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Paper 45
Date: September 13, 2021

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

AXONICS, INC.,
Petitioner,

v.

MEDTRONIC, INC.,
Patent Owner.

IPR2020-00678
Patent 7,774,069 B2

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

JESCHKE, *Administrative Patent Judge*.

JUDGMENT
Final Written Decision
Determining Some Challenged Claims Unpatentable
35 U.S.C. § 318(a)

I. BACKGROUND

Petitioner, Axonics, Inc.,[1] challenges claims 5–9 (the "Challenged Claims") of U.S. Patent No. 7,774,069 B2 (Ex. 1001, "the '069 patent"), which is assigned to Patent Owner, Medtronic, Inc. We have jurisdiction under 35 U.S.C. § 6, and we issue this Final Written Decision under 35 U.S.C. § 318(a) and 37 C.F.R. § 42.73. For the reasons below, we conclude that Petitioner has proven, by a preponderance of the evidence, the unpatentability of claims 5, 6, 8, and 9, but has *not* proven the unpatentability of claim 7.

A. Procedural History

Petitioner filed a Petition seeking *inter partes* review of the Challenged Claims. Paper 1 ("Pet."). Patent Owner filed a Preliminary Response. Paper 6. We instituted trial as to the Challenged Claims. Paper 8 ("Decision on Institution" or "Dec. Inst.").

During the trial, Patent Owner filed a Response (Paper 15, "PO Resp."), Petitioner filed a Reply (Paper 19, "Pet. Reply"), and Patent Owner filed a Sur-reply (Paper 34, "PO Sur-reply"). Patent Owner filed a list of allegedly improper arguments and evidence from Petitioner's Reply (Paper 23), to which Petitioner responded (Paper 26). Similarly, Petitioner filed a list of allegedly improper arguments and evidence from Patent Owner's Sur-reply (Paper 37), to which Patent Owner responded (Paper 38).

Petitioner relies on the declaration testimony of Dr. Dorian Panescu, filed with the Petition (Ex. 1003, "Panescu Pet. Decl.") and the Reply

[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.

(Ex. 1012, "Panescu Reply Decl."). Patent Owner relies on the declaration testimony of Dr. Richard T. Mihran, filed with the Response. Ex. 2002 ("Mihran Decl."). A consolidated oral argument in this proceeding and two related proceedings (IPR2020-00680 and IPR2020-00712) was held on June 17, 2021, and a copy of the transcript of that argument was entered into the record. Paper 44.

B. Related Proceedings

The parties identify a proceeding in the U.S. District Court for the Central District of California involving the '069 patent: *Medtronic, Inc. v. Axonics Modulation Technologies, Inc.*, No. 8:19-cv-02115-DOC-JDE (C.D. Cal.), filed November 4, 2019 (the "California Litigation"). Pet. 56; Paper 4 (Patent Owner's Mandatory Notices) at 2. The California Litigation is currently stayed.

Petitioner also challenges U.S. Patent Nos. 8,457,758 B2 and 8,738,148 B2, which issued from child applications of the '069 patent, in IPR2020-00680 and IPR2020-00712, respectively. Paper 4 at 2.

C. The '069 Patent

The '069 patent is directed to charging an implantable medical device having a battery, such as a cardiac pacemaker. Ex. 1001, code (57), 1:12–20. Rather than remove and re-implant the device whenever the battery is about to run out, the device provides for transcutaneous ("through-skin") energy transfer using inductive coupling to charge a rechargeable battery. *Id.* at 1:45–50. To recharge the battery of the implanted device, an external power source is temporarily positioned on the surface of the skin. *Id.* at 1:52–56. An induction coil in the external power source transfers energy to an induction coil in the implanted device. *Id.* at 2:8–19. The efficiency of

the energy transfer is dictated by how well the two coils are aligned with one another. *Id.* at 2:58–3:24. The '069 patent explains that it improves existing systems by providing an indication of the alignment between the coils, as well as varying the power output of the external power source in order to generate the predetermined level of current in the implanted device. *Id.* at 3:44–55.

D. Illustrative Claim

Petitioner challenges claims 5–9, of which only claim 5 is independent. Independent claim 5 is reproduced below, reformatted from the version provided in the '069 patent, with Petitioner's designations added to identify each clause (*see* Pet. 20–29), and with emphasis added to language relevant to the discussion below:

> 5. [5.0] A system for transcutaneous energy transfer, comprising:
>
> [5.1(a)] an implantable medical device having componentry for providing a therapeutic output, [5.1(b)] said implantable medical device having an internal power source and a secondary coil operatively coupled to said internal power source, [5.1(c)] said implantable medical device adapted to be implanted in a patient;
>
> [5.2(a)] an external power source having a primary coil, [5.2(b)] said external power source providing energy to said implantable medical device when said primary coil of said external power source is placed in proximity of said secondary coil of said implantable medical device [5.2(c)] and thereby *generating a current through said internal power source*;
>
> [5.3(a)] an alignment indicator, operatively coupled to said internal power source, [5.3(b)] *measuring said current* and reporting an alignment between said primary coil and said secondary coil based on said current; and

[5.4] wherein said external power source automatically varies its power output in order to generate a predetermined current in said internal power source.

Ex. 1001, 23:22–42.

E. Asserted Grounds of Unpatentability

Petitioner challenges claims 5–9 on the following grounds:

Claim(s) Challenged	35 U.S.C. §[2]	Reference(s)/Basis
5, 8	102(b)	Schulman[3]
6, 7, 9	103(a)	Schulman, Baumann[4]
5, 8	102(b)	Fischell[5]
6, 7, 9	103(a)	Fischell, Baumann

II. DISCUSSION

A. The Level of Ordinary Skill in the Art

The level of ordinary skill in the art is "a prism or lens" through which we view the prior art and the claimed invention. *Okajima v. Bourdeau*, 261

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[2] 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 Challenged Claims of the '069 patent have an effective filing date before March 16, 2013, we apply the pre-AIA versions of these statutes.

[3] U.S. Patent No. 3,942,535, issued Mar. 9, 1976 (Ex. 1005, "Schulman").

[4] U.S. Patent No. 6,227,204 B1, issued May 8, 2001 (Ex. 1007, "Baumann").

[5] R.E. Fischell et al., *A Long-Lived Reliable, Rechargeable Cardiac Pacemaker*, *in* 1 *Engineering in Medicine* 357 (M. Schaldach et al. eds., 1975) (Ex. 1006, "Fischell").

F.3d 1350, 1355 (Fed. Cir. 2001). The person of ordinary skill in the art is a hypothetical person presumed to have known the relevant art at the time of the invention. *In re GPAC Inc.*, 57 F.3d 1573, 1579 (Fed. Cir. 1995). In determining the level of ordinary skill in the art, we may consider certain factors, including the "type of problems encountered in the art; prior art solutions to those problems; rapidity with which innovations are made; sophistication of the technology; and educational level of active workers in the field." *Id.*

Petitioner contends that a person of ordinary skill in the art at the time of the alleged 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. 14.

In the Decision on Institution, we adopted Petitioner's proposed level of ordinary skill in the art, stating that it "appear[ed] reasonable given the relative level of sophistication required to read and understand the '069 patent and the prior art disclosures." Dec. Inst. 6.

In the Response, Patent Owner proposes a different level, stating that a person of ordinary skill in the art at the time of the alleged invention "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)." PO Resp. 3–4 (citing Mihran Decl. ¶¶ 21–22). Patent Owner disagrees with the level of ordinary skill proposed by Petitioner, stating that "a person of ordinary skill in the art would have had experience and background with

electronics and circuitry, which Petitioner does not even specify." *Id.* at 4. Patent Owner adds, however, that "the result here would not be different even if Petitioner's level of skill were to apply." *Id.* (citing Mihran Decl. ¶¶ 23–24). The parties did not further address this issue at trial. *See generally* Pet. Reply; PO Sur-reply. We agree with Patent Owner that our analysis in this case does not turn on which of the parties' competing definitions of ordinary skill is applied and apply the level of ordinary skill in the art proposed by Petitioner, consistent with the Decision on Institution.

B. Claim Construction

In *inter partes* reviews, the Board interprets claim language using the same claim construction standard that would be used in a civil action under 35 U.S.C. § 282(b), as described in *Phillips v. AWH Corp.*, 415 F.3d 1303 (Fed. Cir. 2005) (en banc). *See* 37 C.F.R. § 42.100(b) (2019). Under that standard, we generally give claim terms their ordinary and customary meaning, as would be understood by a person of ordinary skill in the art at the time of the invention, in light of the language of the claims, the specification, and the prosecution history. *See Phillips*, 415 F.3d at 1313–14. Although extrinsic evidence, when available, may also be useful when construing claim terms under this standard, extrinsic evidence should be considered in the context of the intrinsic evidence. *See id.* at 1317–19.

Element 5.2(c) recites "generating a current through said internal power source," and element 5.3(b) recites, in part, "measuring said current." Ex. 1001, 23:35–37. Petitioner proposes to construe "measuring said current" as "measuring the *actual* current through the internal power source." Pet. 10 (emphasis added); *see also id.* at 10–13 (entire discussion

of the issue). In the Decision on Institution, we stated that the term did not require an express construction at that stage. Dec. Inst. 5–6.

