

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
BRENT M. DOUGAL, *Administrative Patent Judges*.

TARTAL, *Administrative Patent Judge*.

JUDGMENT
Final Written Decision on Remand
Determining No Challenged Claims Unpatentable
35 U.S.C. §§ 144, 318

This case is on remand from the United States Court of Appeals for the Federal Circuit. *Axonics, Inc. v. Medtronic, Inc.*, 75 F.4th 1374 (Fed. Cir. 2024). In *Axonics*, the Federal Circuit stated that Axonics, Inc. (“Petitioner”) appealed our determination that Petitioner had not shown by a preponderance of the evidence that any of claims 3–6, 9–12, or 15–18 of U.S. Patent No. 8,738,148 B2 (Ex. 1001, “the ’148 patent”) is unpatentable based on the asserted prior art. *Axonics*, 75 F.4th at 1376 n.3. The Federal Circuit further stated that Petitioner did not dispute on appeal our claim construction, “only that the Board erred in refusing to consider [Petitioner’s] reply arguments and evidence” under the claim construction applied. *Id.* at 1379–80. Accordingly, the Federal Circuit’s decision in *Axonics* to vacate and remand requires us to consider whether Petitioner shows any of claims 3–6, 9–12, or 15–18 of the ’148 patent is unpatentable in light of Petitioner’s new arguments and evidence presented in its reply. For the reasons discussed below, we determine that Petitioner does not show by a preponderance of the evidence that any of claims 3–6, 9–12, or 15–18 of the ’148 patent is unpatentable.

I. INTRODUCTION

A. *Summary of Procedural History Prior to Remand*

Petitioner¹ filed a Petition pursuant to 35 U.S.C. §§ 311–319 requesting an *inter partes* review of claims 1–18 of the ’148 patent. Paper 1 (“Pet.”). We instituted an *inter partes* review of claims 1–18 on all grounds of unpatentability asserted in the Petition. Paper 8 (“Inst. Dec.”).

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 (misabeled as Paper 31). Petitioner identifies no additional real parties in interest. Pet. 96.

Medtronic, Inc. (“Patent Owner”)² filed a Patent Owner Response. Paper 15 (“PO Resp.”). In its Response, Patent Owner stated that it 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)” (the “Disclaimer”))).

Petitioner filed a Reply to the Patent Owner Response. Paper 19 (“Pet. Reply”). 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). The first oral argument was held on June 17, 2021, and a transcript of that hearing appears in the record. Paper 41.

We entered a Final Written Decision on September 22, 2021, determining that Petitioner failed to show by a preponderance of the evidence the unpatentability of any challenged claim not subject to the Disclaimer. Paper 42 (“FWD”). In the FWD, we addressed at length the construction of the claim terms: “a value associated with said current,” “a signal proportional to said current,” and “a measured voltage associated with said current.” FWD 16–26. In regard to the limitations that recite these terms, which we refer to as the “Value Limitation,” the “Signal Limitation,” and the “Measured Voltage Limitation,” respectively, we determined in the FWD as follows:

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

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.

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.

Id. at 26; *see also id.* at 19 (explaining that we “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’ [i.e., a ‘single input’] or ‘two inputs’” [i.e., a ‘second input’]) (citing PO Resp. 9).

In the FWD, we found that Petitioner did not contend in the Petition that any of the asserted prior art references disclose an external power source that automatically varies its power output based on two inputs, one corresponding to the Value Limitation and another to either the Signal Limitation or the Measured Voltage Limitation. *Id.* at 19–20, 33, 38, 40, 42. We also found in the FWD that Petitioner improperly argued in its Reply “for the first time that features” of the asserted prior art “correspond to a second input that automatically varies the power output of the external power source.” *Id.* at 35, 39–41. We determined in the FWD that Petitioner's arguments that the asserted references “discloses two inputs are improper reply arguments based on improper reply testimony, and do not give them weight.” *Id.* at 37, 41, 43–44. We concluded in the FWD that

Petitioner failed to show the unpatentability of any of claims 3–6, 9–12, or 15–18 of the ’148 patent.³ FWD 45.

Following entry of the FWD, Petitioner filed a Request for Rehearing by the Director (Paper 43), which was denied (Paper 44). Petitioner filed a Notice of Appeal of the Final Written Decision with the Federal Circuit. *See* Paper 45. On August 7, 2023, the Federal Circuit issued a decision in the appeal. At the outset of its decision, the Federal Circuit recognized that, on appeal, Petitioner “does not argue the Board erred in adopting the two-input claim construction, only that the Board erred in refusing to consider [Petitioner’s] reply arguments and evidence under the two-input construction.” *Axonics*, 75 F.4th at 1379–80. The Federal Circuit concluded as follows:

We hold that where a patent owner in an IPR first proposes a claim construction in a patent owner response, a petitioner must be given the opportunity in its reply to argue and present evidence of anticipation or obviousness under the new construction, at least where it relies on the same embodiments for each invalidity ground as were relied on in the petition. We vacate the Board’s decisions in these IPRs and remand for the Board to consider [Petitioner’s] arguments and evidence under the two-input claim construction and, correspondingly, to consider any request by [Patent Owner] to present new evidence in support of its surreply.

Axonics, 75 F.4th at 1384; *see also* Paper 60 (Mandate of the Federal Circuit in the appeal, dated September 13, 2023).

³ We explained in the FWD that, in light of the Disclaimer, “we treat claims 1, 2, 7, 8, 13, and 14 as if they never existed.” FWD 4. Accordingly, in the FWD, we only considered Petitioner’s allegations of unpatentability directed to claims 3–6, 9–12, and 15–18 of the ’148 patent.

B. Summary of Procedural History After Remand

Following the issuance of *Axonics* by the Federal Circuit, the Parties filed a Joint Brief Regarding Post-Remand Procedures (“JBRPRP,” Paper 62). We entered an Order on Procedures on Remand (“OPR,” 64), which authorized Patent Owner to file an amended sur-reply and supporting declaration, authorized Petitioner to depose Patent Owner’s declarant, and authorized additional briefing from both Parties. As required by the Federal Circuit, we considered Patent Owner’s request to file a supporting declaration over the opposition of Petitioner and found the request to be warranted. *See Axonics*, 75 F.4th at 1384 (the Federal Circuit stating it is “confident that in circumstances such as these, the Board will allow an appropriate opportunity for a patent owner to submit evidence with a sur-reply”); OPR 5–7 (finding “Patent Owner has shown a need for the opportunity to support its arguments in opposition to Petitioner’s replies with a supplemental declaration,” and rejecting Petitioner’s assertions that Patent Owner “waived” making such a request).

Patent Owner filed a Rebuttal Declaration of Dr. Richard T. Mihran, dated October 31, 2023 (Ex. 2010), and an Amended Patent Owner’s Sur-reply (Paper 65, “APO Sur-reply”), which is identical to the original sur-reply filed by Patent Owner with the addition of citations to the supporting rebuttal declaration of Dr. Mihran. *See* Ex. 2011 (comparison of PO Sur-reply to APO Sur-reply). Petitioner deposed Dr. Mihran for a second time in this case on November 14, 2023, and the transcript of the deposition was filed by Petitioner as Exhibit 1020. Petitioner filed a Post Remand Brief (Paper 76, “Pet. PRB”) and Patent Owner filed a Post Remand Brief (Paper 77, “PO PRB”). Petitioner’s request for a second oral argument

(Paper 78) was granted and a transcript of the second hearing in this case, held on February 8, 2024, was entered in the record (Paper 85).

C. 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 Federal Circuit addressed both this case and IPR2020-00680 in *Axonics*. *See* 75 F.4th at 1376.

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 as a function of parameters 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.

