis in this case does not turn on which of the parties' competing definitions of ordinary skill is applied and apply the level of ordinary skill in the art proposed by Petitioner, consistent with the Decision on Institution. *See* Inst. Dec. 11 (stating that "the '148 patent and the cited prior art references reflect the appropriate level of skill at the time of the claimed invention and that the level of appropriate skill reflected in these references is consistent with the definition of a person of ordinary skill in the art proposed by Petitioner" (citing *Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001))).

C. Claim Construction

"In an *inter partes* review proceeding, a claim of a patent . . . shall be construed using the same claim construction standard that would be used to construe the claim in a civil action under 35 U.S.C. 282(b)." 37 C.F.R. § 42.100(b). That standard "includ[es] construing the claim in accordance with the ordinary and customary meaning of such claim as understood by one of ordinary skill in the art and the prosecution history pertaining to the patent." *Id.*; *see also Phillips v. AWH Corp.*, 415 F.3d 1303 (Fed. Cir. 2005) (en banc). "When a patentee explicitly defines a claim term in the patent specification, the patentee's definition controls." *Martek Biosciences Corp. v. Nutrinova, Inc.*, 579 F.3d 1363, 1380 (Fed. Cir. 2009).

In the Petition, Petitioner proposes no express construction for any claim term. Pet. 7. Petitioner asserts that "all claim terms should be given their plain and ordinary 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." *Id.* In response, Patent Owner argues that certain claims require "two separate inputs to the external power source (or charging unit)." PO Resp. 6–9. We agree with Patent Owner for the reasons provided in our detailed discussion below. We further find no additional claim terms require express construction.

1. *"a value associated with said current;" "a signal proportional to said current;" and "a measured voltage associated with said current" (variously, claims 3, 6, 9, 12, 15, and 18)*

Claim 3 is directed to "[a] system for transcutaneous energy transfer" and recites, in relevant part, as follows:

> an external power source . . .
>
> wherein said external power source automatically varies its power output based on *a value associated with said current* passing through said internal battery [(the "Value Limitation")];
>
> wherein said external power source automatically varies its power output *based on a signal proportional to said current* passing through said internal battery [(the "Signal Limitation")].

Ex. 1001, 22:50–23:2 (emphases added). Claim 9 is directed to "[a]n external power source," and includes the identical language of the Value Limitation and the Signal Limitation. *Id.* at 23:55–24:6. Claim 15 is directed to "[a] method of transcutaneous energy transfer," and includes

claim language substantively similar to the Value Limitation and the Signal Limitation.[6] *Id.* at 24:52–67.

Claim 6 is directed to "[a] system for transcutaneous energy transfer" and recites, in relevant part, the Value Limitation followed by the following:

> wherein said external power source automatically varies its power source output *based on a measured voltage associated with said current* passing through said internal battery [(the "Measured Voltage Limitation")].

Id. at 23:12–33 (emphases added). Claim 12 is directed to "[a]n external power source," and includes the identical language of the Value Limitation and the Measured Voltage Limitation. *Id.* at 24:16–34. Claim 18 is identical to claim 15, but for the recitation of claim language substantively

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[6] Specifically, claim 15 recites, in relevant part, the following steps:

> driving said external primary coil with a charging signal from said charging unit generating a current passing through said internal battery; and
>
> said charging unit automatically varying its power output based on *a value associated with said current* passing through said internal battery; and
>
> wherein said automatically varying step automatically varies its power output *based on a signal proportional to said current* passing through said internal battery.

Ex. 1001 at 24:52–67 (emphasis added). Although claims 15 and 18 are structured with a single "wherein" clause, whereas claims 3, 6, 9, and 12 each include two "wherein" clauses, neither party suggests that this is a distinction that makes a difference to our analysis. *See*, *e.g.*, PO Resp. 6–15; Pet. Reply 8–14; *see also* Ex. 1003 ¶¶ 34, 35 (Dr. Panescu stating that "the language in all 'wherein' clauses in all claims 13 through 18 . . . closely parallels" the claim language of the other challenged claims such that "the differences in 'wherein' clauses are essentially identical" across claims 3, 6, 9, 12, 15, and 18). Accordingly, our discussion of the Value Limitation and the Signal Limitation applies to each claim that recites "a value associated with said current" or "a signal proportional to said current," respectively.

similar to the Measured Voltage Limitation in place of the claim language substantively similar to the Value Limitation of claim 15.[7] *Id.* at 25:9–25. We will generally refer to the dispute over the Value Limitation, the Signal Limitation, and the Measured Voltage Limitation as corresponding to whether the claims require "one input" or "two inputs." *See also* PO Resp. 9 (stating that Patent Owner refers to these limitations collectively as the "two-input claim limitations"). The Specification of the '148 patent states that "an alignment measurement may be made by measuring a value, e.g., current or voltage, associated with, e.g., proportional to, the current passing through [the] rechargeable power source." *Id.* at 21:3–6. We therefore find that the Specification expressly identifies "current or voltage" as examples of "a value." *Id.*

Patent Owner asserts that claims 3, 6, 9, 12, 15, and 18 should each be construed to require "two separate inputs to the external power source (or charging unit)." PO Resp. 9; *see also id.* at 6 (suggesting that it is unclear from the Petition whether Petitioner contends claims 3, 6, 9, 12, 15, and 18 each require only a single input or multiple inputs). In short, according to Patent Owner, "a value associated with said current" may not be one and the same as either "a signal proportional to said current" or "a measured voltage associated with said current." *Id.* at 9–11 (citing, e.g., Ex. 2002 ¶¶ 33, 34).

Petitioner makes clear in its Reply that in the Petition it only contends claims 3, 6, 9, 12, 15, and 18 do not require two inputs. Pet. Reply 1–2, 6 (contending that "the specific 'value' in question can be the measured voltage, current, or signal," and that "'[a] value associated with said current,'

[7] Our discussion of the Measured Voltage Limitation applies to each claim that recites "a measured voltage associated with said current."

'a measured voltage associated with said current,' and 'a signal proportional to said current' are not required to be separate inputs"); *see also*, *e.g.*, Pet. 19–23 (purporting to show that the Value Limitation and the Signal Limitation of claim 3 are both disclosed by Schulman in the same manner as a single "wherein" limitation of claim 1). Further, in support of the Petition, Dr. Panescu states that "any prior art publication that discloses varying the power output of the external power source based on measuring a current and/or voltage in the implanted device, that is proportional to or associated with the current passing through the internal battery, teaches all different permutations" of the Value Limitation, the Signal Limitation, and the Measured Voltage Limitation across all Challenged Claims. Ex. 1003 ¶¶ 71, 72. There is no allegation in the Petition that any claim requires two inputs.