Patent Owner argues that "the plain and ordinary meaning of the term should apply." PO Resp. 6. According to Patent Owner, "'measuring said current' means what the claim says it means—measuring the current through said internal power source." *Id.* (citing Mihran Decl. ¶ 29; Dec. Inst. 5–6). Patent Owner argues that "[t]here is no indication in the prosecution history that applicant intended to add a requirement directed to measurement of 'actual' current." *Id.*

In the Reply, Petitioner states that the Challenged Claims are "unpatentable under either approach, which renders moot the resolution of the claim construction dispute." Pet. Reply 2. Patent Owner did not address the issue in the Sur-reply.

Petitioner has not shown why the addition of "actual" to Patent Owner's construction of "measuring said current" is necessary to understand the plain and ordinary meaning of the claim language, and concedes that the application of "actual" has no bearing on our analysis. *See* Pet. Reply 2. We agree with Patent Owner that the plain and ordinary meaning of "measuring said current" does not require an express construction, consistent with the Decision on Institution. *See* Dec. Inst. 5–6.

In the discussion of the asserted ground of obviousness based on Fischell and Baumann, we address the parties' constructions of claim 7, which recites "wherein said predetermined current in said internal power source declines as said voltage of said internal power source increases during a charging cycle." Ex. 1001, 23:46–49; *see infra* § II.F.2.b.

We do not discern a need to construe explicitly any other claim terms because doing so would have no effect on the analysis below. *See Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017) (stating that "we need only construe terms 'that are in controversy, and only to the extent necessary to resolve the controversy'" (quoting *Vivid Techs., Inc. v. Am. Sci. & Eng'g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999))).

C. Asserted Anticipation of Claims 5 and 8 by Schulman

Petitioner asserts that claims 5 and 8 of the '069 patent are anticipated under 35 U.S.C. § 102(b) by Schulman. Pet. 16–29; Pet. Reply 2–11. Patent Owner provides arguments addressing this asserted ground. PO Resp. 9–21; PO Sur-reply 2–12. We summarize aspects of Schulman and then address the parties' arguments.

1. Schulman

Schulman discloses "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.

Figure 1 of Schulman is reproduced below:

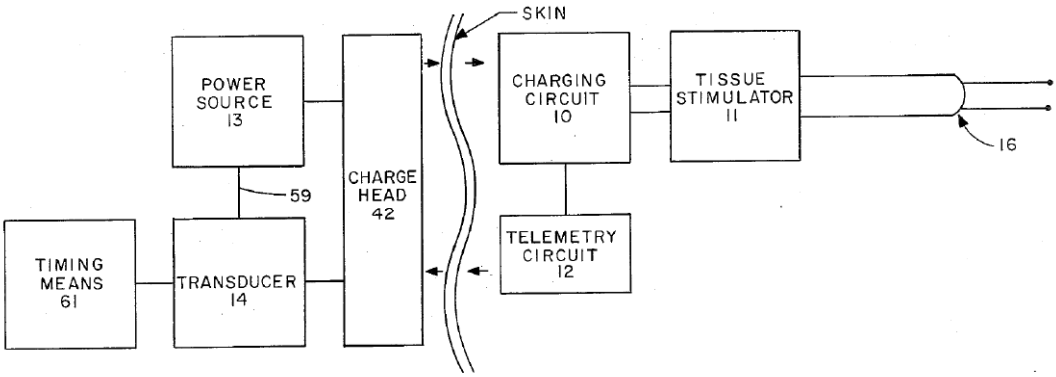


FIG. 1

Figure 1 depicts a block diagram of the tissue stimulating system. Ex. 1005, 3:16–17. The depicted tissue stimulating system includes "a charging circuit 10 including a telemetry circuit 12 and a tissue stimulator 11 including a catheter 16, all designed for implantation into the body of a living patient." *Id.* at 3:42–46. Outside of the "skin" are shown "power source 13 with a 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." *Id.* at 3:47–50.

Figures 2 and 3 are reproduced below:

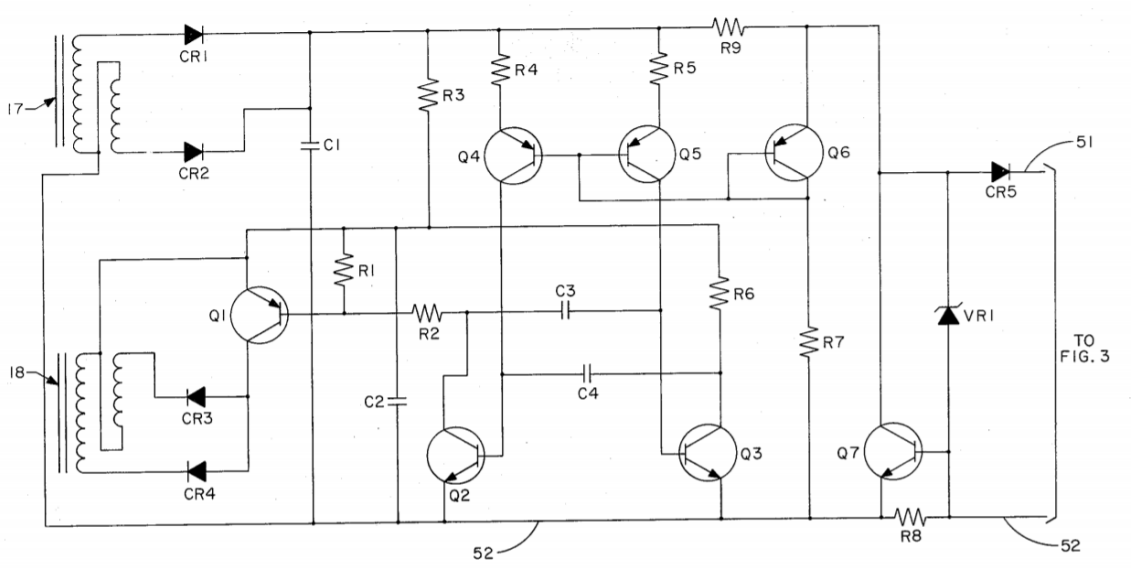
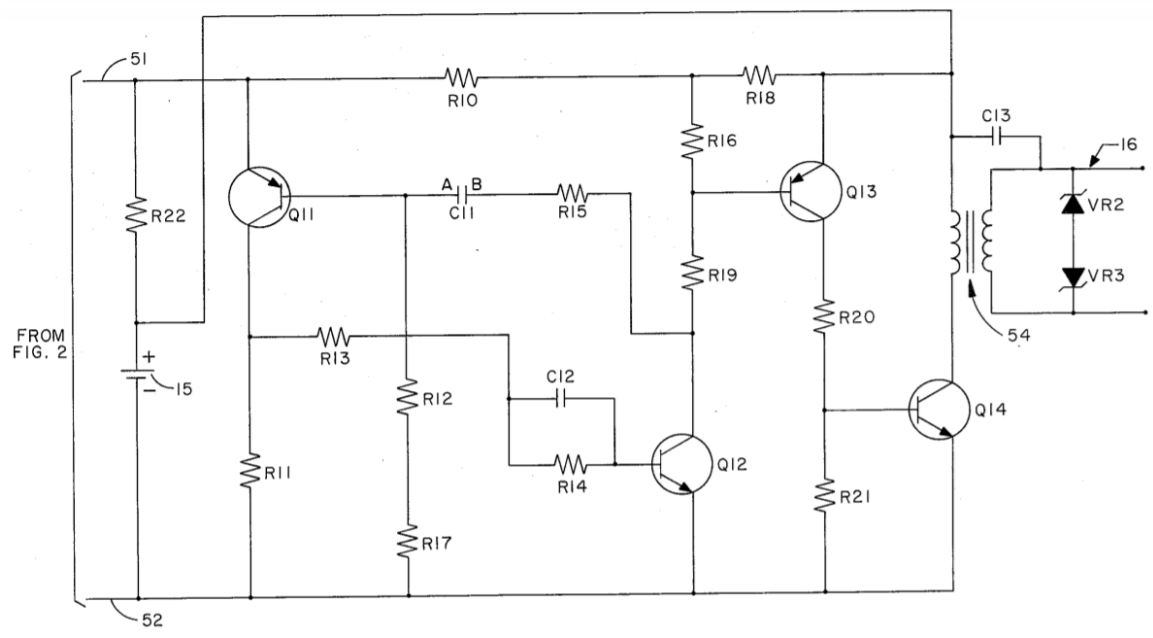


FIG. 2



TISSUE STIMULATOR

FIG. 3

Figure 2 depicts a schematic electrical diagram of the charging and telemetry circuit of Figure 1, and Figure 3 is an electrical schematic diagram of the tissue stimulator in Figure 1. Ex. 1005, 3:18–21. As to Figure 2, Schulman shows two induction coils 17 and 18 and discloses that "[c]harging current passes through the current sampling resistor R9 and through the diode CR5 to the tissue stimulator." *Id.* at 4:11–13. Figure 2 also includes a "shunt current regulator," comprising current shunting transistor Q7 and shunt resistor R8. *Id.* at 5:2–4. Figure 3 depicts, among other aspects, battery 15. *Id.* at 3:68–4:2.

2. Analysis

a. Independent Claim 5

Petitioner contends that Schulman discloses each of the limitations of independent claim 5. Pet. 19–29. To support its arguments, Petitioner identifies certain passages in Schulman and explains the significance of each passage with respect to the corresponding claim limitation. *Id.* Below, we discuss the parties' positions with respect to the requirement, in claim 5, for "measuring said current" in element 5.3(b), in which, as discussed above, "said" refers back to the "current through [the] internal power source" (recited in element 5.2(c)). Ex. 1001, 23:35–39. We refer to this requirement as the "measuring" limitation. This issue is dispositive as to claim 5 in the context of this asserted ground.