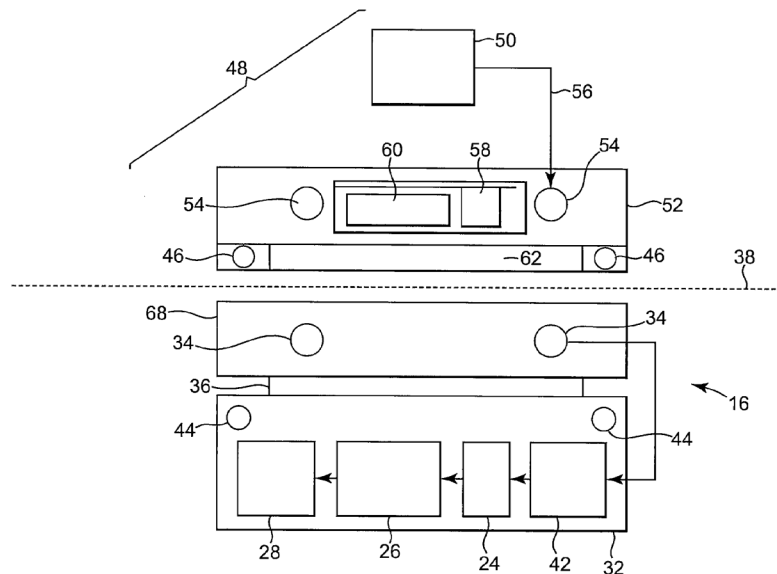


Fig. 3

Figure 3 illustrates implantable medical device 16 situated under cutaneous boundary 38, and associated external charging device 48. Ex. 1001, 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.

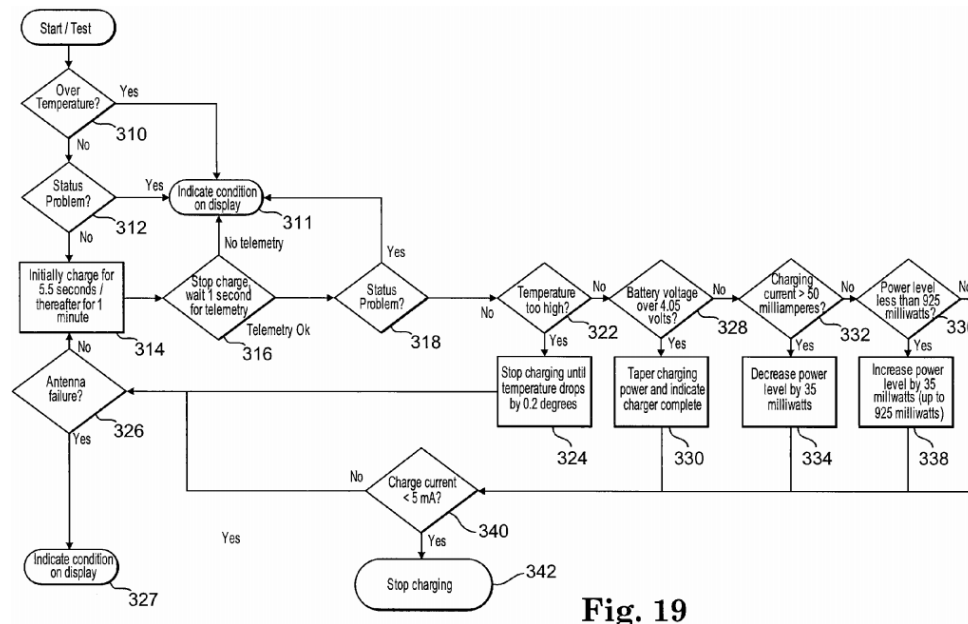


Fig. 19

Figure 19 is a flow chart illustrating the operation of charging unit 50 to charge an implantable medical device. Ex. 1001, 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”; and
- 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.”

Ex. 1001, 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.

Ex. 1001, 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.⁴

⁴ 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.⁵ 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

⁵ 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., <i>A Long-Lived, Reliable, Rechargeable Cardiac Pacemaker, Engineering in Medicine</i> , 357 (Schaldach et al. eds., 1975) (“Fischell” or “Fischell Article”)	1975	Ex. 1006
U.S. Patent No. 3,888,260 (“Fischell ’260”)	Jun. 10, 1975	Ex. 1007
Declaration of Dr. Dorin Panescu	Mar. 2, 2020	Ex. 1003
Supplemental Declaration of Dr. Dorin Panescu	Mar. 19, 2021	Ex. 1012
Deposition Transcript of Dr. Dorin Panescu	Nov. 19, 2020	Ex. 2004
Declaration of Dr. Richard T. Mihran	Dec. 22, 2020	Ex. 2002
Deposition Transcript of Dr. Richard T. Mihran	Feb. 25, 2021	Ex. 2008
Rebuttal Declaration of Dr. Richard T. Mihran	Oct. 31, 2023	Ex. 2010
Deposition Transcript of Dr. Richard T. Mihran	Nov. 14, 2023	Ex. 1020

G. Asserted Grounds of Unpatentability

On remand, we consider Petitioner’s allegations of unpatentability of claims 3–6, 9–12, and 15–18 on the following grounds:

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

Pet. 10–11; *Axonics*, 75 F.4th at 1376 n.3.

II. ANALYSIS OF PATENTABILITY

In *Axonics* the Federal Circuit directed us to consider the new arguments and evidence Petitioner first presented in its Reply concerning allegations that claims 3–6, 9–12, and 15–18 are unpatentable over the asserted prior art. *Axonics*, 75 F.4th at 1376 (stating, “[w]e hold that the Board’s refusal to consider the new arguments and evidence was erroneous, and we vacate and remand for the Board to consider the merits of [Petitioner’s] responsive arguments and evidence under the new claim construction”); *see also* ORP 4–5 (order on remand procedures stating that on remand the claims and grounds for further consideration in this case are the same as the claims and grounds at issue in the FWD).

In addition to the Petition arguments and supporting evidence we previously considered, below we further consider Petitioner’s contentions in

⁶ 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.

light of the arguments and evidence addressed in the portion of Petitioner's Reply that we previously found to be improper new argument and did not consider for purposes of the FWD. We also consider Patent Owner's Amended Sur-reply, as supported by the Rebuttal Declaration of Dr. Mihran, and the arguments and evidence advanced in the post remand briefs of the Parties. Based on the totality of the record in this case, we determine, for the reasons that follow, that Petitioner does not show by a preponderance of the evidence that any of claims 3–6, 9–12, or 15–18 is unpatentable over the asserted prior art.

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)).

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, Inc.*, 842 F.3d 1376, 1382 (Fed. Cir. 2016).

B. Level of Ordinary Skill in the Art

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).

Our analysis here, as in the FWD, does not turn on which of the Parties’ competing definitions of ordinary skill is applied. *See* FWD 16. Moreover, the appropriate level of ordinary skill is not in dispute on remand. Consistent with the FWD and the Decision on Institution, we apply the level of ordinary skill in the art proposed by Petitioner. *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))); FWD 16.

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.

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, 22:50–23:3 (emphases added).

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 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 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 15 is directed to “[a] method of transcutaneous energy transfer,” and includes claim language substantively similar to the Value Limitation and the Signal Limitation.⁷ *Id.* at 24:52–67. Claim 18 is identical to claim 15, but for the recitation of claim language substantively similar to the Measured Voltage Limitation in place of the claim language substantively similar to the Value

⁷ 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, 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.

Limitation of claim 15.⁸ *Id.* at 25:9–25.

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.* In the FWD, we stated that “[a]lthough 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.” FWD 26. We further determined 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.” *Id.* That determination is not at issue here. *See Axonics*, 75 F.4th at 1379–80 (stating that Petitioner did “not argue the Board erred in adopting the two-input claim construction”).