Although Petitioner provides no further explanation in the Petition in support of the contention that claims 3, 6, 9, 12, 15, and 18 each only require a single input, Petitioner offers various arguments in its Reply in support of its interpretation of the claim language. Pet. Reply 1–11. Petitioner argues that the Specification teaches "that a 'value' could be a current or a voltage, though is not limited to these two species," where "a 'value' represents a collection or 'genus' of potential specific implementations." *Id.* at 2. As noted above, we agree that the Specification states that examples of "a value" include "current or voltage." Ex. 1001, 20:67–21:3. We do not find that to be in dispute, but it does not resolve whether a single input may satisfy both the Value Limitation and either the Signal Limitation or the Measured Voltage Limitation.

Next, Petitioner reasons that "while there is a presumption that different terms have different meanings, there is no presumption that different terms require different features." *Id.* at 3 (citing *Applied Med.*

Res. Corp. v. U.S. Surgical Corp., 448 F.3d 1324, 1333 n.3 (Fed. Cir. 2006)). Thus, according to Petitioner, the claim construction issue presented is "[w]hether a single feature taught in the prior art or found in an accused product can satisfy separate claim limitations." Pet. Reply 3 (citing *Applied Med.*, 448 F.3d at 1333 n.3).

We disagree with Petitioner's framing of the issue, which fails to reflect Petitioner's argument that the limitations at issue are not "separate claim limitations," because a disclosure of one is necessarily a disclosure of the other. Specifically, according to Petitioner, its "core premise" is that "'voltage' and 'signal proportional to said current' are species of, and thus narrower in meaning than, 'value.'" *Id.* at 5. Petitioner concedes its proposed construction renders the Value Limitation superfluous, because, as Petitioner recognizes, under its proposal "when the external power source (or charging unit) automatically varies its power output based on 'a measured voltage' or 'a signal proportional to said current' it is also varying its power output (or charging unit) based on 'a value.'" *Id.* at 5–6; *see also id.* at 6 ("[W]hen the second, species wherein limitation is met in any claim, it necessarily meets the first, genus wherein limitation." (citations omitted)). Petitioner is not relying on a single disclosure to satisfy two "separate claim limitations"; rather, Petitioner is asserting two separate claim limitations should be construed as requiring only a single feature.

Next, in its Reply, Petitioner argues for the first time that "[t]he prosecution history of the parent Patent No. 8,457,758 confirms Petitioner's construction," because it purportedly shows that the Examiner rejected independent claims with a "value" limitation, as well as dependent claims with additional limitations "based on the same disclosure," purportedly suggesting that a single input could meet both limitations. Pet. Reply 7.

According to Petitioner, Applicant "never distinguished" the reference relied on by the Examiner "by suggesting that the claims required two inputs." *Id.*

We agree with Patent Owner that the arguments raised by Petitioner in its Reply based on the prosecution history fail to show a clear disavowal or disclaimer and instead reflect unsupported speculation as to what the Examiner and Applicant allegedly understood, premised on "what Applicant did not do during prosecution," not any affirmative position taken by the Applicant. PO Sur-reply 5 (emphasis omitted). Petitioner fails to show that arguments *not made* by the Applicant during prosecution support Petitioner's construction of the claims. *See Schwing GmbH v. Putzmeister Aktiengesellschaft*, 305 F.3d 1318, 1324 (Fed. Cir. 2002) ("Although prosecution history can be a useful tool for interpreting claim terms, it cannot be used to limit the scope of a claim unless the applicant took a position before the PTO that would lead a competitor to believe that the applicant had disavowed coverage of the relevant subject matter."). Patent Owner further asserts that "the fact that Applicant did not merge the two wherein clauses [(i.e., the Value Limitation and the Signal Limitation or the Measured Voltage Limitation)] into a single wherein clause with only a single input during prosecution supports the opposite of Petitioner's argument, i.e., it actually supports the conclusion that two separate inputs are intentionally specified in the claims." PO Sur-reply 5. We agree with Patent

Owner that by including two limitations the Applicant is presumed to have intended each to carry patentable weight, as discussed below.[8]

Patent Owner also shows how the Specification of the '148 patent supports its proposed construction, explaining as follows:

> the [S]pecification teaches that the power source can automatically vary its power output based on multiple inputs, where each input is associated with or proportional to "said current passing through said internal battery." (Ex. 2002 at ¶ 35.) In one example, two separate inputs are utilized in deciding how to vary the power output of the external power source 50: (1) the voltage across rechargeable power source 24; and (2) the charging current through rechargeable power source 24:
>
> > If no over temperature condition exists, charging unit 50 checks (328) to determine if the voltage across rechargeable power source 24 is over a voltage at which the charging rate should begin to decrease, e.g., 4.05 volts. If the voltage across rechargeable power 24 is greater than 4.05 volts, then charging unit 50 begins to taper charging power (330).
> >
> > If the voltage across rechargeable power source 24 is not over 4.05 volts, charging unit 50 checks (332) to determine whether the charging current through rechargeable power source 24 is over a current rate that is not desirable, e.g., 50 milliamperes. *If the charging current is over 50 milliamperes, then the charging power level is decreased (334) by an appropriate, e.g., by 35 milliwatts*.
>
> (Ex. 1001 at 21:58-22:3, emphasis added.) As described in the passage above, both a voltage across the rechargeable power

[8] Patent Owner's additional citations to cases for the proposition that different claim terms are presumed to have different meanings does not support its arguments. PO Resp. 9–10 (citations omitted). As Petitioner notes, there is no dispute that "value," "measured voltage," and "signal proportional to said current" have different meanings. Pet. Reply 5. The issue is whether a single input can satisfy both limitations at issue.

> source and a current through the rechargeable power source are utilized to control the operation of the external charging device. A POSITA would understand that each of these two inputs is associated with or proportional to a current passing through the internal power source. (*See also* Ex. 1001 at 20:65-21:6; Ex. 2002 at ¶ 35.)

PO Resp. 11–12. Patent Owner's argument is persuasively supported by Dr. Mihran, who explains that a person of ordinary skill in the art would have understood the claim language requires two inputs, in part, because the Specification of the '148 patent "provides support for the use of multiple inputs as a basis to vary power output of the power source as claimed." Ex. 2002 ¶¶ 33, 35.