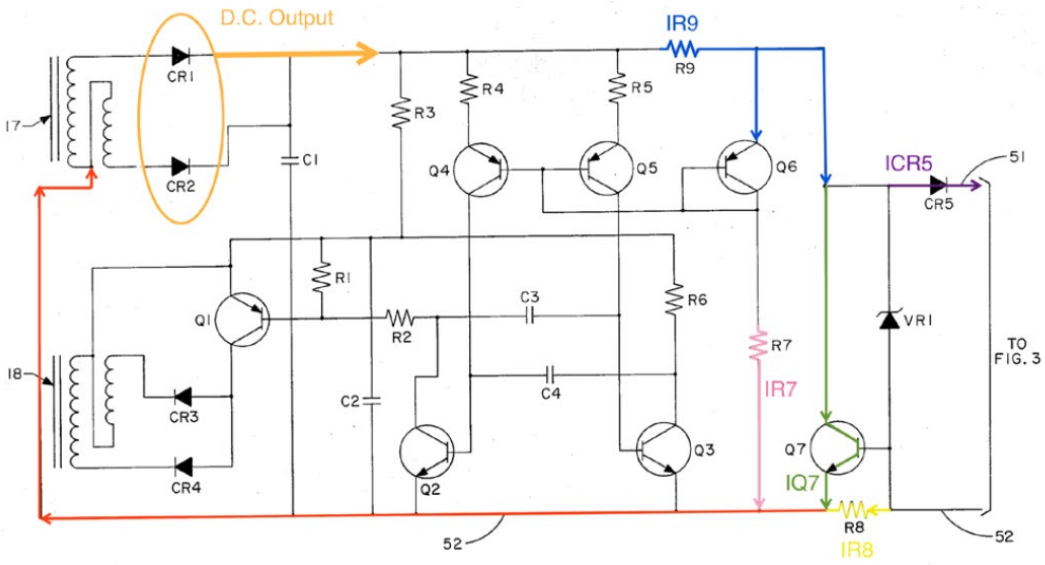
Petitioner asserts that Schulman discloses the "measuring" limitation. Pet. 24–25 (addressing element 5.2(c)), 26–27 (addressing element 5.3(b)); Pet. Reply 2–11. Petitioner identifies the current traveling through resistor R9 in Figure 2 of Schulman as a "charge current" and highlights the passage disclosing that a "[c]harging current passes through the current sampling

resistor R9." Pet. 24 (quoting Ex. 1005, 4:11–13; citing *id.* at 3:59–62, Fig. 2). According to Petitioner, "Schulman teaches that the inductive coupling generates a 'charging current' that flows through the internal battery." Pet. 24–25 (emphasis omitted) (citing Panescu Pet. Decl. ¶¶ 65, 66, 82, 83). Petitioner states that "Schulman teaches measuring the level of charging current into the internal battery and reporting alignment based on the level of that current." Pet. 26–27 (emphasis omitted) (citing Panescu Pet. Decl. ¶ 96; Ex. 1005, 6:28–41, 9:67–10:4).

Patent Owner argues that Schulman does not disclose the "measuring" limitation. PO Resp. 10–21. For the reasons below, based on the full record developed at trial, we are persuaded by Patent Owner's arguments. Specifically, we agree with Patent Owner that Petitioner has not persuasively demonstrated "that the amount of current through resistor R9 [in Figure 2 of Schulman] is the same as the amount of current that goes through the battery 15." *Id.* at 12 (emphasis omitted) (citing Mihran Decl. ¶ 37). In response, Petitioner argues a slightly different point—that all of the current that *does* go through battery 15 *also goes through* resistor R9. *See, e.g.*, Pet. Reply 2 (arguing that "Schulman teaches the current for charging the battery 'passes through the current sampling resistor R9'" (quoting Ex. 1005, 4:11–13)). Similarly, Petitioner argues that "*the vast majority* of the current through resistor R9 flows into and charges the battery 15." *Id.* at 10 (emphasis added). These arguments, however, do not rebut Patent Owner's argument that the current through Schulman's resistor R9 *is not* the current through battery 15; instead, they support it.

Patent Owner's explanation of the operation of the relevant aspects of Figure 2 of Schulman, which is supported by the declaration testimony of

Dr. Mihran, shows that the current out of resistor R9 has *three* different paths, only one of which goes to battery 15. *See* PO Resp. 13–18 (citing Mihran Decl. ¶¶ 38–41). The annotated version of Figure 2 of Schulman provided by Dr. Mihran is shown below:



PO Resp. 14 (citing Mihran Decl. ¶ 38). Schulman's Figure 2 depicts a schematic electrical diagram of the charging and telemetry circuit of Figure 1. Ex. 1005, 3:18–19. The annotated version shows several branches with colored overlays and identifies "D.C. Output" in orange, "IR9" in blue, "IR7" in pink, "IQ7" in green, "ICR5" in purple, "IR8" in yellow, and another branch in red. PO Resp. 14. The annotated Figure 2 shows the three different paths for the current out of resistor R9 toward transistor Q6 (the left branch in blue), "IQ7" (in green), and "ICR5" (in purple).

As noted above, Petitioner identifies the current through resistor R9 as the "current" for the "measuring" limitation. Pet. 24–27. Even assuming that ICR5 (in purple) in annotated Figure 2 above—i.e., one of three paths out of resistor R9—is the "current" at issue in the "measuring" limitation, as argued by Patent Owner, the Petition does not address *the two other* paths

for the current out of R9: current IQ7 (shown in green) and the current to Q6 (the left branch in blue). *See* PO Resp. 14–15 (discussing how "Petitioner completely ignores the shunt current regulator (comprised of the current shunting transistor Q7 and the shunt resistor R8)"), 17 n.3 (arguing that "at least some of the current through resistor R9 bypasses the battery 15 and powers the temperature-compensation transistor Q6"). We address each in turn below.

As to current IQ7, as argued by Patent Owner and supported by the declaration testimony of Dr. Mihran, Schulman discloses that the "shunt current regulator" "pulls current away from that which passes through resistor R9 to ensure that the battery [15] is not receiving more than a predetermined amount of current." PO Resp. 15 (citing Mihran Decl. ¶ 40; Ex. 1005, 9:57–62; Ex. 2004 (deposition of Dr. Panescu), 63:7–64:5, 66:19–67:2, 70:10–25). This understanding is directly supported by the cited passage in Schulman, which provides that "when a current larger than the operating current exists through the resistor R9, proper charging will continue to occur because the shunt current regulator (transistor Q7 and resistor R8) and the zener diode VR1 will prevent excessive current or voltage from being applied to the battery 15." Ex. 1005, 9:57–62. In another passage addressed by Patent Owner, Schulman provides the example of a 40-mA current as the predetermined charging current for battery 15, with additional current out of resistor R9 being diverted as current IQ7. *See id.* at 5:15–20 (*cited at* PO Resp. 16), 5:35–38 (*cited at* PO Resp. 17). Dr. Panescu's discussion of transistor Q7 supports this understanding as well. *See* Panescu Pet. Decl. ¶ 86 ("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.'"). Further, as argued by Patent Owner, Dr. Panescu confirmed this understanding of the operation of transistor Q7 in Figure 2 of Schulman during his deposition. *See* PO Resp. 15–16 (citing Ex. 2004, 63:7–64:5, 66:19–67:2, 70:10–25).

As further argued by Patent Owner, Schulman discloses that the current through resistor R9 is ideally *at or above* the predetermined charging current (such as, e.g., 40 mA) as the shunt current regulator will divert current in excess of this level. PO Resp. 16 (citing Mihran Decl. ¶ 41). As noted by Patent Owner, if the current through R9 is less than the predetermined charging current, alerts issue to the user. *Id.* (citing Ex. 1005, 9:44–10:5, 5:35–38; Mihran Decl. ¶ 41). When the current through resistor R9 is at or above the predetermined charging current, we agree with Patent Owner that the current through resistor R9 is "unreliable as a proxy for the current that passes through the battery 15" because the two current values may be different. *Id.* at 17–18 (citing Mihran Decl. ¶ 41).

Moreover, even when the current through R9 is *less than* the predetermined limit—and thus no current flows through the shunt current transistor Q7 (Ex. 1005, 5:31–33)—some of the current out of resistor R9 does not go to battery 15. For example, as argued by Patent Owner, Schulman discloses that a "small amount" of current flows out of resistor R9 to transistor Q6. Ex. 1005, 4:31–36 (discussing a "small amount of current [that] is permitted to flow through transistor Q6"); *see* PO Resp. 17 n.3 (citing Mihran Decl. ¶ 41 n.4). In addition, as admitted by Dr. Panescu in his deposition, and highlighted by Patent Owner, even current ICR5 (in purple above) does not flow *entirely* through battery 15. *See* PO Resp. 18–

20 (citing Ex. 2004, 48:20–50:8); Ex. 2004, 50:3–8 (Dr. Panescu stating that "the vast majority" of current ICR5 flows through the battery).

In the Reply, Petitioner presents three arguments. First, Petitioner asserts that Patent Owner has not shown that any current out of resistor R9 that does not flow to battery 15 has an "appreciable effect" on the "measuring" limitation. Pet. Reply 3–7. With this statement, Petitioner refers back to a statement in the Decision on Institution that "Patent Owner has not persuasively shown that any current loss (e.g., through transistor Q6 (*see* Ex. 1005, Fig. 2)) has *an appreciable effect* on measuring current through the battery as required by the claim." Dec. Inst. 8 (emphasis added). According to Petitioner, Patent Owner has failed to explain "why any current loss through the shunt current regulator would have an appreciable effect on measuring battery current." Pet. Reply 4.