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))).

⁸ Our discussion of the Measured Voltage Limitation applies to each claim that recites “a measured voltage associated with said current.”

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, Fischell (also referred to as 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.

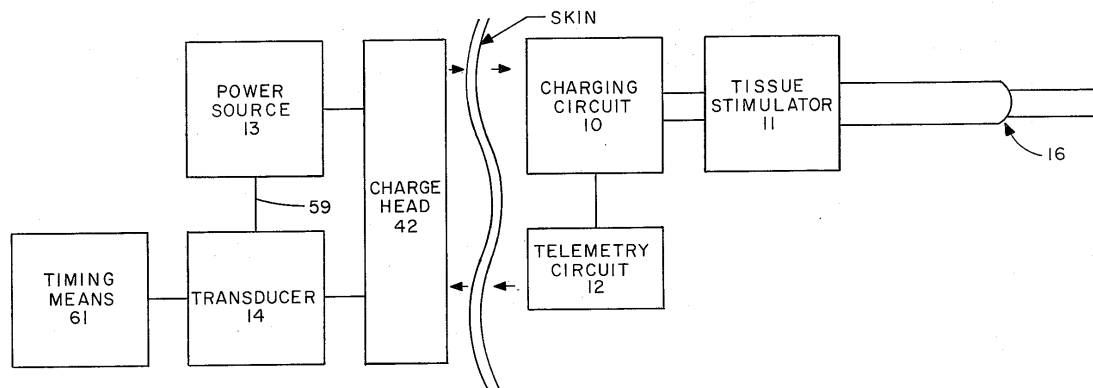


FIG. 1

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 Fischell

Fischell, 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 Fischell is reproduced below.

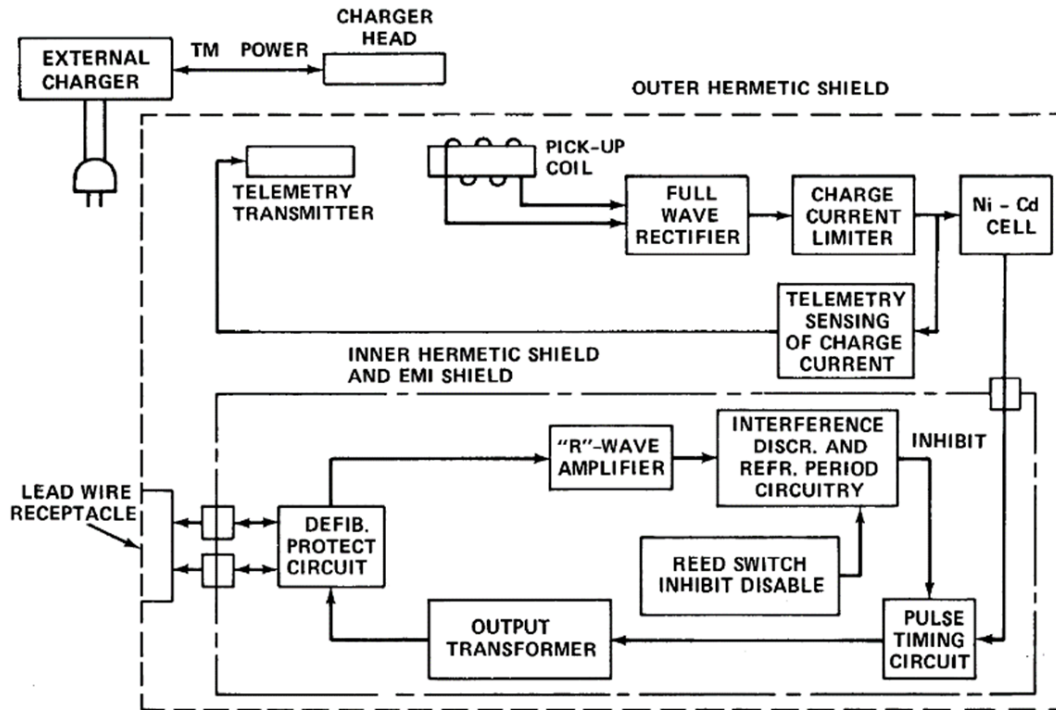


Fig. 8 Block diagram of rechargeable demand pacemaker

Figure 8 of Fischell is a block diagram of the rechargeable cardiac pacemaker system described in Fischell. *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.

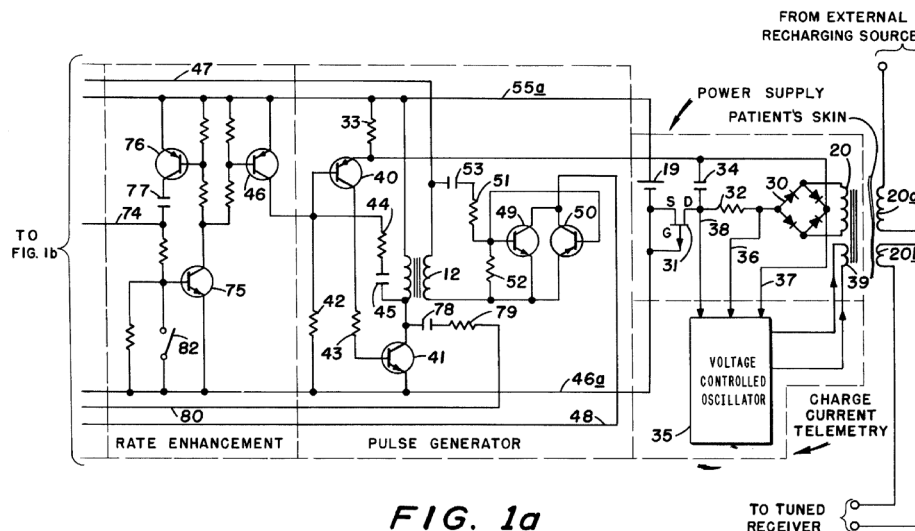
A telemetry transmitter in Fischell communicates back to the external device the charge current in the battery. Ex. 1006, 370–373 (disclosing “a telemetry system is powered whose output frequency from the pacer is proportional to the charge current in the battery”), Fig. 8 (noting a box for telemetry 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

pacemaker 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 pacemaker or stimulator battery.” *Id.* at 1:59–2:3.

Figure 1a of Fischell '260 is reproduced below:



Fischell '260 Figure 1a, together with Figure 1b (not reproduced), is a schematic diagram of circuitry utilized in a rechargeable demand inhibited cardiac pacemaker. *Id.* at 3:27–31. As shown in Figure 1a, electrical power for the electronic circuitry of the proposed pacemaker 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; Pet. Reply 11–14. In regard to claim 3, for example, Petitioner contends Schulman discloses an implantable electrical tissue stimulator with an internal battery (battery 15) coupled to a secondary coil (coils 17 and 18) and an external electrical charging power source with a primary coil (coil 24). Pet. 14–17 (citing, *e.g.*, Ex. 1005, 1:7–11, 2:27–33, 2:36–40, 3:42–46, Figs. 1–4). We focus our discussion on Petitioner’s arguments with regard to the Value Limitation, the Signal Limitation, and the Measured Voltage Limitation, because it is dispositive.

