

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

NEURENT MEDICAL INC. & NEURENT MEDICAL LTD.

Petitioners,

v.

AERIN MEDICAL, INC.

Patent Owner.

Case No. IPR2024-00277

U.S. Patent No. 11,241,271

**REPLY DECLARATION OF DR. GREGORY T. MARTIN REGARDING
CLAIMS 1, 4, 8-10 OF U.S. PATENT NO. 11,241,271**

NEURENT 1097
NEURENT v. AERIN
IPR2024-00277

Table of Contents

I.	INTRODUCTION	1
II.	MATERIALS CONSIDERED	2
III.	SUMMARY OF OPINIONS	3
IV.	LEGAL PRINCIPLES	4
V.	OVERVIEW OF THE TECHNOLOGY AND THE '271 PATENT	4
VI.	CLAIM CONSTRUCTION	5
VII.	LIMITATION 1[A] IS OBVIOUS OVER EDWARDS-'535 AND STERN.	6
A.	The combination of Edwards-'535 and Stern teaches limitation 1[a]: “bipolar electrode pairs”	7
1.	Limitation 1[a] does not require “bipolar electrode pairs” active “at the same time”	7
2.	Stern teaches “bipolar electrode pairs” that are active “at the same time”	10
B.	The combination of Edwards-'535 and Stern teaches limitation 1[a]: “bipolar electrode pairs”	15
1.	Limitation 1[a] does not require “two rows of bipolar electrode pairs” with “at least three electrodes in [each] row”	16
2.	Stern teaches “bipolar electrode pairs” that include “at least three electrodes in [each] row”	29
C.	A person of ordinary skill in the art would have been motivated to combine Edwards-'535 and Stern	32
VIII.	LEVEL OF ORDINARY SKILL IN THE ART	36
IX.	AVAILABILITY FOR CROSS-EXAMINATION	38
X.	RIGHT TO SUPPLEMENT	40
XI.	JURAT	40

I, Gregory T. Martin, Ph.D., declare as follows:

I. INTRODUCTION

1. I am making this declaration at the request of Neurent Medical Inc. and Neurent Medical Ltd. (“Neurent” or “Petitioners”) as an independent expert consultant in this proceeding before the United States Patent and Trademark Office and to address and respond to the arguments made in the Patent Owner’s Patent Owner Response (“POR”) and the declaration submitted by Dr. Marom Bikson (“Bikson Declaration”) (Ex.2001) in support of the POR. I previously submitted a Declaration in support of the Petition, dated January 14, 2024 (Ex.1004) (“First Declaration”).

2. As stated in the First Declaration, I am being compensated for my work on this matter at my standard hourly consulting rate of \$400 per hour, but my opinions are based on my own views and understanding of the prior art, the knowledge of a person of ordinary skill in the art, and the patented technology. My compensation is not dependent on and in no way affects the substance of my statements, opinions, or conclusions in my First Declaration and this Reply Declaration nor is it dependent on any testimony I give or on the outcome of this proceeding.

3. As also stated in my First Declaration, I have no financial interest in Petitioners or Patent Owner. I similarly have no financial interest in the '271 patent and have had no contact with the named inventors of the '271 patent.

II. MATERIALS CONSIDERED

4. In forming my opinions, in addition to my knowledge and experience, I have considered the materials cited in my First Declaration and the documents cited herein, which are listed in **Appendix A**.¹

5. Since preparing my First Declaration, I have reviewed Patent Owner's Preliminary Response ("POPR"), the Board's Institution Decision ("ID"), the Patent Owner's Response ("POR"), and the Bikson Declaration (Ex.2001). I have also reviewed and considered the documents cited by Dr. Bikson in his declaration, and the transcript of Dr. Bikson's deposition held on January 7, 2025 ("Bikson Deposition") (Ex.1084-Bikson-Tr.).

¹ Similar to my First Declaration, various annotations have been added to the figures and diagrams in this report. All of these annotations are added unless noted otherwise.

III. SUMMARY OF OPINIONS

6. As I laid out in my First Declaration, my opinion is that limitations in claims 1, 4, and 8-10 of the '271 patent would have been obvious to a person of ordinary skill in the art. As I explain in this declaration, my opinion continues to be that claims 1, 4, and 8-10 of the '271 patent would have been obvious over the prior art that I discussed in my First Declaration.

7. I have reviewed the POR, the Bikson Declaration, and the Bikson Deposition—nothing in those has caused me to change my opinions set forth in my First Declaration. Rather, my review of those documents confirms my opinion that claims 1, 4, and 8-10 of the '271 patent would have been obvious.