Second, Petitioner argues that current through the shunt current regulator *does not* have an "appreciable effect" on "measuring" the current through battery 15. *See* Pet. Reply 7–9. Specifically, Petitioner argues that the amount of current through the shunt current regulator is "negligible" and that the system in Schulman "would be designed to minimize the amount of current overshoot." *Id.* at 7, 9 (citing Panescu Reply Decl. ¶¶ 14–15). Third, Petitioner argues that no other currents in Schulman have an "appreciable effect" on the "measuring" limitation. Pet. Reply 9–11.

Petitioner and Dr. Panescu do not quantify the amount of current that could be diverted through the shunt current regulator." *See* Pet. Reply 8–9 (citing Panescu Reply Decl. ¶¶ 14–15). Further, as acknowledged by Petitioner, Schulman does not quantify the amount of current diverted through the shunt current regulator. Pet. Reply 8 (stating that, "[i]n terms of

the magnitude of the current that is only transiently diverted by the shunt current regulator, Schulman does not explicitly offer any quantification").

We are also not persuaded by Petitioner's assertion that "Schulman refers to the current through R9 as 'charging current' because any R9 current that is diverted from the battery 15 is negligible." Pet. Reply 7. Petitioner does not cite any evidence, including declarant testimony, to support this position.

Petitioner also argues that Schulman satisfies the "measuring" limitation because "[a]ny over-current condition that turns on the shunt current regulator is . . . necessarily transient." Pet. Reply 7. Specifically, Petitioner argues that "[w]hile the shunt will divert some current from the battery in an over-current condition, that shunted current results in feedback through the telemetry feedback loop to the external charger, which then adjusts the power it delivers to bring the current back down to the designated, acceptable limit." *Id.* at 6–7; *see id.* at 7–8 (similar discussion, citing Panescu Pet. Decl. ¶¶ 84–95). Patent Owner responds that Petitioner has not adequately supported the assertion that any over-current condition through the shunt current regulator is "transient." PO Sur-reply 10–12.

Even assuming that Petitioner is correct that any over-current condition that turns on the shunt current regulator is transient, it does not support that Schulman discloses the "measuring" limitation. Petitioner has not adequately explained why the "measuring" limitation could be satisfied even though during at least *some* (assumedly "transient") time periods, the current out of resistor R9 is admittedly *not* the current through battery 15—i.e., there is an "over-current condition." *See, e.g.*, Pet. Reply 6–7 (discussing how "the shunt will divert some current from the battery in an

over-current condition"). With this argument, Petitioner essentially contends that the "measuring" limitation is satisfied as long as the amount of current through resistor R9 is approximately the amount of current through battery 15 at least *at some points in time*. Schulman does not *expressly* disclose measuring the current *through battery 15*; instead, Schulman discloses measuring a current *elsewhere*—i.e., through resistor R9—which, at certain points in time, may have a value approximately the same as the current through battery 15. We do not view this as satisfying the "measuring" limitation. *See MEHL/Biophile Int'l Corp. v. Milgraum*, 192 F.3d 1362, 1365 (Fed. Cir. 1999) (noting that the "possibility" that, under certain circumstances, a laser designed for tattoo removal may be pointed at hair follicles "does not legally suffice to show anticipation" of a patent involving laser hair removal). As argued by Patent Owner, Petitioner had the burden to show how the current through resistor R9 "maps to the current through the battery 15" (PO Sur-reply 9), which Petitioner has not adequately done.

For the reasons above, we find, based on the complete record, that Petitioner has not shown by a preponderance of the evidence that Schulman discloses the "measuring" limitation. Accordingly, we determine, based on the complete record, that Petitioner has not demonstrated by a preponderance of the evidence that claim 5 is anticipated by Schulman.

b. Claim 8

Claim 8 depends directly from claim 5. *See* Ex. 1001, 23:50–52. For the reasons discussed above as to claim 5 in the context of this ground, we determine, based on the complete record, that Petitioner has not

demonstrated by a preponderance of the evidence that claim 8 is anticipated by Schulman.

D. Asserted Obviousness of Claims 6, 7, and 9 Based on Schulman and Baumann

Petitioner asserts that claims 6, 7, and 9 of the '069 patent would have been obvious under 35 U.S.C. § 103(a) based on Schulman and Baumann. Pet. 16, 40–49; Pet. Reply 14–17. Patent Owner provides arguments addressing this asserted ground. PO Resp. 29–39; PO Sur-reply 22–24.

Claims 6, 7, and 9 all depend from claim 5. *See* Ex. 1001, 23:43–49, 23:53–55. For the requirements in independent claim 5, Petitioner relies solely on Schulman, not Baumann or the combination of Schulman and Bauman. *See* Pet. 45 (stating that "Schulman teaches all of the limitations of its base claim, independent claim 5," before addressing claim 6), 48–49 (stating that claims 5 and 8 have been shown to be anticipated by Schulman before addressing claim 9). In the context of this asserted ground, Patent Owner relies on its prior arguments, including that Schulman does not disclose the "measuring" limitation in claim 5. *See* PO Resp. 29–30. For the reasons discussed above as to the asserted anticipation of claim 5 based on Schulman, we determine that Petitioner has not shown by a preponderance of the evidence that Schulman teaches or suggests the "measuring" limitation. Thus, we determine, based on the complete record, that Petitioner has not demonstrated by a preponderance of the evidence that claims 6, 7, and 9 would have been obvious based on Schulman and Baumann.

E. Asserted Anticipation of Claims 5 and 8 by Fischell

Petitioner asserts that claims 5 and 8 of the '069 patent are anticipated under 35 U.S.C. § 102(b) by Fischell. Pet. 16, 29–40; Pet. Reply 11–14.

Patent Owner provides arguments addressing this asserted ground. PO Resp. 21–29; PO Sur-reply 13–22. We first summarize aspects of Fischell and then address the parties' arguments.

1. Fischell

Fischell discloses a rechargeable cardiac pacemaker. Ex. 1006 at 357.[6] Figure 8 of Fischell is reproduced below:

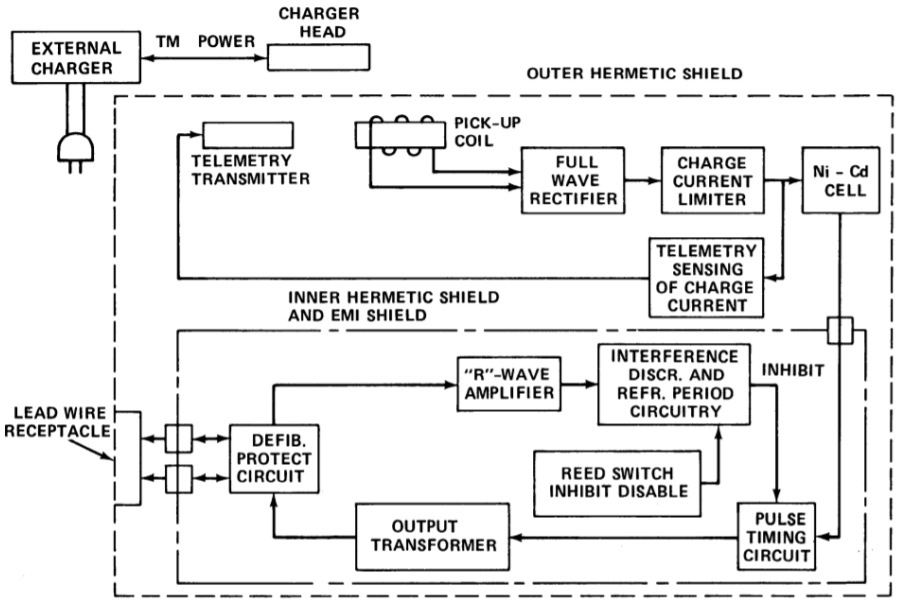


Fig. 8 Block diagram of rechargeable demand pacemaker

Figure 8 depicts a block diagram of a rechargeable demand pacemaker. Ex. 1006 at 369. The external charger with a charger head identified in the block in the upper left corner of Figure 8 transfers energy to a pickup coil in the implant (surrounded by the dotted line) in order to recharge the battery. *Id.* at 372 (disclosing that "the external charger applies an alternating magnetic field which is picked up through the intact skin by

[6] Like Petitioner, we cite to the native page numbers in Fischell, rather than the overlaid page numbers added by Petitioner prior to filing as an exhibit.

the pulse generator's pickup coil"). Fischell discloses a telemetry system that communicates back to the external device using an "output frequency . . . that is proportional to the charge current in the battery." *Id.* at 372–73; *see also id.* at 372 (describing "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"), 370 (Table 3 (noting a "Battery charge current telemetry" item)), Fig. 8 (including a block for "TELEMETRY SENSING OF CHARGE CURRENT").

2. Analysis

a. Independent Claim 5

Petitioner contends that Fischell satisfies each of the limitations of independent claim 5. Pet. 29–39. To support its arguments, Petitioner identifies certain passages in Fischell and explains the significance of each passage with respect to the corresponding claim limitation. *Id.* We address in turn below each limitation in claim 5.

(1) Element 5.0

In element 5.0, which is the preamble, claim 5 recites "[a] system for transcutaneous energy transfer." Ex. 1001, 23:22–23. Petitioner states that it does not "advocate that the preamble limits the scope of the claim." Pet. 32 (emphasis omitted). We agree the preamble is not limiting; here, the body of the claim "sets out the complete invention" such that "the language of the preamble is superfluous." *Schumer v. Lab. Comput. Sys., Inc.*, 308 F.3d 1304, 1310 (Fed. Cir. 2002). To the extent element 5.0 is limiting, however, we find that a passage in Fischell cited numerous times by Petitioner discloses energy transfer through skin: "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 372–73.