1. Claims 3, 6, 9, 12, 15, and 18

Each of claims 3, 9, and 15 includes the Value Limitation and the Signal Limitation. Each of claims 6, 12, and 18 includes the Value Limitation and the Measured Voltage Limitation. In the Petition, Petitioner contends the Value Limitation and the Signal Limitation of claims 3, 9, and 15 are disclosed by a single input in Schulman. Pet. 22–23, 32–33, 45–46. Similarly, in the Petition, Petitioner contends the Value Limitation and the Measured Voltage Limitation are disclosed by a single input in Schulman. *Id.* at 25–26, 34–35, 48–49. As explained above (*see* Section II.C.1), and not at issue on remand, we determined in the FWD 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.” FWD 26; *Axonics*, 75 F.4th at 1379–80. It is undisputed that Petitioner did not show in the Petition by a preponderance of the evidence that Schulman anticipates any of claims 3, 6, 9, 12, 15, or 18 of the ’148 patent. *See Axonics*, 75 F.4th at 1379–80. We further consider Petitioner’s contentions on remand in light of the new arguments and evidence Petitioner presented in its Reply. *See id.* at 1384.

Petitioner argues 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, 6, 9, 12, 15, and 18.” Pet. Reply 12–14.⁹

⁹ As to whether “the Petition’s mapping” shows Shulman discloses two inputs, Petitioner did not allege in the Petition, much less establish by a preponderance of the evidence, that Schulman disclosed two inputs. *See*,

Specifically, Petitioner argues for the first time in its Reply as follows:

To the extent . . . is not considered an “input,” Schulman discloses that the current through R9 can increase: (1) when the magnitude of charging current passing through the internal battery 15 exceeds a predetermined current (Ex. 1001, 5:22–24; Ex. 1003, ¶70), as described in the Petition (Pet., 19–26; Ex. 1003, ¶¶90–91; POR, 19); and (2) when the voltage across the output leads 51 and 52 exceeds the predetermined maximum amount (Ex. 1001, 5:7–14, 5:36–59, Ex. 1012, ¶¶12–18).

Pet. Reply 12.

Petitioner’s position is in contrast to Dr. Panescu’s original declaration testimony upon which Petitioner relied upon as support for the arguments asserted in the Petition, where Dr. Panescu explained the operation of Schulman and did not state that Schulman disclosed two separate inputs to the external power source. *See, e.g.*, Ex. 1003 ¶¶68–88. Instead, Dr. Panescu explained that “Schulman refers to resistor R9 as ‘current *sampling* resistor’ because resistor R9 provides a measure of the charging current that is supplied to internal battery 15” (citing Ex. 1005, 6:17–19), that “[i]t is in response to the magnitude of this charging current, as sampled by R9, that the frequency of the multivibrator circuit (made up,

e.g., Pet. 22–23, 32–33, 45–46. For example, Petitioner argued in the Petition, in regard to claim 3, that the measured current through R8 in Schulman discloses both the Value Limitation and the Signal Limitation. Pet. 22–23. In its Reply, Petitioner states that the “current passing through R8 tracks the current through R9 and is equal to the current passing through batter[y] 15,” and that “the current passing through R8 and the voltage across it measure the same ‘value.’” Pet. Reply 12. Petitioner does not argue or establish in the Reply that the current through R8 and R9 correspond to “two inputs.” Moreover, Patent Owner explains, and we agree, that Petitioner fails to show how “any value related to resistor R8” is an “input to the external charger that is then used to automatically vary the power output.” *See* APO Sur-reply 13.

in part, of transistors Q2 and Q3) is controlled” (citing *id.* at 4:36–42), and that “[t]his frequency is then telemetered back to the external power source via coil 18” (citing *id.* at 4:45–53). Ex. 1003 ¶ 75. Dr. Panescu proceeded to explain “in greater detail how Schulman teaches that the value (voltage or current) representing the current passing through the internal battery is measured in the implanted device, is telemetered back to the external power source, and varies the power output of the external power source” as follows:

The charging and telemetry circuit shown in FIG. 2 of Schulman includes a “shunt current regulator” made up of transistor Q7 and resistor R8 The function of this shunt current regulator circuit is to regulate the magnitude of the charging current passing through internal battery 15 “at a predetermined current.” [Ex. 1005], 5:22–24. This is accomplished by connecting resistor R8 “in series with the rectified output leads 51 and 52.” [*Id.* at] 5:1–7. The current through R8 reflects the charging current passing through internal battery 15.

For most of the charging operation, the current through R8 tracks the current through R9 as they both reflect the current passing through the battery. The magnitude of the current through R8 is measured by comparing the resulting voltage across R8 to the base-emitter ON-voltage threshold of transistor Q7. As the charging current through R9 increases the current through the battery and therefore the current through R8 also increase. The increased current through R8 will cause the voltage differential at the base-emitter junction of transistor Q7 to increase, which will at some point cause transistor Q7 to turn on and draw an increasing amount of current. Schulman, 5:15–20. This additional current drawn by the collector terminal of Q7 is supplied by the current through sampling resistor R9. The increased current through resistor R9 increases the frequency of the multivibrator Q2/Q3 as explained above. This increase in multivibrator frequency is telemetered back via coil 18 to the external power source, lowering the power output of the external charger to in turn lower the amount of charge current. . . . The

point explained here, however, is that the shunt current regulator, along with the feedback loop controlling external charging signal, operates to regulate the charge current at a predetermined target level. Schulman explains that this base-emitter voltage threshold is 0.4 V: “For example, if one wanted to maintain a charging current of 40 milliamperes into the battery 15, and the base-emitter voltage drop required to initiate conductance in transistor Q7 is 0.4 volts, one would select a resistance value for resistor R8 such that 40 milliamperes would produce a 0.4 voltage differential between the base-emitter leads of transistor Q7.” [*Id.* at] 5:25–31.

Ex. 1003 ¶¶ 77–79.

In a separate portion of his declaration discussing the alleged anticipation of claims 2, 8, and 14 by Schulman, claims not at issue on remand, Dr. Panescu stated in regard to leads 51 and 52 as follows:

Schulman discloses that “[a]ll current up to a *maximum level* will flow through the rectified output leads 51 and 52 to charge the battery 15.” [Ex. 1005], 6:17–19. Schulman further discloses that “any current less than this *maximum* passing through [current sampling] resistor R9 is indicative of inadequate charging of the battery 15.” [*Id.* at] 6:19–21. If a current less than this maximum is detected at current sampling resistor R9, Schulman teaches varying the charging current by “alter[ing] the output of a current control means” in order to attain the maximum charging current. [*Id.* at] 6:41–43. Similarly, if charging current “exceeds a maximum operating level,” the output current is lowered, “result[ing] in a reduced magnetic field strength acting between the induction coils 19, 20 and 21 of the power source and induction coils 17 and 18 the charging circuit.” [*Id.* at 7:25–29.] In other words, Schulman also teaches ensuring that the charging current does not exceed a maximum value so as to maintain the charging current at the maximum level. Additionally, elements Q7/R8 and VR1 provide further protection in ensuring that the battery 15 charging current does not exceed a maximum level. Thus Schulman monitors and regulates the charging current such that current passing through

the battery comprises a maximum amount of current for charging the battery.

Ex. 1003 ¶ 89. Thus, Dr. Panescu's testimony makes clear that the only input to the external power source he identified in his original declaration as being disclosed by Schulman is the current sampled by R9, corresponding to the Value Limitation. Indeed, Dr. Panescu maintained throughout the proceeding that nothing more was required of the challenged claims.

Ex. 1012 ¶ 10 (Dr. Panescu stating that he understood that "Dr Mihran's opinion is that a person of ordinary skill in the art would have understood each wherein clause in claims 3, 9, 15, and 18 to require a separate respective input (first, a 'value associated with said current passing through said internal battery'; and second, for claims 3, 9, 15, and 18, a 'signal proportional to said current passing through said internal batter', for claims 6 and 12, 'a measured voltage associated with said current passing through said internal battery') used by the external power source as a basis for automatically varying its power output," and that he "disagree[d], at least for the reasons set forth in [his] prior declaration").