8. I reviewed the transcript of my deposition² and Dr. Bikson's discussions thereof. Dr. Bikson repeatedly mischaracterizes my opinions, including those on the prior art I discussed in my First Declaration and the reasons why a person of ordinary skill in the art would have interpreted that prior art to teach and render obvious the limitations of the '271 patent claims. Dr. Bikson's opinion is that

² The errata that I submitted for my deposition are included in Exhibits 1094 and 1095.

the '271 patent claims would not have been obvious. I disagree. Moreover, my testimony does not support Dr. Bikson's opinions. I therefore maintain, as I stated in my First Declaration, that the '271 patent claims would have been obvious to a person of ordinary skill in the art and without the use of hindsight. Dr. Bikson only disagrees with a subset of my opinions. I therefore focus on these few areas of dispute in this Reply Declaration.

IV. LEGAL PRINCIPLES

9. In my First Declaration, I set forth the applicable principles of patent law that counsel provided to me, which I incorporate by reference here. Ex.1004, ¶¶10-22. I have continued to apply those principles in providing my opinions in this Reply Declaration.

V. OVERVIEW OF THE TECHNOLOGY AND THE '271 PATENT

10. I discussed the technology background, the '271 patent, and the prosecution history of the '271 patent in paragraphs 29-49 of my First Declaration, which I incorporate by reference here.

11. I have reviewed the section of Dr. Bikson's entitled "Overview of the '271 patent and the Challenged Claims." Ex.2001-Bikson, ¶¶43-48. I note that Dr. Bikson leaves out several aspects of the '271 patent disclosure that are relevant to

how a person of ordinary skill in the art would have interpreted the '271 patent claims. I identify those portions below.

12. As I explained in my First Declaration, I applied the priority date of June 14, 2011 and do not offer any opinion to whether the '271 patent is entitled to a particular priority date. Ex.1004, ¶25. Dr. Bikson applied the same priority date to his analysis. Ex.2001-Bikson, ¶35.

VI. CLAIM CONSTRUCTION

13. In performing my analysis in First Declaration, I applied the plain and ordinary meaning of the claim terms and continue to do so in this Reply Declaration. Ex.1004, ¶¶46-49. Dr. Bikson agrees with me that the plain and ordinary meaning should be applied to the '271 patent claim terms (Ex.2001-Bikson, ¶56), but his analysis does not appear to do so. As I explain below, with respect to claim 1, instead of applying the plain and ordinary meaning, Dr. Bikson appears to suggest that “two rows of bipolar electrode pairs” should be interpreted in a specific manner so as to contain additional requirements. Although I disagree with Dr. Bikson’s interpretation of claim 1, the prior art still discloses the additional requirements that Dr. Bikson seeks to add to the claims.

VII. LIMITATION 1[A] IS OBVIOUS OVER EDWARDS-'535 AND STERN

14. For the reasons I explained in my First Declaration, the combination of Edwards-'535 and Stern teaches limitation 1[a] of the '271 patent. Ex.1004, ¶¶65-97. In my First Declaration, I explained that a person of ordinary skill in the art would have been motivated to combine Edwards-'535 and Stern with a reasonable expectation of success. Ex.1004, ¶¶75-97.

15. Dr. Bikson appears to disagree with me that Stern teaches limitation 1[a] which requires “two rows of bipolar electrode pairs” and further disagrees that it would have been obvious to combine Edwards-'535 and Stern. Ex.2001-Bikson, ¶¶62-79, 84-59. I disagree with Dr. Bikson for three reasons. First, Dr. Bikson's opinion is based on his incorrect interpretation of the scope and requirements of claim 1 of the '271 patent. Second, Dr. Bikson reads the Stern reference too narrowly, which led him to incorrectly conclude that Stern does not teach limitation 1[a] under his (incorrect) interpretation. Third, Dr. Bikson does not address many of the reasons I provided as to why a person of skill in the art would combine Edwards-'535 with Stern, and misinterprets the selected reasons he does address.

16. Dr. Bikson's arguments do not change my opinion that the claims of the '271 patent would have been obvious. Therefore, as I explained in my First

Declaration and further below in this Reply Declaration, both the combination of Edwards-'535 and Stern teach limitation 1[a].

A. The combination of Edwards-'535 and Stern teaches limitation 1[a]: “bipolar electrode pairs”

17. Dr. Bikson opines that Stern does not teach “two rows of bipolar electrode pairs” as claimed by the '271 patent because, in his view, limitation 1[a] requires bipolar electrode pairs that are active “at the same time.” Ex.2001-Bikson, ¶¶62-71. I disagree with his interpretation, but even if his interpretation was correct, that would not change my opinion that Stern discloses “two rows of bipolar electrode pairs.”

1. Limitation 1[a] does not require “bipolar electrode pairs” active “at the same time”

18. Dr. Bikson’s opinion is that the prior art does not disclose “two rows of bipolar electrode pairs” because it does not disclose the electrode pairs being active or delivering energy “at the same time.” Ex.2001-Bikson, ¶¶69-70. The requirement that the electrodes are delivering energy “at the same time” does not appear in claim 1, and the claim does not otherwise recite language requiring the “two rows of bipolar electrode pairs” to be active at the same time. Rather, the claims recite “two rows of bipolar electrode pairs,” meaning what is required is more than one bipolar

electrode pair. As I explained in my First Declaration, Edwards-'535 in view of Stern discloses two rows of bipolar electrode pairs. Ex.1004, ¶¶65-97.