In its Reply, Petitioner states that it "does not dispute that there are embodiments where two inputs associated with a current passing through the internal battery would be used." Pet. Reply 8. Thus, there is no dispute that the Specification provides support, at least under some embodiments, for Patent Owner's interpretation that the Value Limitation and either the Signal Limitation or the Measured Voltage Limitation each require two inputs. Instead, according to Petitioner, Patent Owner seeks to improperly import a two-input requirement from particular embodiments into the claim language (Pet. Reply 8–9 (citing *Superguide Corp. v. DirecTV Enters., Inc.*, 358 F.3d 870, 875 (Fed. Cir. 2004))), and Patent Owner's proposed construction would exclude a preferred embodiment that requires only a single input, which is "rarely, if ever, correct" (*id*. at 9–10 (quoting *PPC Broadband, Inc. v. Corning Optical Commc'ns RF, LLC*, 815 F.3d 747, 755 (Fed. Cir. 2016))). Contrary to Petitioner's arguments, the claim language expressly includes two limitations, such that there is no improper importation of requirements from the Specification. We also find, as

explained above, that the Specification expressly supports a two-input embodiment, and Petitioner directs us to no persuasive support for the notion that every claim must be construed to encompass every preferred embodiment disclosed in the Specification.

Lastly, Petitioner argues that "although [Patent Owner] does not advance this argument, if their linguistic interpretation is to be applied consistently, the dependent claims that add yet a third wherein clause [(i.e., claims 4, 5, 10, 11, 16, and 17)] must describe a system in which the external power source varies the power based on three separate inputs." Pet. Reply 10–11. According to Petitioner, Patent Owner "nowhere suggests that the [S]pecification teaches this." *Id.* Patent Owner, however, shows that Petitioner's argument finds no support in the record. PO Sur-reply 10–11. Patent Owner explains that during cross-examination "Dr. Mihran explained that the '148 patent describes an external charger which varies its power output based on at least three inputs." *Id.* (citing Ex. 2008, 114:10–120:8 (explaining variation of the power output being controlled based on "the temperature measurement and the power level being dissipated by the external primary coil during the recharging process" in addition to the "battery voltage input" and the "charging current input")). We agree with Patent Owner that Petitioner offers no evidence to the contrary. *See id.*

In its Sur-reply, Patent Owner further identifies where we view the focus of the dispute to be, explaining that "Petitioner's argument that one value that is a signal proportional to the current or a measured voltage associated with the current can satisfy both limitations would render the first wherein clause that recites the 'value' input superfluous." PO Sur-reply 8 (citing *Wasica Fin. GmbH v. Cont'l Auto. Sys., Inc.*, 853 F.3d 1272, 1288 (Fed. Cir. 2017) ("It is highly disfavored to construe terms in a way that

renders them void, meaningless, or superfluous.")); *see also* PO Resp. 10 (arguing that "[c]laims must be interpreted with an eye toward giving effect to all terms in the claim" (quoting *Becton, Dickinson & Co. v. Tyco Healthcare Grp., LP*, 616 F.3d 1249, 1257 (Fed. Cir. 2010))).

Although the '148 patent makes clear that "a value" may include, for example "voltage," we agree with Patent Owner that the two independent limitations should be construed such that the Value Limitation does not render superfluous the Signal Limitation or the Measured Voltage Limitation. Our determination is further supported, as explained above, by Petitioner's failure to show that its proposed construction is supported by the Specification or the prosecution history. Patent Owner has shown that if the Signal Limitation or the Measured Voltage Limitation do no more than further limit the Value Limitation, as Petitioner contends, then the Value Limitation is rendered superfluous. Accordingly, we conclude that Petitioner has not sufficiently supported its proposed construction and determine that the Value Limitation and the Signal Limitation, as well as the Value Limitation and the Measured Voltage Limitation both require two separate inputs to the external power source.

2. Additional Claim Terms

We find no additional claim term requires express construction. *See Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017) ("[W]e 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))).

D. Scope and Content of the Prior Art

To demonstrate the unpatentability of claims 3–6, 9–12, and 15–18 of the '148 patent, Petitioner relies on Schulman, the Fischell Article, and Fischell '260. Pet. 8–9. A brief summary of each of these references, focused on the teachings relied upon by Petitioner, is provided below.

1. Summary of Schulman

Schulman, titled Rechargeable Tissue Stimulating System, generally "relates to a rechargeable tissue stimulating system for providing a charge to a voltage source implanted in a living being, and for regulating recharging of the voltage source through the use of a telemetry circuit." Ex. 1005, 1:7–11. Schulman describes the use of an induction coil external to the patient that "is used to induce current flow in a charging circuit located beneath the skin of the patient" and "external means" that "modulate the strength of the charging magnetic field, as well as provide visual or audio indication of proper charging as well as the proper positioning of the external power source with respect to the implanted charging circuit, completion of the proper charging interval to restore the amount of current used, and improper charging." *Id.* at code (57).

Figure 1 of Schulman is reproduced below.

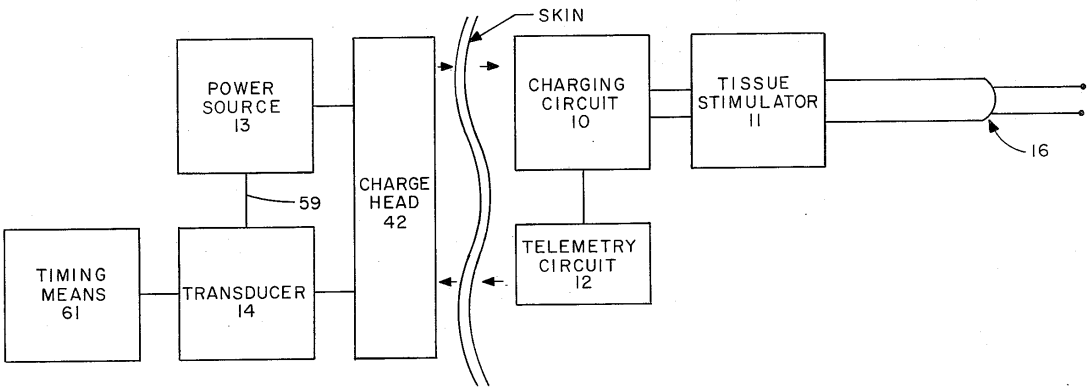

FIG. 1

Figure 1 is a block diagram of a rechargeable tissue stimulating system of Schulman. *Id.* at 3:16–17, 3:42–46. The system includes charging circuit 10, with telemetry circuit 12 and tissue stimulator 11, for implantation in the body. *Id.* at 3:42–46. External to the patient, the system further includes power source 13 with transducer 14 "in the form of a detector circuit for recharging and for verifying the charging condition of the implanted portions of the tissue stimulating system," charge head 42, and timing means 61. *Id.* at 3:47–53. "The output of transducer 14 is used to control the power oscillator output energy and is used to drive the timing means 61, which includes a timing and indicator circuit." *Id.* at 3:55–58.