In his Supplemental Declaration, Dr. Panescu stated that "if" the challenged claims require two separate inputs that are used by the external power source, then Schulman discloses "two situations" when the current through "current sampling resistor R9" can increase, which results in there being two inputs. Ex. 1012 ¶¶ 11–12. As to the first "situation," Dr. Panescu identifies "when the magnitude of the charging current passing through the internal battery 15 exceeds a predetermined current," as corresponding to "automatically varying the output power of the external power source based on a measured current or value." *Id.* ¶¶ 12–15. According to Dr. Panescu, Schulman discloses as follows:

When the current through the internal battery, as measured by current regulator R8/Q7, increases above a predetermined target value (40mA), the current regulator turns on, increasing the current through current sampling resistor R9. That in turn increases the telemetered multivibrator output frequency which causes the power supplied by the external power source to decrease. This feedback loop operates in reverse as well, whereby when there is inadequate charging, the loop operates to increase the power supplied by the external power source. In this manner Schulman teaches *automatically varying the output power of the external power source based on a measured current or value*.

Ex. 1012 ¶ 14. In his Supplemental Declaration, Dr. Panescu cites no support from Schulman for his opinion in this regard. *See id.* ¶¶ 12–14.

By contrast, in his Rebuttal Declaration, Dr. Mihran disputes Dr. Panescu’s new description of the operation of Schulman, noting that the current through R9 is not increased as a result of the current regulator R8/Q7 turning on, but that “[i]nstead, it is the increase in current through R9 in excess of the desired 40 mA operating current that causes the current regulator R8/Q7 to turn on, which acts to shunt this excess current through Q7, thereby diverting it away from the battery to maintain the desired operating condition during charging.” Ex. 2010 ¶ 6 n.3 (citing Ex. 1005, 5:2–7, 5:15–38, 9:57–68). We credit the testimony of Dr. Mihran, as supported by the cited portions of Schulman, over the unsupported testimony of Dr. Panescu in regard to how Schulman operates to measure current at R9. *See id.* However, whether Schulman discloses automatically varying the output power of the external power source based on a value associated with current passing through the internal battery, as required by the Value Limitation, is not in dispute. Dr. Mihran, for example, states that “Schulman discloses that the sole input provided to the external power

source that the external power source uses to automatically regulate its power output is the input that derives from the amount of current flowing through the current sampling resistor R9.” Ex. 2010 ¶ 5 (citing, *e.g.*, Ex. 1005, 4:45–53, 6:35–38).

As to the second “situation,” Dr. Panescu identifies “when the voltage across the output leads 51 and 52 exceeds the predetermined maximum amount” as corresponding to both the Signal Limitation and the Measured Voltage Limitation. Ex. 1012 ¶¶ 12, 15–16. Specifically, Dr. Panescu states as follows:

When the voltage across leads 51 and 52 exceeds a predetermined amount, a current starts to flow through the zener diode VR1 to limit this increased voltage. As the zener diode VR1 draws current, the current through current sampling resistor R9 increases. That in turn increases the telemetered multivibrator output frequency which causes the power supplied by the external power source to decrease. In this manner Schulman teaches automatically varying the output power of the external power source based on a measured voltage or a signal, where the signal is the voltage across the output leads 51 and 52.

Id. ¶ 16 (emphasis omitted). In his Supplemental Declaration, Dr. Panescu cites no support from Schulman for his opinion in this regard. *See id.*; *see also* APO Sur-reply 15 (Patent Owner arguing that Petitioner “simply alleges that the current through R9 will be increased if the zener diode turns on”). Dr. Panescu also does not address why the voltage across leads 51 and 52 would constitute a “separate” input from the measured current at R9, where, as here, the Signal Limitation and the Measured Value Limitation require a separate input from the Value Limitation based upon which the external power source automatically varies the power output.

Patent Owner argues, and we agree, that the measured current through R9 is the only input to the external power source Schulman

discloses to automatically vary the output of the external power source. *See* APO Sur-reply 14–15. Patent Owner further argues, and we further agree, that the voltage across output leads 51 and 52 of Schulman is not an input to the external power source separate from the measured current through R9 in Schulman. *See* APO Sur-reply 11–16 (citing, *e.g.*, Ex. 1003 ¶ 75; Ex. 2002 ¶ 46; Ex. 1005, 6:35–38; Ex. 2010 ¶¶ 4–7).

In support of Patent Owner, Dr. Mihran states that “[t]he voltage between nodes 51 and 52 is never provided to the external power source in Schulman.” Ex. 2010 ¶ 4. According to Dr. Mihran, “Schulman discloses that the sole input provided to the external power source that the external power source uses to automatically regulate its power output is the input that derives from the amount of current flowing through the current sampling resistor R9.” *Id.* ¶ 5 (emphasis omitted) (citing Ex. 1005, 4:45–53, 6:35–38; Ex. 2002 ¶ 46). Dr. Mihran further states as follows:

My understanding of Dr. Panescu’s opinion is that he does not contend that the voltage between nodes 51 and 52 is ever sent to the external power source as an input, and instead simply asserts that if “the voltage across leads 51 and 52 exceeds a predetermined amount,” then the current through R9 increases, which in turn “causes the power supplied by the external power source to decrease.” (Ex. 1012 at ¶16.) This does not represent a separate input, however, because the input derived from the current flowing through the current sampling resistor R9 (i.e. the load modulation frequency of telemetry circuit 12, the components of which “form a free-running multivibrator”) is what Dr. Panescu also identifies as satisfying the first input, “a value associated with said current passing through said internal battery.” (Ex. 1012 at ¶14 (“when the current through the internal battery . . . increases above a predetermined target value, the current regulator turns on, increasing the current through current sampling resistor R9.”))

Ex. 2010 ¶ 5 (emphasis omitted). According to Dr. Mihran, “various operating conditions may influence the value” of the amount of current flowing through current sampling resistor R9, and the current through R9 is the “only value that is communicated to the external power source,” corresponding to a single input that “cannot satisfy both of the two inputs required by claims 3, 6, 9, 12, 15, and 18 of the ’148 patent.” *Id.* ¶ 6.

Dr. Mihran further states as follows:

I understand Dr. Panescu’s opinion to be that, because Schulman discloses that the current through R9 is used by the external charger to automatically vary its output, any “value” that influences the amount of current through resistor R9 is a “separate respective input[] used by the external power source as a basis for automatically varying its power output.” ([Ex. 1012 ¶14].) In other words, Dr. Panescu simply identifies a voltage across two points in the circuit that he claims affects the current through R9 and contends that that voltage satisfies one of the two required separate inputs based on its alleged *indirect* impact on the output of the external charger. This strained interpretation of the claims renders superfluous the two separate inputs to the external power source required by claims 3, 6, 9, 12, 15, and 18 of the ’148 patent: (1) “a value associated with said current passing through said internal battery” and (2) “a signal proportional to said current passing through said internal battery” (claims 3, 9, and 15) and “measured voltage associated with said current passing through said internal battery” (claims 6, 12, and 18). In any circuit, there may be multiple components (e.g., transistors, switches, diodes, etc.) that can influence the current through a particular resistor. For example, in Schulman the current drawn by the stimulation portion of the implant circuit will influence the amount of current through R9. Dr. Panescu’s interpretation that a voltage or current at these components represents a “separate input” in Schulman is incorrect, because the sole input that is telemetered back to the external charger is the input derived from the amount of current flowing through R9.

Ex. 2010 ¶ 7.