For these reasons, we find, based on the complete record, that this element is not limiting, and further find that if it is limiting, the record evidence summarized above shows, by a preponderance of the evidence, that Fischell discloses element 5.0. Patent Owner does not present arguments for this element.

(2) Element 5.1(a)–(c)

In elements 5.1(a)–(c), claim 5 recites "an implantable medical device having componentry for providing a therapeutic output, said implantable medical device having an internal power source and a secondary coil operatively coupled to said internal power source, said implantable medical device adapted to be implanted in a patient." Ex. 1001, 23:24–29.

To address these elements, Petitioner identifies (1) the rechargeable demand pacemaker shown, for example, in Figure 8 of Fischell as the "implantable medical device," (2) "Ni – Cd CELL" on the right side of Figure 8 as the "internal power source," and (3) the "PICK-UP COIL" along the top of Figure 8 as the "secondary coil." Pet. 32–34. The record evidence, summarized above, supports Petitioner's position as to these elements. We find, based on the complete record, that Petitioner has demonstrated by a preponderance of the evidence that Fischell discloses elements 5.1(a)–(c). Patent Owner does not present arguments for these elements.

(3) Element 5.2(a)–(c)

In elements 5.2(a)–(c), claim 5 recites "an external power source having a primary coil, said external power source providing energy to said implantable medical device when said primary coil of said external power source is placed in proximity of said secondary coil of said implantable medical device and thereby generating a current through said internal power source." Ex. 1001, 23:30–35. To address these elements, Petitioner identifies the "EXTERNAL CHARGER" and "CHARGER HEAD" in the upper left portion of Figure 8 of Fischell as the "external power source" and quotes the passage discussed above in the context of the preamble as to these elements 5.2. Pet. 34–36. The record evidence, summarized above, supports Petitioner's position as to these elements. We find, based on the complete record, that Petitioner has demonstrated by a preponderance of the evidence that Fischell discloses elements 5.2(a)–(c). Patent Owner does not present arguments for these elements.

(4) Element 5.3(a)

In element 5.3(a), claim 5 recites "an alignment indicator, operatively coupled to said internal power source." Ex. 1001, 23:36–37. To address this element, Petitioner identifies passages in Fischell that, according to Petitioner, teach "that alignment indicator lights and beeping sounds operate in response to a charge level of the battery and are therefore operatively coupled to the battery." Pet. 36 (emphasis omitted) (citing Ex. 1006 at 377–78; Panescu Pet. Decl. ¶¶ 103–104). The record evidence, summarized above, supports Petitioner's position as to this element. We find, based on the complete record, that Petitioner has demonstrated by a preponderance of

the evidence that Fischell discloses element 5.3(a). Patent Owner does not present arguments for this element.

(5) Element 5.3(b)

In element 5.3(b), claim 5 recites "measuring said current and reporting an alignment between said primary coil and said secondary coil based on said current." Ex. 1001, 23:37–39. Petitioner asserts that Fischell discloses this element. Pet. 35–36 (addressing element 5.2(c)[7]), 37–39 (addressing element 5.3(b)); Pet. Reply 11–14.

As to the requirement for "reporting an alignment between said primary coil and said secondary coil based on said current" in element 5.3(b), Petitioner identifies passages in Fischell that teach "the activation of different lights indicating proper alignment based on the level of charge current into the battery." Pet. 38–39 (emphasis omitted) (citing Ex. 1006 at 378; Panescu Pet. Decl. ¶¶ 103–104). The record evidence, summarized above, supports Petitioner's position as to the "reporting an alignment between said primary coil and said secondary coil based on said current" requirement. Patent Owner does not present arguments for this requirement.

As to the "measuring" limitation, Petitioner highlights Figure 8 of Fischell and identifies as a "charge current" the current sent to the "Ni – Cd CELL" shown on the right side of the figure. *See* Pet. 35 ("As depicted in FIG. 8, Fischell teaches that the energy supplied by the external primary coil and picked up by the internal secondary 'pick-up coil' is applied to a 'full wave rectifier,' the output of which goes through a 'charge current limiter' that in turn applies charge current to the internal battery (Ni-Cd cell)."

[7] In the context of this asserted ground, Petitioner did not separate element 5.2(c) from element 5.2(b). *See* Pet. 35–36.

(emphasis omitted) (citing Panescu Pet. Decl. ¶¶ 99, 100)). Petitioner highlights the block labeled "TELEMETRY SENSING OF CHARGE CURRENT" in Figure 8, and states that its "input taps the node between the 'charge current limiter' and the 'Ni-Cd cell'" and that its "output is coupled to the 'telemetry transmitter' block." Pet. 37 (emphasis omitted). Petitioner then reproduces the portion of Table 3 from Fischell, reproduced below, which, according to Petitioner, "identifies telemetry of battery charge current occurring by means of an FM output from the pulse generator." *Id.* (emphasis omitted) (citing Panescu Pet. Decl. ¶¶ 100–104).

Battery charge current telemetry	by pulse rate measurement and by means of FM output from pulse generator

Ex. 1006 at 370, *reproduced at* Pet. 37. The reproduced portion above provides the following text: "Battery charge current telemetry" and then "by pulse rate measurement and by means of FM output from pulse generator." Ex. 1006 at 370. Next, Petitioner provides this discussion of two telemetry systems in Fischell:

> Two types of telemetry systems that can provide the doctor and the patient with valuable information are avail[a]ble from the pacer, namely: a. telemetry by means of pulse rate to measure battery voltage, and b. ***telemetry*** by means of a frequency modulated signal from the pu[ls]e generator into the external charger ***to measure and control charge current into the battery***.

Pet. 37–38 (quoting, with emphasis added, Ex. 1006 at 371–72). Thus, Petitioner asserts that Fischell expressly teaches telemetry "to measure . . . charge current into the battery." Ex. 1006 at 371–72.

Patent Owner argues that Fischell does not disclose the "measuring" limitation. PO Resp. 21–29. Specifically, Patent Owner argues that "Petitioner simply fails to show how the 'telemetry sensing of charge current' block in Fischell's Figure 8 measures the 'actual current' through the Ni-Cd cell under its proposed construction" and that "Fischell does not disclose measuring the current ***through*** the Ni-Cd cell even under the plain and ordinary meaning of this claim term." *Id.* at 22 (citing Mihran Decl. ¶¶ 46–56). According to Patent Owner, Figure 8 of Fischell is a "high-level diagram," and Fischell "provides no circuit diagram to show the current being measured, does not explain how current is measured, and does not explain what current is actually measured." *Id.* at 23 (citing Pet. 37–39; Mihran Decl. ¶ 50). Patent Owner contends that Figure 8 does not show *all* the current pathways—such as currents to power pacing functions and the telemetry circuit itself—such that "what current is actually being measured in Fischell's system as compared to what is passing through the battery is not disclosed." *Id.* at 24 (citing Mihran Decl. ¶ 50; Ex. 1006, Fig. 8). According to Patent Owner, "[b]ecause Fischell does not expressly disclose that the current passing through the Ni-Cd cell battery is what is being measured, Petitioner is necessarily relying on an inherent disclosure in Fischell to satisfy its burden of anticipation." *Id.*; *see also id.* at 28–29 (discussing the law of inherency).

With this argument, Patent Owner focuses on Figure 8 of Fischell, but does not address *all* the aspects of Fischell relied on by Petitioner. Patent Owner argues that it is unclear from Figure 8 *alone* whether the "CHARGE CURRENT" being sensed by the telemetry system is (1) the current to the identified "internal power source" (the "Ni – Cd CELL" shown in Figure 8)

or (2) larger in magnitude than the current to the "Ni – Cd CELL," with additional current draws *downstream* of the disclosed sensing (for example, to power the telemetry system itself). *See, e.g.*, PO Resp. 24 ("Fischell confirms that the telemetry circuit is being powered by the current being generated by the external power source, further casting doubt on what component of current passing through the Ni-Cd cell battery under these conditions is actually represented by the 'charge current.'" (citing Mihran Decl. ¶ 51; Ex. 1006 at 372–73)). Petitioner, however, does not merely argue that Figure 8 *alone* shows that Fischell discloses the "measuring" limitation. *See, e.g.*, Pet. 37–39.

Nowhere in its briefing does Patent Owner address Petitioner's reliance on the *express* disclosure in Fischell describing Figure 8 as including "***telemetry*** by means of a frequency modulated signal from the pu[ls]e generator into the external charger ***to measure and control charge current into the battery***." Pet. 37–38 (quoting, with emphasis added, Ex. 1006 at 371–72); *see* PO Resp. 21–29 (discussing this ground but not addressing this disclosure in Fischell); PO Sur-reply 13–22 (same). This "into the battery" disclosure strongly supports Petitioner's position that Fischell discloses the "measuring" limitation.[8]

[8] The "measuring" limitation requires measuring the current *through* the internal power source, whereas Fischell discloses measuring "current *into* the battery." *See supra* § II.B; Ex. 1006 at 372 (emphasis added). Although Patent Owner frames the issue as Petitioner failing to show that Fischell discloses measuring current "through the battery" (*see, e.g.*, PO Resp. 23–25, 27), we view this as merely echoing the claim language at issue. Patent Owner has not, in the briefing in this proceeding, argued that measuring current *into* a battery fails to satisfy a requirement for measuring current *through* a battery.