2. Summary of the Fischell Article

The Fischell Article, titled "A Long-lived, Reliable, Rechargeable Cardiac Pacemaker," describes a cardiac pacemaker system with a "rechargeable cell specifically adapted for use at body temperature." Ex. 1006, 357. The system includes an external device with a charger head that transfers energy to a pickup coil in the implant in order to recharge the battery. *Id.* at 372 (disclosing "the external charger applies an alternating magnetic field which is picked up through the intact skin by the pulse generator's pickup coil"), Fig. 8.

Figure 8 of the Fischell Article is reproduced below.

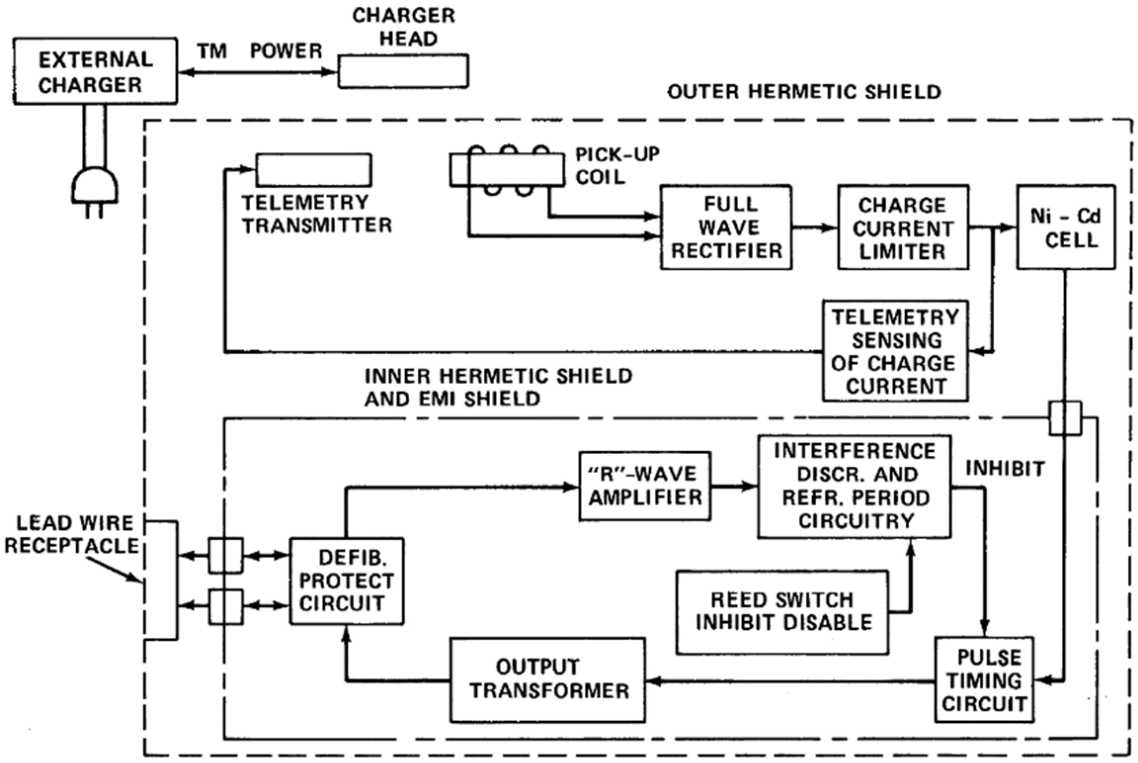

Fig. 8 Block diagram of rechargeable demand pacemaker

Figure 8 of the Fischell Article is a block diagram of the rechargeable cardiac pacemaker system described in the Fischell Article. *Id.* at 369. Petitioner describes the system shown in Figure 8 as follows:

> a block diagram of a rechargeable pacemaker system showing an "external charger" and a hermetically sealed rechargeable pacemaker or "pulse generator" that is implanted beneath the skin of the patient. The implantable device includes a "pick-up coil" that interfaces with an induction coil in the "charger head" of the external device, circuitry to convert the magnetic energy to current for charging an internal rechargeable battery, a "Ni-Cd cell," a block titled "telemetry sensing of charge current" that is coupled between the battery and a "telemetry transmitter" that transmits information back to the external charger. "When the external charger applies an alternating magnetic field which is picked up through the intact skin by the pulse generator's pickup coil, a telemetry system is powered whose output frequency from the pacer is proportional to the charge current in the battery."

> Ex. 1006 at 372–373. The charger head of the external charger detects this frequency and "closed-loop controls the battery charge current" to bring it to a desired value (e.g., 40 mA). Ex. 1006 at 373.

Pet. 50–51.

A telemetry transmitter in the Fischell Article communicates back to the external device the charge current in the battery. Ex. 1006, 370–373 (disclosing "a telemetry system is powered whose output frequency from the pacer is proportional to the charge current in the battery"), Fig. 8 (noting a box for telemetry sensing of charge current), Table 3 (noting a "Battery charge current telemetry" item). If the battery is not charging properly due to misalignment (i.e., the current level is too low), the user is made aware by a beeping sound and flashing lights on the external device. *Id.* at 377–378. If the battery is receiving too much current, a feedback control system maintains charge at the appropriate level. *Id.* at 367 ("The charging circuit for the rechargeable pacer limits the charge (and overcharge) current into the battery to 40 mA."), 372 (disclosing "telemetry . . . to measure and control charge current into the battery"), 373 ("The external charg[ing] detects [the telemetry] and closed-loop controls the battery charge current to a value of 40 mA."), 378 ("A feedback control system in the charger maintains the battery charge current at the proper 40 mA level.").

3. Summary of Fischell '260

Fischell '260, titled Rechargeable Demand Inhibited Cardiac Pacer and Tissue Stimulator, generally relates to a "demand inhibited cardiac pacer or human tissue stimulator" that uses a rechargeable battery and "provides accurate telemetry indication as to when such recharging of the unit's battery is taking place." Ex. 1007, codes (54), (57). The demand inhibited cardiac pacer or human tissue stimulator of Fischell '260 includes "double hermetic

sealing" which provides an "effective electromagnetic shield for the internal electronic components . . . without severely attenuating the alternating magnetic field that is utilized to recharge the pacer or stimulator battery." *Id.* at 1:59–2:3.