We find that because it is largely unsupported and conclusory, the opinion of Dr. Panescu in his Supplemental Declaration that “Schulman teaches automatically varying the output power of the external power source based on a measured voltage or a signal, where the signal is the voltage across the output leads 51 and 52,” is entitled to little weight. *See* Ex. 1012 ¶ 16 (emphasis omitted). In his original declaration, Dr. Panescu made clear that, according to Schulman, the output of the external power source was lowered if the charging current, as measured at sampling resistor R9, “exceeds a maximum operating level,” not because of the voltage across output leads 51 and 52. *See* Ex. 1003 ¶ 89; *see also* Ex. 1005, 7:25–29 (stating that “when the current passing through resistor R9 in the charging circuit exceeds a maximum operating level, the signal from circuit 59 will lower the output current from current control means 60”).

Petitioner does not allege that any measurement of voltage across output leads 51 and 52 in Schulman is conveyed to an external power source to automatically vary its power output. Instead, Petitioner’s argument is premised on the notion that if the voltage across leads 51 and 52 exceeds a predetermined amount, then it will affect the current sampled by resistor R9. We also find persuasive Dr. Mihran’s testimony that Petitioner’s strained interpretation renders the Value Limitation superfluous to the Signal Limitation and the Measured Voltage Limitation because the voltage across leads 51 and 52 was not shown by Petitioner to be a separate input to the external power source. *See* Ex. 2010 ¶ 7 (explaining that “there may be multiple components (e.g., transistors, switches, diodes, etc.) that can influence the current through a particular resistor,” and that influencing the current measured at R9 does not constitute a separate input to the external charger from the measured current at R9).

To be clear, we need not resolve whether the challenged claims require each separate input be separately conveyed to the external power source. Here, the burden to show anticipation is on Petitioner and Petitioner offers no persuasive evidence or explanation to establish by a preponderance of the evidence that a person of ordinary skill in the art would have understood the voltage across output leads 51 and 52 corresponds to “a signal” or “a measured voltage” based upon which the external power source “automatically” varies its power output, as required by the challenged claims. Nor does Petitioner explain, based on persuasive evidence, why a person of ordinary skill in the art would have understood the voltage across leads 51 and 52 in Schulman to be a separate input from the measured current at R9 when, at most, Petitioner alleges the voltage across leads 51 and 52 may, in certain circumstances, have some effect on the measured current at R9, itself. Thus, Petitioner does not show by a preponderance of the evidence that Schulman discloses to a person of ordinary skill in the art two separate inputs to the external power source, as Petitioner conceded is required by the Value Limitation and the Signal Limitation or the Measured Voltage Limitation.

Petitioner’s additional new arguments in its Post Remand Brief do not lead to a different conclusion. Pet. PRB 1–5. According to Petitioner, Dr. Mihran confirmed that in Schulman “current through R9 is used by the external power source to automatically vary its output, and the voltage has at least an ‘indirect impact on the output.’” *Id.* at 2 (citations omitted). Petitioner directs us to no argument in its Reply that expressly asserted an “indirect impact” on measured current corresponded to the Signal Limitation or the Measured Voltage Limitation and neither of Petitioner’s allegations

show that the voltage across leads 51 and 52 is a separate input to the external power source for the same reasons discussed above.

The remainder of Petitioner's arguments in its Post Remand Brief are directed to accusations that Patent Owner's arguments are "untimely and wrong," "incorrect," and "contradictory of the positions on infringement it has taken in district court." *Id.* at 2–5. Our decision, however, does not turn on any of the alleged Patent Owner arguments or district court positions that Petitioner disputes. As the Federal Circuit has explained, "[i]n an inter partes review, the burden of persuasion is on the petitioner to prove 'unpatentability by a preponderance of the evidence,' 35 U.S.C. 316(e), and that burden never shifts to the patentee." *Dynamic Drinkware, LLC v. Nat'l Graphics, Inc.*, 800 F.3d 1375, 1378 (Fed. Cir. 2015).

Specifically, we find no merit in Petitioner's argument that, based on the deposition testimony of Dr. Mihran, Patent Owner "abandoned" arguments made in Patent Owner's Sur-reply. Pet. PRB 2 (citing Ex. 1020, 86:1–24). Dr. Mihran explained that whether "an input needs to be telemetering from the implant to charger" was not the basis of his opinion, but that the challenged claims require "two separate" inputs to the external power source "used as distinct or separate considerations or inputs for making decisions about controlling output power." Ex. 1020, 86:1–24. Petitioner also mischaracterizes Patent Owner's arguments on whether a "value" must be a "measurement," and alleges Patent Owner "disavowed arguing measurement." Pet. PRB 2 (citing JBRPRP 79–80; APO Sur-reply 14–15). Contrary to Petitioner's assertions, Patent Owner argued that Petitioner relied on "the current through R9" in Schulman as the "only measurement provided to the external power source," and that "[t]he single

measurement for resistor R9 cannot satisfy the requirements of two inputs.”
APO Sur-reply 14–15.

We also are not persuaded by Petitioner’s argument that Patent Owner’s “only remaining theory” is that Petitioner failed to show that “the voltage ‘can be *determined* from the current through . . . R9.” Pet. PRB 2 (citing APO Sur-reply 11–12). Petitioner again mischaracterizes Patent Owner’s argument, which stated “Petitioner does not explain how the voltage across leads 51 and 52 can be determined from the current through resistor R9 and simply alleges that the current through resistor R9 will be increased if the zener diode turns on.” APO Sur-reply 15 (emphasis omitted).

Petitioner also asserts that Dr. Mihran explained in his deposition that in his view a person of ordinary skill in the art would have understood “separate inputs” as meaning that they are “distinguishable,” particularly upon receipt at the external source. Pet. PRB 3 (citing Ex. 1020, 87:2–88:8). Our determination does not turn on whether two inputs must be distinguishable at the external source, but on Petitioner’s failure to show that a person of ordinary skill in the art would have understood Schulman to disclose two inputs, as explained above. Petitioner further argues that “the claims do not impose the requirements [Patent Owner] seeks: the charger distinguishing or determining the values, telemetry, or two measurements.” *Id.* According to Petitioner, the challenged claims “do not require charger-side software that determines or distinguishes values on the charger side,” “do not require multiple communication pathways,” and do not “require measurement for both ‘wherein’ clauses.” *Id.* at 4. Petitioner’s arguments are not persuasive because our determination is not based on any of the “requirements” Petitioner alleges Patent Owner seeks to impose.

Moreover, we don't find Patent Owner's identification of an absence of evidence from Petitioner to be equivalent to an effort by Patent Owner to impose "new" requirements. For example, Patent Owner arguing that Schulman does not disclose a separate input separately conveyed to the external power source is relevant to whether Schulman discloses two inputs, even if the challenged claims do not require that each separate input be separately conveyed. That is because, had Petitioner identified evidence that Schulman discloses a value conveyed to the external charger separate from the measured current, that would have been relevant to whether Schulman discloses two inputs. The absence of such evidence is likewise relevant, even if the challenged claims do not require each separate input be separately conveyed from the implant to the external charger. Ultimately, however, our determination is based on Petitioner's failure to show that Schulman discloses two inputs to the external power source corresponding to the Value Limitation and the Signal Limitation or the Measured Voltage Limitation.

Petitioner also argues that Patent Owner takes positions "directly contradictory of the positions on infringement it has taken in district court." Pet. PRB 5. According to Petitioner, Patent Owner alleges in district court infringement based on "source code variables that are never sent to the charger." *Id.* (citing Ex. 1021, 3–4). As noted above, we need not resolve whether the challenged claims require each separate input be separately conveyed to the external power source. Moreover, our determination is not based on contentions either Party makes in district court. *See also* PO PRB 5 (arguing that Petitioner's characterizations of infringement contentions "is irrelevant as to how Petitioner alleges Schulman discloses the two-input limitation" and that there is no conflict in the positions Patent

Owner has taken in district court). For the foregoing reasons, we determine Petitioner does not show by a preponderance of the evidence that Schulman anticipates any of claims 3, 6, 9, 12, 15, or 18 of the '148 patent.