Only by ignoring the "into the battery" disclosure of Fischell does Petitioner's position become one potentially based on inherency (as argued by Patent Owner). *See* PO Resp. 24. Indeed, Petitioner makes clear that it "did not rely on an inherency argument since there is no missing claim element" in that "Fischell *expressly discloses* 'sensing of charge current' in Fig. 8, *and* provides for 'telemetry . . . to measure and control charge current into the battery.'" Pet. Reply 12–13 (emphasis added, alteration in original) (quoting Ex. 1006 at 372); *see also id.* at 12 ("Fischell not only depicts in Fig. 8 a block named 'telemetry ***sensing of charge current***' that connects directly to the Ni-Cd battery cell, but explicitly provides for 'telemetry by means of a frequency modulated signal from the [implanted] pulse generator into the external charger ***to measure and control charge current into the battery***.'" (alteration in original) (quoting, with emphasis added, Ex. 1006 at 372)). In the Sur-reply, Patent Owner again does not address Fischell's "into the battery" disclosure. *See* PO Sur-reply 13–22 (discussing this ground but not the "into the battery" disclosure).

As part of this argument addressing alleged inherency, Patent Owner contends that the "TELEMETRY SENSING OF CHARGE CURRENT" block in Figure 8 could be implemented in many ways and that the example provided by Dr. Panescu is not sufficiently specific to show the "vital details to understanding whether the measured current goes through the battery." PO Resp. 27 (citing Mihran Decl. ¶¶ 55–56); PO Sur-reply 15–17 (repeating aspects of this argument). Patent Owner also points to Dr. Panescu's "admi[ssion]" in his deposition that there is "more than one way to implement the telemetry sensing of charge current block in Figure 8." Ex. 2004, 94:7–15, *cited at* PO Resp. 28–29.

Patent Owner again, however, focuses solely on Figure 8 of Fischell and ignores the express "into the battery" disclosure discussed above. The "measuring" limitation does not recite any particular implementation for measuring current through the internal power source, but instead recites only "measuring said current." Ex. 1001, 23:37. Put simply, the "measuring" limitation requires measuring current through the internal power source, and Fischell expressly discloses a telemetry system "to measure and control charge current into the battery" (Ex. 1006 at 372).

Patent Owner also argues that the use of the term "charge current" in the "TELEMETRY SENSING OF CHARGE CURRENT" in Figure 8 of Fischell is inadequate to show that Fischell discloses the "measuring" limitation because "charge current" is a term that may be used for a current that *does not* entirely flow through a battery. *See* PO Resp. 24–26. In support, Patent Owner argues that Petitioner uses the term "charge current" with respect to the disclosure of Schulman to refer to the current through resistor R9 of Schulman. *Id.* at 25 (arguing that "Petitioner labels the current through resistor R9 in Schulman as 'charge current' just like the term 'charge current' in the 'telemetry sensing of charge current block' of Fischell's Figure 8, even though, as discussed above, some of this 'charge current' in Schulman is diverted to other parts of the circuitry, and does not pass through the battery"); PO Sur-reply 13 (repeating aspects of this argument). This argument is unavailing, however, because with it, Patent Owner focuses *solely* on Figure 8 of Fischell, particularly the reference to "charge current" therein, and ignores the "into the battery" disclosure, on which Petitioner relies as to the "measuring" limitation. *See* Pet. 37–39. Petitioner's use of "charge current" to describe Schulman's current through

resistor R9 does not impact Fischell's express disclosure of "charge current into the battery" (Ex. 1006 at 372).

Next, Patent Owner argues that Dr. Panescu improperly relies on Figure 6 of Fischell to support Petitioner's positions. *See* PO Resp. 26 (citing Panescu Pet. Decl. ¶ 100). We agree with Patent Owner that Figure 6 is a different embodiment, developed before the Figure 8 embodiment. *Id.*; *see* Ex. 1006 at 368 ("Fig. 6 shows a circuit for the fixed rate, rechargeable pacer as developed at the Applied Physics Laboratory in 1968."). We do not view Petitioner (or Dr. Panescu), however, as relying on anything in Figure 6 to show that Fischell discloses the "measuring" limitation. Indeed, the Petition does not discuss Figure 6 and relies on other disclosures related to the Figure 8 embodiment (as summarized above). *See* Pet. 37–39.

Finally, in the Sur-reply, Patent Owner discusses at length Dr. Mihran's testimony during his deposition by Petitioner in this proceeding addressing U.S. Patent No. 3,888,260 (the "Fischell '260 patent") to purportedly show that in Fischell, the "charge current" disclosed "is not necessarily the current passing through the Ni-Cd cell." PO Sur-reply 18 (citing Ex. 2008, 84:14–85:1). Patent Owner also argues that in related IPR2020-00712, Dr. Panescu "acknowledges . . . that while Fischell does not disclose the details of its circuit, those details are shown in the Fischell '260 patent." *Id.* at 19–20 (citing Ex. 2005 ¶ 100). The Fischell '260 patent, however, is not in the record in this proceeding.

Petitioner contends in response that Patent Owner's Sur-reply arguments based on the Fischell '260 patent are untimely. *See* Paper 37. Patent Owner responds with a list of pages in both the Response and Petitioner's Reply that allegedly "support" the Sur-reply arguments at issue.

See Paper 38. For the reasons below, we agree with Petitioner that Patent Owner's Sur-reply arguments based on the Fischell '260 patent are untimely. In general, a "sur-reply may only respond to arguments raised in the preceding brief. . . . While replies and sur-replies can help crystalize issues for decision, a reply or sur-reply that raises a new issue or belatedly presents evidence may not be considered." Consolidated Trial Practice Guide 74 (Nov. 2019), https://www.uspto.gov/TrialPracticeGuideConsolidated ("TPG"). Moreover, even if timely, we find Patent Owner's arguments not persuasive, as explained below.

With regard to timeliness, Patent Owner first highlights arguments in the Response that address similar issues, but does not explain why the argument in the Sur-reply was not included in the Response. *See* Paper 38. Indeed, Dr. Panescu's Declaration from related IPR2020-00712 (Ex. 2005) was filed *with* the Response in this proceeding, and the statements in Dr. Mihran's deposition about the Fischell '260 patent, which issued in 1975, could have been made in Dr. Mihran's Declaration filed with the Response in this proceeding. Although Patent Owner asserts to have been responding to aspects of pages 11–14 of Petitioner's Reply (*see* Paper 38), the arguments in the Sur-reply do not reference the Reply in any way; instead, the arguments merely summarize and quote portions of Dr. Mihran's deposition testimony at length, as allegedly "corroborat[ing]" his Declaration provided with the Response. PO Sur-reply 18 (discussing Dr. Mihran stating that an aspect of the Fischell '260 patent "corroborates my opinion") (emphasis omitted), 19 (discussing Dr. Mihran stating that an aspect of the Fischell '260 patent "corroborates the point I'm making in my declaration") (emphasis omitted); TPG 74 (stating that a "sur-reply *may only*

respond to arguments raised in the preceding brief" (emphasis added)). For these reasons, we view the arguments at issue from the Sur-reply as attempting to improperly augment Dr. Mihran's Declaration (filed with the Response (Ex. 2002)) with his own deposition testimony (Ex. 2008).

The untimeliness of Patent Owner's arguments on this issue is supported by the fact that Patent Owner cites to *the petition* filed in IPR2020-00712 (filed on March 16, 2020) as to how Petitioner relied on the Fischell '260 patent there. *See* PO Sur-reply 20 n.5 ("Notably, in related IPR 2020-00712 involving the '148 patent, Petitioner relies on the Fischell '260 patent to supplement the disclosure of the Fischell article (Ex. 1006)." (citing Ex. 2006 (the petition in IPR2020-00712))). Based on this, the arguments in the Sur-reply could have been included in the Response in this proceeding, which was filed on December 22, 2020—over *nine months after* the petition in IPR2020-00712. *See* PO Resp. 41.

Further, even considering the arguments at issue in the Sur-reply, they essentially provide lengthy quotes from Dr. Mihran's deposition testimony, without adequately explaining *why* that testimony allegedly shows that Fischell—even as understood in light of the Fischell '260 patent—does not satisfy the "measuring" limitation. For example, Dr. Mihran states the conclusion that "by looking at the detail of that Fischell '260 patent, it is quite apparent that what Fischell is talking about as charge current is actually not a current through the battery" (Ex. 2008, 84:20–23, *cited at* PO Sur-reply 18), but Dr. Mihran's discussion in his deposition does not support that conclusion with any actual evidence or analysis. *See* 37 C.F.R. § 42.65(a) ("Expert testimony that does not disclose the underlying facts or data on which the opinion is based is entitled to little or no weight."); *see*

also Ex. 2008, 90:16–17 (stating that "the more detailed disclosure in the Fischell '260 patent does allow us to gain more insight" into Fischell, but not discussing any specific support), *cited at* PO Sur-reply 19. We give little weight to Dr. Mihran's unsupported testimony that, in view of the Fischell '260 patent, one of ordinary skill in the art would have understood that Fischell's charge current is not current into the battery, when Fischell expressly discloses "charge current into the battery." Ex. 1006 at 372. For the reasons above, we find, based on the complete record, that Petitioner has shown by a preponderance of the evidence that Fischell discloses element 5.3(b) (which includes the "measuring" limitation).