Figure 1a of Fischell '260 is reproduced below:

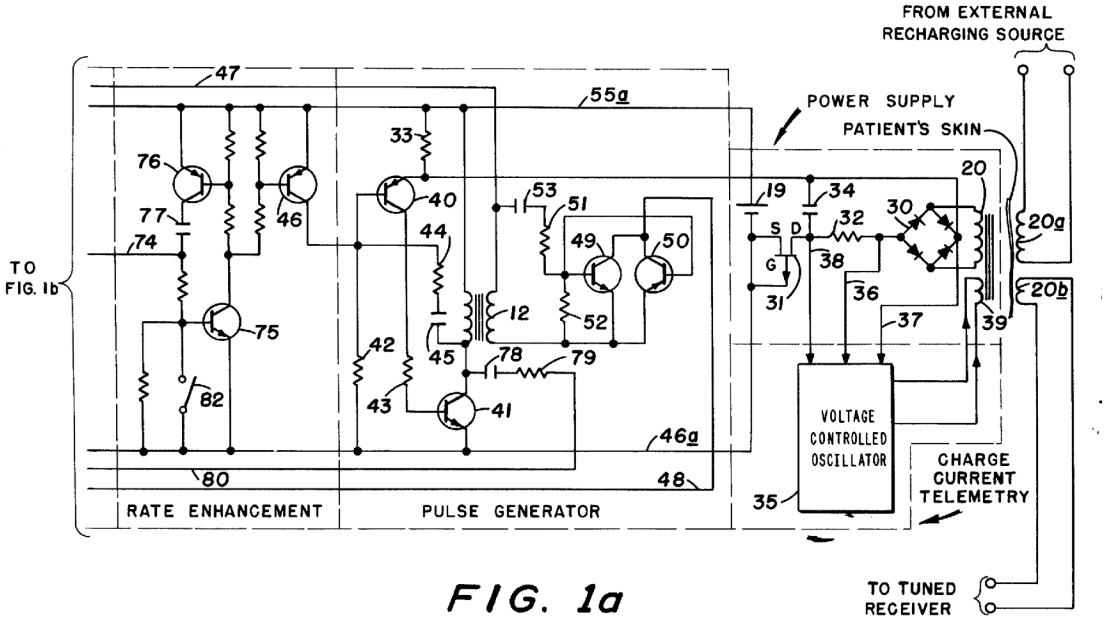

FIG. 1a

Fischell '260 Figure 1a, together with Figure 1b (not reproduced), is a schematic diagram of circuitry utilized in a rechargeable demand inhibited cardiac pacer. *Id.* at 3:27–31. As shown in Figure 1a, electrical power for the electronic circuitry of the proposed pacer unit is provided by single cell rechargeable nickel-cadmium battery 19 and "is maintained in an acceptable operating condition by recharging energy inductively coupled through the patient's skin from a suitable external source of recharging energy by means of the ferrite core input transformer 20 and the illustrated recharge head 20a." *Id.* at 6:40–50. Petitioner identifies recharge head 20a as an "external coil" and input transformer 20 as an "internal coil." Pet. 79. Fischell '260 states that "[t]he input recharging energy developed across the

illustrated upper secondary winding of the input transformer 20 is rectified at the conventional full-wave diode bridge rectifier 30," and that the "output recharging current available at the diagonals of the rectifier 30 is applied to the battery 19 through a series recharging circuit comprising a conventional field effect transistor current limiter 31, current monitoring resistor 32, and a small (e.g., 3 ohm) voltage drop resistor 33." Ex. 1007, 6:50–59. "A voltage controlled oscillator 35 . . . receive[s] operating supply voltage from the output of the full wave rectifier bridge 30," and is "also connected . . . to receive a control voltage signal developed across the current monitoring resistor 32." *Id.* at 6:66–7:3. "As a result, the output frequency generated by the oscillator 35 varies in accordance with the value of recharging current being supplied to the battery 19." *Id.* at 7:3–6. "The output frequency telemetry signal from the oscillator 35, when detected by a suitable external receiving unit (not shown) via the winding 20b, thus provides accurate indications both that recharging is taking place and the precise value of the recharging current." *Id.* at 7:10–15.

E. Alleged Anticipation by Schulman

Petitioner contends that claims 3–6, 9–12, and 15–18 of the '148 patent are anticipated by Schulman. Pet. 11–49. We focus our discussion on Petitioner's arguments with regard to the Value Limitation, the Signal Limitation, and the Measured Voltage Limitation, because they are dispositive.

1. Claims 3, 9, and 15

Each of claims 3, 9, and 15 includes the Value Limitation and the Signal Limitation. Ex. 1001, 22:50–23:3, 23:55–24:6, 24:52–67. Petitioner contends in the Petition that under its claim interpretation the Value

Limitation and the Signal Limitation are disclosed by the same disclosure of a single input in Schulman. Pet. 22, 23, 32, 33, 45, 46.

Petitioner does not contend in the Petition that Schulman discloses an external power source that automatically varies its power output based on two inputs, one corresponding to the Value Limitation and another to the Signal Limitation. *See id.* In its Response, Patent Owner describes Petitioner's contentions in the Petition as "not entirely clear," and then proceeds to explain why "Petitioner does not identify anywhere in Schulman's teachings a second input used to regulate the external power source." PO Resp. 20–28 (addressing "to the extent Petitioner is relying on a value related to resistor R8 (e.g., current through or voltage across resistor R8) in Schulman for disclosing both inputs in the two-input claim limitations," as well as "to the extent Petitioner's analysis of Schulman includes a mapping of a value related to resistor R9 (e.g., current through or voltage across resistor R9) to the first input and a value related to resistor R8 (e.g., current through or voltage across resistor R8) to the second input"). We have considered Petitioner's contentions in the Petition and find Petitioner does not allege any claim requires two inputs, much less that Schulman discloses two inputs. *See* Pet 2–6 (summarizing the '148 patent without suggesting it describes the use of two inputs); *see also id.* at 11–49 (explaining how Petitioner contends Schulman anticipates claims of the '148 patent). In its Reply Petitioner does not purport to support or show how it alleged in the Petition that Schulman disclosed two inputs. *See generally* Pet. Reply. Likewise, Dr. Panescu did not suggest or explain in his declaration supporting the Petition that any claim required two inputs or that Schulman anticipated a claim because it disclosed two inputs. *See, e.g.*, Ex. 1003 ¶ 70–71 (stating that "all 'wherein' clauses" at issue in the claims

challenged "replicate the same feature: controlling the power output of the external power source based variously on a 'value' or 'signal ('current' or "voltage') 'associated with' or 'proportional to' the current passing through the internal battery of the implantable medical device"); *see also id.* at ¶ 72 (stating that "any prior art publication that discloses varying the power output of the external power source based on measuring a current and/or voltage in the implanted device, that is proportional to or associated with the current passing through the internal battery, teaches all different permutations" of the "'wherein' clauses" of the claims challenged). This is confirmed in Dr. Panescu's Supplemental Declaration, in which he states that he "understand[s] that Dr. Mihran's opinion is that a person of ordinary skill in the art would have understood each wherein clause . . . to require a separate respective input . . . used by the external power source as a basis for automatically varying its power output," and that he "disagree[s], at least for the reasons set forth in [his] prior declaration.).