2. 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 does not show by a preponderance of the evidence that Schulman anticipates any of claims 3, 9, or 15, for the same reasons Petitioner does not show by a preponderance of the evidence that Schulman anticipates any of claims 4, 5, 10, 11, 16, or 17, which depend from one of claims 3, 9, or 15.

F. Alleged Anticipation by Fischell

Petitioner contends that claims 3, 4, 9, 10, 15, and 16 of the '148 patent are anticipated by Fischell. Pet. 49–76; Pet. Reply 15–18. For example, in regard to claim 3, Petitioner contends that Fischell discloses an implantable cardiac pacemaker with a pick-up coil, an external charger with a charger head and inductive coil, and a system that uses “telemetry by means of pulse rate to measure battery voltage” and “telemetry by means of a frequency modulated signal from the pulse generator into the external charger to measure and control charge current into the battery.” Pet. 51–59 (citing, *e.g.*, Ex. 1003 ¶¶ 95–98; Ex. 1006, 357, 364, 367–368, 371–373, 378, Fig. 8). Petitioner did not address anticipation by Fischell at the oral argument following remand or in its post remand brief. *See* Pet. PRB; Paper 85, 15:13–16:4 (Petitioner stating that it “rested on the prior briefing” in regard to allegations based on Fischell). 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. In the Petition, Petitioner contends that the Value Limitation and the Signal Limitation are disclosed by the same disclosure of a single input in Fischell. Pet. 58, 59, 65, 66, 75, 76. As explained above (*see* Section II.C.1), and not at issue on remand, we determined that “the Value Limitation and the Signal Limitation . . . require two separate inputs to the external power source.” FWD 26; *Axonics*, 75 F.4th at 1379–80. It is, therefore, undisputed on remand that Petitioner did not show in the Petition by a preponderance of the evidence that Fischell anticipated any of claims 3, 9, or 15 of the ’148 patent. *See Axonics*, 75 F.4th at 1379–80. We further consider Petitioner’s contentions on remand in light of the new arguments and evidence Petitioner presented in its Reply. *See id.* at 1384.

Petitioner argues 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,’ Fischell still anticipates claims 3, 9, and 15.” Pet. Reply 16. Specifically, Petitioner argues that Fischell discloses a telemetry system that provides battery voltage and charge current. *Id.* at 16–17 (citing Ex. 1006, 370, 372, 373, 380; Ex. 1012 ¶¶ 23–27). Fischell states that it provides a “telemetry system . . . by means of which battery voltage and charge current can be accurately determined.” Ex. 1006, 380. Petitioner directs us to no persuasive evidence that Fischell expressly discloses both the Value Limitation and the Signal Limitation. Instead, according to Dr. Panescu, Fischell “clearly teaches that the charge current value . . . is strongly linked to the charge voltage value.” Ex. 1012 ¶ 25. Dr. Panescu further states as follows:

In Fig. 8, Fischell Article [Ex. 1006] teaches how telemetry can be used to control the amount of charging energy emitted by the external charger. Fischell Article explicitly explains how the charging current value can be used to automatically control the external charger to achieve an optimal charging of the implanted device battery. . . . [T]he values of charging current and of charging voltage are strongly correlated. Therefore, Fischell Article's telemetry circuit can be indirectly understood to be capable of controlling the charging energy of the external charger based on the charging voltage determined for the implanted device battery.

Id. ¶ 27. From this, Dr. Panescu states that he believes Fischell “teaches separate respective inputs used by the external power source as a basis for automatically varying its power output” and that he believes claims 3, 9, and 15 are anticipated by Fischell. *Id.* ¶¶ 28–29.

Patent Owner argues, and we agree, that Petitioner's allegations and evidence of how Fischell “can be indirectly understood to be capable of” controlling charging based on charging voltage are insufficient to show anticipation of any challenged claim by Fischell, because Petitioner's allegations are based only on insufficiently supported speculation and do not show that a person of ordinary skill in the art would have understood Fischell to disclose two inputs to the external charger. APO Sur-reply 16–18. Moreover, Patent Owner establishes that in Fischell the “battery voltage is not used to control charge current into the battery.” *Id.* at 18 (citing Ex. 1006, 372–373; Ex. 2010 ¶¶ 11–12). Even if the “charge current value . . . is strongly linked to the charge voltage value,” as asserted by Petitioner, that does not show Fischell contemplates, much less discloses to a person of ordinary skill in the art, what is required by the Value Limitation and the Signal Limitation. We further find Dr. Mihran's supporting testimony deserves greater weight than Dr. Panescu in this regard, because

Dr. Mihran's testimony is supported by and consistent with the express disclosures of Fischell he cites. *See* Ex. 2010 ¶¶ 11–12 (citing Ex. 1006, 272, 370–373). Accordingly, we determine Petitioner does not show by a preponderance of the evidence that Fischell anticipates any of claims 3, 9, or 15 of the '148 patent.

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 does not show by a preponderance of the evidence that Fischell anticipates any of claims 3, 9, or 15, for the same reasons Petitioner does not show by a preponderance of the evidence that Fischell anticipates any of claims 4, 10, or 16, which depend from one of claims 3, 9, or 15.

*G. Alleged Obviousness over the Combination of
Fischell 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 Fischell and Fischell '260. Pet. 77–96; Pet. Reply 18–25. Petitioner did not address alleged obviousness over Fischell and Fischell '260 in its post remand brief or at the oral argument following remand. *See* Pet. PRB; Paper 85, 15:13–16:4 (Petitioner stating that it “rested on the prior briefing” in regard to allegations based on Fischell).

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. Claims 5,

11, and 17 further recite either “wherein said external power source” (claims 5 and 11) or “wherein said automatically varying step” (claim 17) “automatically varies its power output based on a voltage proportional to said current passing through said internal battery.” *Id.*

In the FWD, we determined that because Petitioner only contends in the Petition that the Value Limitation and the Signal Limitation of claims 5, 11, and 17 are taught by Fischell based on the same arguments Petitioner advances in support of its contention that Fischell anticipates claims 3, 9, and 15, Petitioner failed to show in the Petition by a preponderance of the evidence that any of claims 5, 11, or 17 would have been obvious over the combination of Fischell and Fischell ’260. FWD 42–43 (citing Pet. 81–84, 88, 92). That determination is not at issue on remand. *Axonics*, 75 F.4th at 1379–1380, 1384 (stating that Petitioner “does not argue the Board erred in adopting the two-input claim construction, only that the Board erred in refusing to consider [Petitioner’s] reply arguments and evidence under the two-input construction,” and remanding “for the Board to consider [Petitioner’s] arguments and evidence under the two-input claim construction”). It is, therefore, undisputed on remand that Petitioner did not show in the Petition by a preponderance of the evidence that the subject matter of any of claims 5, 11, or 17 would have been obvious over Fischell and Fischell ’260. *See id.* We further consider Petitioner’s contentions on remand in light of the new arguments and evidence Petitioner presented in its Reply. *See id.* at 1384.

In its Reply, Petitioner argues that “if the Board adopts [Patent Owner’s] claim construction, the Fischell 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 power source.” Pet.

Reply 20. Petitioner provides no obviousness analysis of claims 5, 11, and 17. *See id.* Instead, Petitioner asserts claims 5, 11, and 17 would have been obvious over Fischell and Fischell '260 “for the same reasons”

Petitioner argues in regard to claims 6, 12, and 18, which we discuss below. Claims 5, 11, and 17 include the Signal Limitation. Claims 6, 12, and 18 include the Measured Voltage Limitation. Petitioner does not show that the same teachings of the same art that would have allegedly rendered the Measured Voltage Limitation obvious necessarily also renders obvious, for the same reasons, the Signal Limitation. Accordingly, we find, based on Petitioner’s lack of analysis of claims 5, 11, and 17, that Petitioner fails to show any of claims 5, 11, and 17 would have been obvious over Fischell and Fischell '260. Moreover, to the extent that Petitioner relies on its obviousness analysis of claims 6, 12, and 18 to show the obviousness of claims 5, 11, and 17, because we find Petitioner’s showing insufficient as to claims 6, 12, and 18 for the reasons provided below, we likewise find Petitioner fails to show any of claims 5, 11, or 17 would have been obvious over Fischell and Fischell '260 for the same reasons provided below.