(6) Element 5.4

In element 5.4, claim 5 recites "wherein said external power source automatically varies its power output in order to generate a predetermined current in said internal power source." Ex. 1001, 23:40–42. To address this element, Petitioner identifies passages in Fischell that, according to Petitioner, teach "a feedback telemetry system that automatically adjusts the power of the external charger in order to generate battery charge current at 40 mA ('predetermined current')." Pet. 39 (emphasis omitted) (citing Ex. 1006 at 372–73, 378; Panescu Pet. Decl. ¶¶ 101–103). The record evidence, summarized above, supports Petitioner's position as to this element. We find, based on the complete record, that Petitioner has demonstrated by a preponderance of the evidence that Fischell discloses element 5.4. Patent Owner does not present arguments for this element.

(7) Conclusion

For the reasons above, we determine, based on the complete record, that Petitioner has demonstrated by a preponderance of the evidence that claim 5 is anticipated by Fischell.

b. Dependent Claim 8

Claim 8 depends directly from claim 5, and recites "wherein said predetermined current in said internal power source comprises a maximum amount of current for charging said internal power source." Ex. 1001, 23:50–52. To address this claim, Petitioner identifies two passages in Fischell: (1) "The charging circuit for the rechargeable pacer ***limits the charge (and overcharge) current*** into the battery to 40 mA;" and (2) "A feedback control system in the charger maintains the battery charge current at the proper 40 mA level." Pet. 39–40 (quoting, with emphasis added, Ex. 1006 at 367, 378).

The record evidence, summarized above, supports Petitioner's position as to this claim. Patent Owner does not present arguments addressing the additional limitation of this claim. We determine, based on the complete record, that Petitioner has demonstrated by a preponderance of the evidence that claim 8 is anticipated by Fischell.

F. Asserted Obviousness of Claims 6, 7, and 9 Based on Fischell and Baumann

Petitioner asserts that claims 6, 7, and 9 of the '069 patent would have been obvious under 35 U.S.C. § 103(a) based on Fischell and Baumann. Pet. 16, 49–55; Pet. Reply 17. Patent Owner provides arguments addressing this asserted ground. PO Resp. 39–41; PO Sur-reply 24. We summarized aspects of Fischell above. *See supra* § II.E.1. Below, we first summarize aspects of Baumann and then address the parties' arguments.

1. Baumann

Baumann "relates to a charging device for charging of rechargeable NiCd, Ni-metal hydride or lithium batteries of implants . . . by transcutaneous transmission of electric power." Ex. 1007, 1:7–11. Figure 1 of Baumann is reproduced below:

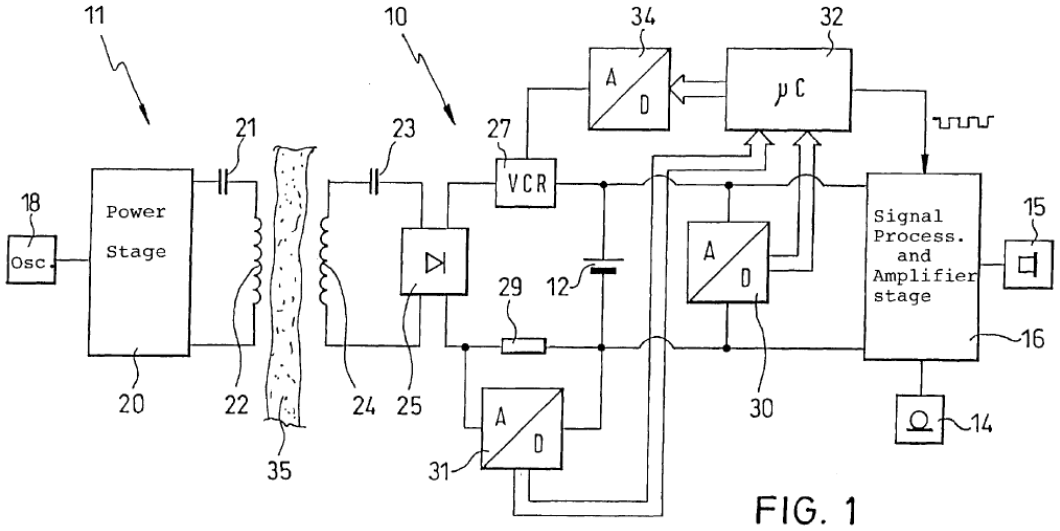


FIG. 1

Figure 1 depicts "a schematic circuit diagram of an electronic hearing implant with a charging device." Ex. 1007, 3:47–48. Among other aspects, Figure 1 shows implantable power receiving part 10 and external power transmission part 11. *Id.* at 3:60–62. Baumann discloses that "[t]he charging device is used to charge a rechargeable battery 12." *Id.* at 3:62–63.

Figure 3 is reproduced below:

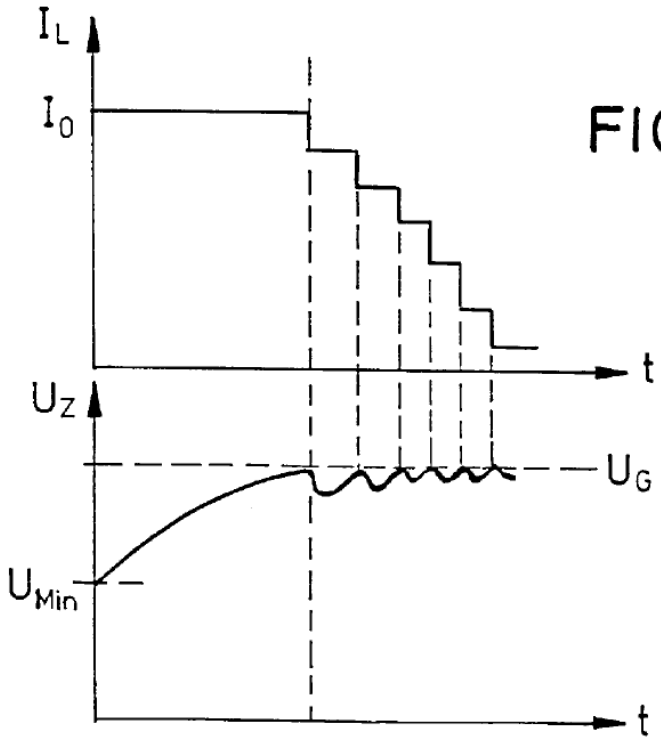


FIG. 3

Figure 3 depicts "charging characteristics of a battery charged by means of the charging device in accordance with a respective charging technique" of Baumann. Ex. 1007, 3:53–56. Specifically, Figure 3 shows that

> in a first charging phase (T1), [the charging current detector] allows a relatively high charging current (I_L) to flow and which, after the cell voltage (U_Z) of the battery has reached a predetermined limiting charging voltage (U_G), in a second charging phase (T2), reduces the charging current as compared to the charging current which flows at the end of the first charging phase.

Ex. 1007, code (57).

2. Analysis

a. Dependent Claim 6

Claim 6 depends from claim 5, and recites "wherein said predetermined current in said internal power source varies as a function of a voltage of said internal power source." Ex. 1001, 23:43–45. To address the additional limitation of this claim, Petitioner highlights Baumann's Figure 3 and identifies a passage showing that Baumann teaches "that battery current varies as a function of battery voltage." Pet. 52 (emphasis omitted) (citing Ex. 1007, 5:14–22).

Petitioner also provides reasons to combine the relied-upon aspects of Fischell with Baumann. Pet. 49–50. Specifically, Petitioner states that one of ordinary skill in the art "would have been motivated to incorporate the teachings of Baumann into Fischell to not only realize decreased charging time, but to also improve on the safety and reliability features of the system." Pet. 50. According to Petitioner, one of ordinary skill in the art "would have been motivated to incorporate the teachings of Baumann into Fischell in order to provide a charging process that charged batteries at an increased current, suitable for Ni-Cd batteries" and "would have been able to make the necessary modifications to Fischell in order to incorporate the main technical principals taught by Baumann." *Id.* (citing Panescu Pet. Decl. ¶ 127).

The record evidence, summarized above, supports Petitioner's position as to this claim. We find, based on the complete record, that Petitioner has demonstrated by a preponderance of the evidence that Fischell as modified by Baumann satisfies the subject matter of this claim. We also determine that Petitioner has demonstrated by a preponderance of the

evidence that one of ordinary skill in the art at the time of the invention would have had reason to modify Fischell based on Baumann, as proposed, and that the articulated reasoning is supported by rational underpinning. Patent Owner does not present arguments addressing the additional limitation of this claim. We determine, based on the complete record, that Petitioner has demonstrated by a preponderance of the evidence that claim 6 would have been obvious based on Fischell and Baumann.

b. Dependent Claim 7

Claim 7 depends from claim 6, and recites "wherein said predetermined current in said internal power source declines *as* said voltage of said internal power source increases during a charging cycle." Ex. 1001, 23:46–49 (emphasis added). Petitioner argues that the term "as" in claim 7

> suggests that the inverse relationship between the battery voltage and battery current is continuous in the course of the change. However, the only instance where it could be argued the '069 patent describes the relationship between the battery charging current and battery voltage with any specificity is, with reference to the flow diagram in FIG. 19, at column 21, lines 38 to 43.

Pet. 52–53 (emphasis omitted). The relied-upon passage of the '069 patent is reproduced below:

> If no over temperature condition exists, charging unit 50 checks (328) to determine if the voltage across rechargeable power source 24 is over a voltage at which the charging rate should begin to decrease, e.g., 4.05 volts. If the voltage across rechargeable power [source] 24 is greater than 4.05 volts, then charging unit 50 begins to taper charging power (330).

Ex. 1001, 21:38–43, *quoted at* Pet. 53.