For the reasons provided in our claim construction discussion above, *supra* § II.C.1, we reject Petitioner's contention that a single input disclosed by Schulman may satisfy both the Value Limitation and the Signal Limitation of claims 3, 9, and 15, which require two separate inputs to the external power source (or charging unit). Thus, Petitioner fails to show by a preponderance of the evidence that a single input taught by Schulman discloses both the Value Limitation and the Signal Limitation, as required by claims 3, 9, and 15.

Belatedly, Petitioner seeks to argue in its Reply that "[e]ven if the Board adopts [Patent Owner's] claim construction positions requiring two "inputs," and its assertions that the Petition's mapping of the claimed 'value,' 'measured voltage' associated with a current, and 'signal

proportional to said current,' do not meet its proffered claim construction, Schulman still anticipates" claims 3, 9, and 15.[9] Pet. Reply 12–14. Petitioner then proceeds to argue for the first time that features of Schulman correspond to a second input that automatically varies the power output of the external power source. *Id.* In so doing, Petitioner fails to meet its burden to show in the Petition "[h]ow the challenged claim is to be construed," but instead relies on Patent Owner to show in its Response to the Petition the proper construction. 37 C.F.R. § 42.104(b)(3). Indeed, Petitioner does not argue, much less show that its "mapping" of the claims to Schulman in the Petition corresponds to two inputs that automatically vary the power output. Petitioner's Reply is not an opportunity to advance new arguments based on new testimony in an effort to show that challenged claims are unpatentable where the proper claim construction requires additional features, such as two inputs instead of one input, contrary to the position taken by Petitioner in the Petition. *See SAS Inst., Inc. v. Iancu*, 138 S. Ct. 1348, 1356 (2018) (stating in regard to *inter partes* review that "petitioner's petition . . . is supposed to guide the life of the litigation"); *see also Sirona Dental Sys. GmbH v. Institut Straumann AG*, 892 F.3d 1349, 1356 (Fed. Cir. 2018) (stating that "[b]ecause an IPR must proceed '[i]n accordance with' or 'in conformance to' the petition," it would "not be proper for the Board to deviate from the grounds in the petition") (quoting *SAS Inst.*, 138 S. Ct. at 1357)).

Patent Owner argues, and we agree, that consideration of arguments raised improperly by Petitioner for the first time in its Reply is unwarranted.

[9] Petitioner does not even attempt to explain in its Reply how its "mapping" of claim limitations in the Petition meets Patent Owner's claim construction, requiring two inputs. *See generally* Pet. Reply.

PO Sur-reply 11–12 (citing Consolidated Trial Practice Guide (November 2019) ("CTPG") at 73 ("Petitioner may not submit new evidence or argument in reply that it could have presented earlier, e.g. to make out a prima facie case of unpatentability."), 74 ("'Respond' in the context of 37 C.F.R. § 42.23(b) does not mean proceed in a new direction with a new approach as compared to the positions taken in a prior filing. While replies and sur-replies can help crystalize issues for decision, a reply or sur-reply that raises a new issue or belatedly presents evidence may not be considered.") (citing *Intelligent Bio-Sys., Inc. v. Illumina Cambridge Ltd.*, 821 F.3d 1359, 1369–70 (Fed. Cir. 2016))). Moreover, Patent Owner identified the new arguments advanced by Petitioner, and Petitioner had the opportunity to show where the arguments were raised prior to its Reply. Paper 23, 1; Paper 26, 1–2. Petitioner directs us to claim charts in the Petition that purport to show how Schulman discloses a single-input, consistent with Petitioner's claim construction. *See* Paper 26, 1. Petitioner fails to direct us to any argument in the Petition that recognizes that claims 3, 9, and 15 require a separate input for "a value" and "a signal," much less that Schulman discloses the same.

In considering whether Petitioner could have presented its arguments earlier in its Petition, we find that Petitioner chose to interpret the claims as requiring only a single input, notwithstanding the fact that the Specification of the '148 patent discloses embodiments where power output would vary based on two inputs, as Petitioner later acknowledged. *See* Pet. Reply 8 (stating that "Petitioner does not dispute that there are embodiments [in the '148 patent] where two inputs associated with a current passing through the internal battery would be used"). Thus, Petitioner had an adequate opportunity to assess the '148 patent and to understand that it disclosed

support for two separate inputs, but failed to do so. Petitioner's apparent misapprehension of what is disclosed in the '148 patent as od the filing of its Petition does not afford Petitioner the opportunity to present new arguments in its Reply in an attempt to show for the first time that claimed features are disclosed by other elements of the asserted references. Petitioner may respond to arguments raised in the Patent Owner Response in its Reply, however, that Reply may not offer an entirely new rationale based on a new combination of elements in the asserted references to show unpatentability based on what amounts to a new ground not set forth in the Petition. *See* CTPG 73–74.