2. *Claims 6, 12, and 18*

Each of independent 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. In the Petition, Petitioner relies only on Fischell as disclosing both of these limitations through a single input. *See* Pet. 77–82, 84–96. Specifically, Petitioner contends in the Petition as follows:

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, 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 does not inherently teach that limitation, it certainly suggests it.

Id. at 81–82. Petitioner relies in the Petition on Fischell '260 only to the extent that Fischell is insufficiently detailed regarding control based on voltage, not as disclosing a second input. *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 Fischell as teaching a single input in the Petition).

In the FWD, we determined that, because Petitioner failed to show in the Petition that Fischell “teaches two inputs corresponding to both the Value Limitation and the Signal Limitation,” Petitioner failed to show in the Petition by a preponderance of the evidence that Fischell, alone or in combination with Fischell '260, “teaches both the Value Limitation and the Measured Voltage Limitation.” FWD 44. That determination is not at issue on remand. *Axonics*, 75 F.4th at 1379–1380, 1384 (stating that Petitioner “does not argue the Board erred in adopting the two-input claim construction, only that the Board erred in refusing to consider [Petitioner's] reply arguments and evidence under the two-input construction,” and remanding “for the Board to consider [Petitioner's] arguments and evidence under the two-input claim construction”). It is, therefore, undisputed on remand that Petitioner did not show in the Petition by a preponderance of the evidence that the subject matter of any of claims 6, 12, or 18 would have

been obvious over Fischell and Fischell '260. *See id.* We further consider Petitioner's contentions on remand in light of the new arguments and evidence Petitioner presented in its Reply. *See id.* at 1384.

In its Reply, Petitioner argues 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,' Fischell and Fischell '260 still render obvious claims 6, 12, and 18." Pet. Reply 18. Petitioner asserts that Patent Owner "does not dispute that Fischell '260 teaches at least one 'input' of a 'measured voltage.'" *Id.* (citing PO Resp. 33–34). Petitioner also contends that "Fischell teaches a feedback telemetry system that automatically varies the power of the external power source based on measuring the battery charge current in the pacemaker," and that "charge current is a 'value.'" *Id.* at 19 (citing Ex. 1003 ¶¶ 95–98; Ex. 1006, 371–373, 378). From this, Petitioner concludes that "Fischell and Fischell '260 teach every limitation" of claims 6, 12, and 15. *Id.*

Patent Owner argues that Petitioner "attempts to re-characterize" its obviousness allegations in the Petition, which were based on Petitioner's contention that the challenged claims only require a single input, to argue the same challenged claims would have been obvious for the same reasons even if the claims require two inputs. APO Sur-reply 20. As Patent Owner explains, Petitioner's allegations of obviousness over Fischell and Fischell '260 in the Petition were directed to showing that it would have been obvious for a single input to satisfy both the Value Limitation and the Measured Voltage Limitation based on Petitioner's proposed "modification to Fischell's system such that the telemetered signal was a measured voltage, or voltage proportional to, the current passing through the battery." *Id.*

Petitioner alleges for the first time in its Reply that the asserted combination teaches two inputs, and Patent Owner argues that Petitioner's new allegations are "insufficient to establish a *prima facie* case of obviousness," because "Petitioner does not point to any teaching or suggestion (e.g., in Fischell or Fischell '260) that two different inputs would have been used by the proposed combination for varying the power output of the external power source." APO Sur-reply 21 (citing *KSR*, 550 US at 418 (an invention "composed of several elements is not proved obvious merely by demonstrating that each of its elements was, independently, known in the prior art"))). Patent Owner also argues that "Petitioner is unable to point to anything in the Petition where it provided any contention or evidence that a [person of ordinary skill in the art] would have had a reasonable expectation of success" in regard to the asserted combination of Fischell and Fischell '260. *Id.* at 22–23 (citing *KEYnetik, Inc. v. Samsung Elecs. Co., Ltd.*, 841 Fed. App'x. 219, 228 (Fed. Cir. 2021) (holding "[t]he Board erred in assigning no burden to [Petitioner]" to show a reasonable expectation of success); *Redline Detection, LLC v. Star Envirotech, Inc.*, 811 F.3d 435, 449 (Fed. Cir. 2015)).

Petitioner's new arguments in reply have no evidentiary support to establish that a person of ordinary skill in the art would have had reason to combine Fischell and Fischell '260 in the manner asserted. Dr. Panescu's declaration in support of Petitioner's Reply (Exhibit 1012) does not address obviousness, much less support Petitioner's new reply allegations based on obviousness. Petitioner argues in its Reply that Patent Owner does not "rebut the full scope of arguments Petitioner made regarding motivation to combine" in the Petition, but the burden is on Petitioner to show a motivation to combine in light of its new arguments in reply that the asserted

art teaches two inputs. In the Petition, Petitioner argued that the challenged claims only required a single input and that a person of ordinary skill in the art “would have been motivated to combine the teachings of Fischell ’260 with Fischell Article to take advantage of the improvements offered by the detailed implementation of the rechargeable pacer offered by Fischell ’260.” Pet. 81 (citing Ex. 1003 ¶¶ 101–103). Petitioner offers no persuasive explanation, and no evidence, that the same rationale supports the new asserted combination in the Reply of features that allegedly teach two inputs. *See* Pet. Reply 20–24.

Petitioner also failed to show a person of ordinary skill in the art would have had a reasonable expectation of success. The only argument Petitioner directs us to from the Petition is Petitioner allegation that “Fischell ’260 teaches a detailed implementation for ‘POWER SUPPLY’ and ‘CHARGE CURRENT TELEMETRY’ blocks in FIG. 1a of Fischell.” Pet. Reply (quoting Pet. 80–81). Petitioner provided no argument or evidence that a person of ordinary skill in the art would have had a reasonable expectation of success in combining Fischell and Fischell ’260, as alleged for the first time in its Reply, to arrive at the two inputs required by the Value Limitation and the Measured Voltage Limitation. Lastly, Petitioner argues for the first time in its Reply that a reasonable expectation of success is shown by the ’148 patent, itself, which uses a telemetry system configured “in a conventional manner.” Pet. Reply 25 (citing Ex. 1001, 7:33–8:14). Petitioner provides no evidence other than attorney argument to show that how the ’148 patent is configured establishes by a preponderance of the evidence that a person of ordinary skill in the art would have had a reasonable expectation of success in combining different single inputs taught in Fischell and Fischell ’260 into a two-input system, which neither asserted

reference teaches or suggests. For all of the foregoing reasons, we determine Petitioner does not show by a preponderance of the evidence that the subject matter of any of claims 5, 6, 11, 12, 17, or 18 would have been obvious over the asserted combination of Fischell and Fischell '260.

III. CONCLUSION

In sum, based on the entire record, Petitioner does not show the unpatentability of any of claims 3–6, 9–12, 15–18 of the '148 patent by a preponderance of the evidence, as summarized in the table below:

Claims	35 U.S.C. §	Reference(s)	Claims 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		3, 4, 9, 10, 15, 16
5, 6, 11, 12, 17, 18	103	Fischell, 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 were not 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.

IPR2020-00712
Patent 8,738,148 B2

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