We also reproduce Figure 19 of the '069 patent below:

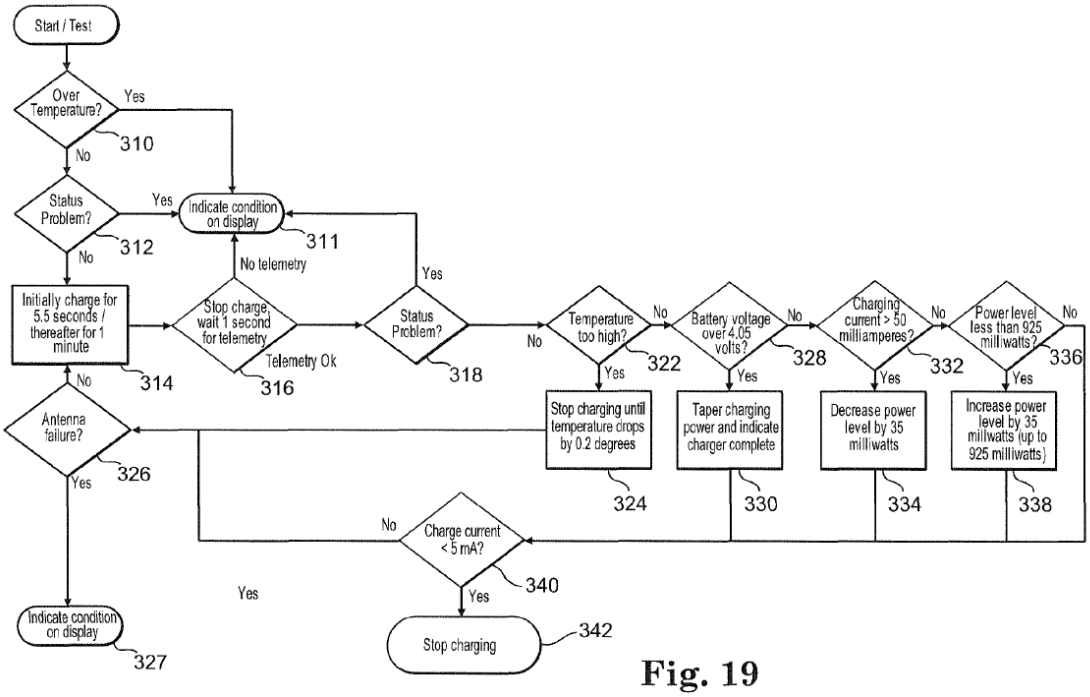


Fig. 19

Ex. 1001, Fig. 19. Figure 19 "is a flow chart illustrating charging of an implantable medical device." *Id.* at 6:31–32. Petitioner argues that, in the '069 patent, "charging current does not decrease in a continuous manner as the battery voltage increases during charging, and instead 'begins to taper' only after it is determined that the increasing battery voltage has reached a level that 'is greater than 4.05 volts.'" Pet. 53 (emphasis omitted). Petitioner contends that "[t]his is precisely how Baumann's 'charging current detector' operates." *Id.* (emphasis omitted) (citing Panescu Pet. Decl. ¶¶ 113–115).

Petitioner's argument that Baumann discloses the subject matter of claim 7 is based on its proposed construction, whereby Petitioner argues that the Specification supports that claim 7 *includes* within its scope instances in which the current in an internal power source declines "only after" the voltage of the internal power source increases during a charging cycle.

Pet. 53 (citing Panescu Pet. Decl. ¶¶ 113–115); *see also* Panescu Pet. Decl. ¶ 113 (stating that claim 7 "requires that ***current declines as a result of, or following, an increase of battery voltage*** by an amount during a charging current"). We are not persuaded, however, that Petitioner has sufficiently shown how the relied-upon passage of the Specification supports Petitioner's proposed construction of claim 7. Specifically, the passage does not disclose the voltage of the internal power source (i.e., rechargeable power source 24) *increasing*, as required by the claim. Instead, it discloses assessing whether the voltage across the internal power source "is greater than" a certain value. *See* Ex. 1001, 21:41–43. In addition, the passage does not disclose a "predetermined current" in the internal power source declining, as also required by the claim. Instead, it discloses the possibility of *external* charging unit 50 beginning to taper its charging power. *See id.* Neither Petitioner nor Dr. Panescu has adequately explained how the passage discloses, corresponds to, or is connected to what is recited in claim 7. *See* Pet. 53 (citing Panescu Pet. Decl. ¶¶ 113–115).

Petitioner also argues that Patent Owner's proposed construction would exclude an embodiment in the Specification—i.e., the embodiment in column 21 discussed above. *See* Pet. 15–16 (citing *Nobel Biocare Servs. AG v. Instradent USA, Inc.*, 903 F.3d 1365, 1381 (Fed. Cir. 2018); *Adams Respiratory Therapeutics, Inc. v. Perrigo Co.*, 616 F.3d 1283, 1290 (Fed. Cir. 2010)). We, however, need not address Patent Owner's proposed construction to ascertain whether Petitioner has shown that Baumann discloses the subject matter of claim 7. As set forth above, Petitioner's argument that Baumann discloses the subject matter of claim 7 is based on

its own proposed construction, and for the same reasons above, Petitioner has not shown support for its proposed construction.

Apart from Petitioner's proposed construction that claim 7 includes within its scope instances in which the current in an internal power source declines "only after" the voltage of the internal power source increases during a charging cycle, Petitioner makes no argument that Baumann discloses the additional limitation of claim 7. *See* Pet. 52–54; Pet. Reply 14–17; *see also* PO Resp. 34 ("Indeed, Petitioner repeatedly acknowledges that its analysis of Baumann with respect to claim 7 relies on the battery current declining ***only after*** the battery voltage reaches a predetermined limiting charging voltage U_G, which then remains constant." (citing Pet. 42–43, 45–48)). Thus, we determine, based on the complete record, that Petitioner has not demonstrated by a preponderance of the evidence that claim 7 is anticipated by Baumann. *See* PO Resp. 30–34.

c. Dependent Claim 9

Claim 9 depends from claim 8, and recites "wherein said predetermined current in said internal power source declines over time as an internal impedance of said internal power source increases." Ex. 1001, 23:53–55. To address the additional limitation of this claim, Petitioner identifies a passage in Baumann that shows that Baumann teaches "that charging of batteries, as they age over time with increasing resistance, would be regulated by decreasing the amount of charge current being delivered to the battery." Pet 54–55 (emphasis omitted) (citing Ex. 1007, 2:34–40; Panescu Pet. Decl. ¶¶ 116–121). Petitioner relies on the same reasons to combine summarized above as to claim 6. Pet. 49–50.

The record evidence, summarized above, supports Petitioner's position as to this claim. We find, based on the complete record, that Petitioner has demonstrated by a preponderance of the evidence that Fischell as modified by Baumann satisfies the subject matter of this claim. We also determine that Petitioner has demonstrated by a preponderance of the evidence that one of ordinary skill in the art at the time of the invention would have had reason to modify Fischell based on Baumann, as proposed, and that the articulated reasoning is supported by rational underpinning. Patent Owner does not present arguments addressing this claim. We determine, based on the complete record, that Petitioner has demonstrated by a preponderance of the evidence that claim 9 would have been obvious based on Fischell and Baumann.

III. CONCLUSION

Upon consideration of the Petition, Response, Reply, Sur-reply and the evidence of record, we determine that Petitioner (1) has *not* proven by a preponderance of the evidence that claims 5 and 8 are anticipated by Schulman, (2) has *not* proven by a preponderance of the evidence that claims 6, 7, and 9 would have been obvious based on Schulman and Baumann, (3) has proven by a preponderance of the evidence that claims 5 and 8 are anticipated by Fischell, (4) has proven by a preponderance of the evidence that claims 6 and 9 would have been obvious based on Fischell and Baumann, and (5) has *not* proven by a preponderance of the evidence that claim 7 would have been obvious based on Fischell and Baumann.[9]

[9] Should Patent Owner wish to pursue amendment of the Challenged Claims in a reissue or reexamination proceeding subsequent to the issuance

IV. ORDER

For the reasons above, it is:

ORDERED that Petitioner has proven by a preponderance of the evidence that claims 5, 6, 8, and 9 are unpatentable;

FURTHER ORDERED that Petitioner has not proven by a preponderance of the evidence that claim 7 is unpatentable;

FURTHER ORDERED that, pursuant to 35 U.S.C. § 318(b), upon expiration of the time for appeal of this Decision or the termination of any such appeal, a certificate shall issue canceling claims 5, 6, 8, and 9; and

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

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of this decision, we draw Patent Owner's attention to the April 2019 Notice Regarding Options for Amendments by Patent Owner Through Reissue or Reexamination During a Pending AIA Trial Proceeding, 84 Fed. Reg. 16,654 (Apr. 22, 2019). If Patent Owner chooses to file a reissue application or a request for reexamination of the challenged patent, we remind Patent Owner of its continuing obligation to notify the Board of any such related matters in updated mandatory notices. *See* 37 C.F.R. §§ 42.8(a)(3), (b)(2).

In summary:

Claims	35 U.S.C. §	Reference(s)/ Basis	Claims Shown Unpatentable	Claims Not Shown Unpatentable
5, 8	102(b)	Schulman		5, 8
6, 7, 9	103(a)	Schulman, Baumann		6, 7, 9
5, 8	102(b)	Fischell	5, 8	
6, 7, 9	103(a)	Fischell, Baumann	6, 9	7
Overall Outcome			5, 6, 8, 9	7

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