We further find Petitioner's need to file a supplemental declaration from Dr. Panescu, who maintains that two inputs are not required by the claims, but further opines for the first time that if two inputs are required by the claims, Schulman still anticipates claims 3, 9, and 15, supports our determination that Petitioner improperly seeks to advance new arguments in its Reply. Ex. 1012 ¶¶ 10–20. Such testimony is not offered in support of the arguments advanced in the Petition, but to instead present a new rationale based on new features that go well-beyond proper supplemental testimony. *See, e.g.*, *id.* ¶ 10 (Dr. Panescu maintaining "at least for the reasons set forth" in his prior declaration in support of the Petition that two inputs are not required before offering new testimony that two inputs would have been obvious). Accordingly, we find Petitioner's arguments that Schulman discloses two inputs are improper reply arguments based on improper reply testimony and do not give them weight. For the foregoing

reasons, we conclude that Petitioner fails to show by a preponderance of the evidence that any of claims 3, 9, and 15 are anticipated by Schulman.[10]

2. Claims 6, 12, and 18

Each of claims 6, 12, and 18 includes the Value Limitation and the Measured Voltage Limitation. Ex. 1001, 23:12–33, 24:16–34, 25:9–25. Petitioner contends in the Petition that under its claim interpretation the Value Limitation and the Measured Voltage Limitation are disclosed by the same disclosure of a single input. Pet. 25, 26, 34, 35, 48, 49. Petitioner does not contend in the Petition that Schulman discloses an external power source that automatically varies its power output based on two inputs, one corresponding to the Value Limitation and another to the Measured Voltage Limitation. *See id.* For the reasons provided in our claim construction

[10] In its Sur-reply, Patent Owner further disputes the merits of Petitioner's Reply arguments, asserting that Schulman does not disclose that an external power source automatically varies its power output based on two inputs, where one input is a value associated with said current passing through the internal battery and the other input is a signal proportional to the current. PO Sur-reply 12–16. However, as Patent Owner states, the record is incomplete because "allowing Petitioner to raise such new arguments and evidence at this late stage is highly prejudicial to [Patent Owner] given it does not get an opportunity to rebut such new allegations with its own evidence (e.g., expert testimony), which [Patent Owner] would have submitted if it were allowed to do so." *Id.* at 12. To be clear, Patent Owner did not seek leave to submit additional expert testimony. Nevertheless, we agree with Patent Owner that new evidence is not typically permitted in support of a sur-reply. *See* 37 C.F.R. § 42.23(b) ("A sur-reply . . . may not be accompanied by new evidence other than deposition transcripts of the cross-examination of any reply witness."). Moreover, we agree with Patent Owner that it would be prejudicial to Patent Owner to be required to refute what amounts to a new ground of unpatentability not raised in the Petition, but instead asserted for the first time by Petitioner in its Reply. Thus, reaching the merits of the new arguments raised by Petitioner on an incomplete record is unwarranted in this case.

discussion above, *supra* § II.C.1, we reject Petitioner's contention that a single input disclosed by Schulman may satisfy both the Value Limitation and the Measured Voltage Limitation of claims 6, 12, and 18, which require two separate inputs to the external power source (or charging unit). Thus, Petitioner fails to show by a preponderance of the evidence that a single input taught by Schulman discloses both the Value Limitation and the Measured Voltage Limitation, as required by claims 6, 12, and 18.

Belatedly, Petitioner seeks to argue in its Reply that "[e]ven if" the claims require two inputs, "Schulman still anticipates" claims 6, 12, and 18. Pet. Reply 12–14. The issue presented in regard to new arguments and testimony purporting to show that claims 6, 12, and 18 are anticipated by Schulman under the claim construction advanced by Patent Owner are the same as those addressed above in regard to anticipation of claims 3, 9, and 15 by Schulman. For the same reasons provided above, we determine that consideration of arguments raised improperly by Petitioner for the first time in its Reply is unwarranted. *See supra* § II.E.1. For the foregoing reasons, we conclude that Petitioner fails to show by a preponderance of the evidence that any of claims 6, 12, and 18 are anticipated by Schulman.

3. Claims 4, 5, 10, 11, 16, and 17

Claims 4 and 5 depend from claim 3, claims 10 and 11 depend from claim 9, and claims 16 and 17 depend from claim 15. Ex. 1001, 23:4–11, 24:7–14, 25:1–8. Having determined above that Petitioner has not shown by a preponderance of the evidence that Schulman anticipates claims 3, 9, and 15, for the same reasons Petitioner has not shown by a preponderance of the evidence that Schulman anticipates any of claims 4, 5, 10, 11, 16, and 17, which depend from one of claims 3, 9, and 15.

F. Alleged Anticipation by the Fischell Article

Petitioner contends that claims 3, 4, 9, 10, 15, and 16 of the '148 patent are anticipated by the Fischell Article. Pet. 49–76. We focus our discussion on Petitioner's arguments with regard to the Value Limitation and the Signal Limitation, because they are dispositive.

1. Claims 3, 9, and 15

Each of claims 3, 9, and 15 includes the Value Limitation and the Signal Limitation. Ex. 1001, 22:50–23:3, 23:55–24:6, 24:52–67. Petitioner contends in the Petition that under its claim interpretation the Value Limitation and the Signal Limitation are disclosed by the same disclosure of a single input in the Fischell Article. Pet. 58, 59, 65, 66, 75, 76. Petitioner does not contend in the Petition that the Fischell Article discloses an external power source that automatically varies its power output based on two inputs, one corresponding to the Value Limitation and another to the Signal Limitation. *See id.* For the reasons provided in our claim construction discussion above, *supra* § II.C.1, we reject Petitioner's contention that a single input disclosed by the Fischell Article may satisfy both the Value Limitation and the Signal Limitation of claims 3, 9, and 15, which require two separate inputs to the external power source (or charging unit). Thus, Petitioner fails to show by a preponderance of the evidence that a single input taught by the Fischell Article discloses both the Value Limitation and the Signal Limitation, as required by claims 3, 9, and 15.

Belatedly, Petitioner seeks to argue in its Reply that "[e]ven if the Board adopts [Patent Owner's] understanding that the claims require a separate input for 'a value associated with said current' and 'a signal proportional to said current,' [the] Fischell [Article] still anticipates claims 3, 9, and 15." Pet. Reply 16 (citing Ex. 1012 ¶¶ 20–27 (the

Supplemental Declaration of Dr. Panescu offered by Petitioner in support of its Reply following Patent Owner's Response)). Petitioner then proceeds to argue for the first time that features disclosed in the Fischell Article correspond to a second input that automatically varies the power output of the external power source. *Id.* In so doing, Petitioner again fails to meet its burden to show in the Petition "[h]ow the challenged claim is to be construed," but instead relies on Patent Owner to show in its Response to the Petition the proper construction. 37 C.F.R. § 42.104(b)(3). Petitioner's Reply is not an opportunity to advance new arguments based on new testimony in an effort to show that challenged claims are unpatentable where the proper claim construction requires additional features, such as two inputs instead of one input as Petitioner alleged.

The issue presented in regard to new arguments and testimony purporting to show that claims 3, 9, and 15 are anticipated by the Fischell Article under the claim construction advanced by Patent Owner are the same as those addressed above in regard to anticipation of claims 3, 9, and 15 by Schulman. For the same reasons provided above, we determine that consideration of arguments raised improperly by Petitioner for the first time in its Reply is unwarranted. *See supra* § II.E.1. For the foregoing reasons, we conclude that Petitioner fails to show by a preponderance of the evidence that any of claims 3, 9, and 15 are anticipated by the Fischell Article.

2. Claims 4, 10, and 16

Claim 4 depends from claim 3, claim 10 depends from claim 9, and claim 16 depends from claim 15. Ex. 1001, 23:4–11, 24:7–14, 25:1–8. Having determined above that Petitioner has not shown by a preponderance of the evidence that the Fischell Article anticipates claims 3, 9, and 15, for the same reasons Petitioner has not shown by a preponderance of the

evidence that the Fischell Article anticipates any of claims 4, 10, and 16, which depend from one of claims 3, 9, and 15.

G. Alleged Obviousness over the Combination of the Fischell Article and Fischell '260

Petitioner asserts the subject matter of claims 5, 6, 11, 12, 17, and 18 of the '148 patent would have been obvious over the Fischell Article and Fischell '260. Pet. 77–96.

1. Claims 5, 11, and 17

Claim 5 depends from claim 3, claim 11 depends from claim 9, and claim 17 depends from claim 15. Ex. 1001, 23:8–11, 24:7–10, 25:5–8. Each of claims 5, 11, and 17 includes the Value Limitation and the Signal Limitation of the independent claim from which each depends, and Petitioner only contends in the Petition that these limitations are taught by the Fischell Article based on the same arguments Petitioner advances in support of its contention that the Fischell Article anticipates claims 3, 9, and 15. Pet. 81–84, 88, 92. For the reasons provided above, Petitioner fails to show that the Fischell Article teaches both the Value Limitation and the Signal Limitation. *See supra* § II.F.1.

Belatedly, in its Reply, Petitioner seeks to argue that "if the Board adopts [Patent Owner's] claim construction, [the] Fischell [Article] and Fischell '260 still render[] obvious claims 5, 11, and 17 because the combination discloses two separate inputs to vary the power output of the external source." Pet. Reply 20; *see also id.* at 18–19 (purporting to show that the Fischell Article teaches two inputs). Patent Owner argues that Petitioner's new arguments in reply are improper and that the asserted combination does not disclose two inputs. PO Sur-reply 18–23. For the same reasons provided above, we determine that consideration of arguments

raised improperly by Petitioner for the first time in its Reply is unwarranted. *See supra* § II.E.1. Accordingly, Petitioner fails to show by a preponderance of the evidence that any of claims 5, 11, or 17 would have been obvious over the combination of the Fischell Article and Fischell '260.

2. Claims 6, 12, and 18

Each of claims 6, 12, and 18 includes the Value Limitation and the Measured Voltage Limitation. Ex. 1001, 23:12–33, 24:15–34, 25:9–25. Petitioner relies only on the Fischell Article as disclosing both of these limitations through a single input. *See* Pet. 77–82, 84–96. Specifically, Petitioner contends as follows:

> Claims 5, 6, 11, 12, 17, and 18 of the '148 [p]atent are directed at varying the power supplied by the external power source based on "a voltage proportional to" or "a measured voltage associated with" the current passing through the internal battery. [The] Fischell Article does teach "telemetry sensing of charge current" (i.e., the actual current passing through the battery) based on which the power supplied by the external power source is varied. Given that electrical current is commonly measured by measuring the voltage drop across a known resistor, according to Ohm's law, [the] Fischell Article inherently also teaches varying the power supplied by the external power source based on a voltage associated with or proportional to the current passing through the internal battery. Thus, even if it is argued that Fischell Article does not inherently teach that limitation, it certainly suggests it.

Id. at 82. Petitioner relies on Fischell '260 only to the extent that the Fischell Article is insufficiently detailed regarding control based on voltage. *See id.* at 87 (stating that "Fischell '260 teaches controlling the frequency output of the telemetry circuit based on measuring a 'voltage signal developed across the current monitoring resistor.'"); *see also* PO Resp. 33–34 (asserting that Fischell '260 is not relied upon by Petitioner to teach a

separate second input); Pet. Reply 18–19 (not disputing that Petitioner only relies on the Fischell Article as teaching a single input in the Petition). For the same reasons provided above on which we found that Petitioner fails to show that the Fischell Article teaches two inputs corresponding to both the Value Limitation and the Signal Limitation, we likewise conclude that Petitioner fails to show by a preponderance of the evidence that the Fischell Article, alone or in combination with Fischell '260, teaches both the Value Limitation and the Measured Voltage Limitation. *See supra* §§ II.C.1, II.F.1.

Belatedly, in its Reply, Petitioner seeks to argue that "if the Board adopts [Patent Owner's] understanding that the claims require a separate input for 'a value associated with a current' and 'a measured voltage associated with a current,' [the] Fischell [Article] and Fischell '260 still render obvious claims 6, 12, and 18." Pet. Reply 18–19 (purporting to show that the Fischell Article teaches two inputs). Patent Owner argues that Petitioner's new arguments in reply are improper and that the asserted combination does not disclose two inputs. PO Sur-reply 21–23. For the same reasons provided above, we determine that consideration of arguments raised improperly by Petitioner for the first time in its Reply is unwarranted. *See supra* § II.E.1. Accordingly, Petitioner fails to show by a preponderance of the evidence that any of claims 6, 12, or 18 would have been obvious over the combination of the Fischell Article and Fischell '260.

III. CONCLUSION

Claims 1–18 of the '148 patent were challenged in the Petition, however, claims 1, 2, 7, 8, 13, and 14 were subsequently disclaimed by Patent Owner. The remaining claims challenged were not shown to be

unpatentable by a preponderance of the evidence, as summarized in the table below.

Claim(s)	35 U.S.C. §	Reference(s)	Claim(s) Shown Unpatentable	Claims Not Shown Unpatentable
3–6, 9–12, 15–18	102	Schulman		3–6, 9–12, 15–18
3, 4, 9, 10, 15, 16	102	Fischell Article		3, 4, 9, 10, 15, 16
5, 6, 11, 12, 17, 18	103	Fischell Article, Fischell ’260		5, 6, 11, 12, 17, 18
Overall Outcome				3–6, 9–12, 15–18

IV. ORDER

In consideration of the foregoing, it is hereby:

ORDERED that claims 3–6, 9–12, and 15–18 of the ’148 patent have not been proven by a preponderance of the evidence to be unpatentable; and

FURTHER ORDERED that, as this is a Final Written Decision, a party seeking judicial review of the Decision must comply with the notice and service requirements of 37 C.F.R. § 90.2.

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