19. Dr. Bikson's interpretation is inconsistent with the '271 patent's description that bipolar electrode pairs that can be activated separately *or* individually. For example, the '271 patent teaches that "each pair of electrodes (bipolar) or each electrode (monopolar) may have a separate, controlled electrical channel to allow for different regions of the treatment element to be activated separately." Ex.1001-USP271, 23:64-24:1. Activating each pair of electrodes "separately" is the opposite of activating pairs "at the same time," which Dr. Bikson says is required by the claims. His opinion is therefore inconsistent with this portion of the specification. The '271 patent gives another example that the "the needles or needle pairs of Figure 8F may be individually controlled to produce an optimal treatment effect." *Id. see also* 24:1-3. A person of ordinary skill in the art would have understood that "individually" controlling pairs of electrodes would include controlling pairs to be on while others are off, which is again the opposite of what Dr. Bikson says is required by the claims. The '271 patent does not describe any other complete circuits formed at the same time or any arrangements where electrode pairs are active at the same time as being optimal or preferred embodiments, let alone the only embodiment.

20. Dr. Bikson overlooks this disclosure in the '271 patent in reaching his opinion regarding this claim scope. Ex.2001-Bikson, ¶65. Rather, he simply concludes that “[c]onsistent with the '271 patent’s description, a POSITA would have understood a ‘pair’ of bipolar electrodes to be two electrodes located near each other that have opposite polarities.” Ex.2001-Bikson, ¶65 (citing Ex-1001, 22:28-30, (“Unless specified otherwise, electrodes described can be monopolar (e.g., used in conjunction with a grounding pad) or bipolar (e.g., alternate polarities within the electrode body, used in conjunction with other tissue-applied electrodes”)), FIGS. 8F-G). I have reviewed the portions of the '271 patent that Dr. Bikson cites, and none disclose electrode pairs applying energy at the same time. That disclosure is consistent with pairs of electrodes being activated either at different times (i.e., “separately”) *or* at the same time. I therefore disagree with Dr. Bikson’s conclusion that activation of pairs at the same time is required and that the disclosed embodiments of activating pairs separately are excluded from “two rows of bipolar electrode pairs,” as it is inconsistent with the plain and ordinary language of the claim (which does not require one or the other) and the '271 patent.

21. I therefore disagree with Dr. Bikson that claim 1 of the '271 patent requires the “two rows of bipolar electrode pairs” to deliver energy “at the same time.”

2. Stern teaches “bipolar electrode pairs” that are active “at the same time”

22. As I explain above, I disagree with Dr. Bikson that the claims require activating pairs of electrodes at the same time. However, even if his interpretation was correct, that would not change my opinion that Stern discloses “two rows of bipolar electrode pairs.” Though I disagree, for the purposes of the following analysis, I assume that limitation 1[a] requires two rows of bipolar electrode pairs that are active “at the same time,” as Dr. Bikson proposes. Ex.2001-Bikson, ¶¶69-70. Even under this interpretation, Stern teaches activating bipolar electrode pairs “at the same time.” For example, Stern states that “any combination of pairs of electrodes [shown in Figure 15] may be utilized together.” Ex.1033-Stern, 13:39-43. A person of ordinary skill in the art would have understood that when pairs of electrodes are used together, they are active “at the same time.” I note that Dr. Bikson did not discuss Stern’s disclosure of utilizing pairs of electrodes “together” in forming his opinion that Stern does not teach “two rows of bipolar electrode pairs” that are active “at the same time.”

23. In any event, Stern’s teachings are consistent with the ’271 patent’s discussion of electrode pairs. As I explained above, the ’271 patent describes pairs that are activated in individually or separately, and does not further state that only

one of these activation patterns is required. Ex.1001-USP271, 23:64-24:1; 24:1-3. Dr. Bikson does not identify any disclosure of electrode pairs that are only activated at the same time in the '271 patent. Consistent with the '271 patent's disclosure, Stern discloses pairs that are "utilized together" for the purposes of considering whether there are two rows of bipolar electrode pairs active at the same time.

24. In view of Stern's teaching of "two rows of bipolar electrode pairs" active at the same time, Dr. Bikson is incorrect that "Stern teaches at most closing one of switches 242, 244, 246, and 248 and one of switches 234, 236, 238, and 240 to form a single pair of bipolar electrodes." Ex.2001-Bikson, ¶69. The ability to activate a single pair at a time is just one possible arrangement of Stern's pairs. As explained above, Stern also discloses an arrangement that uses electrode pairs "together."

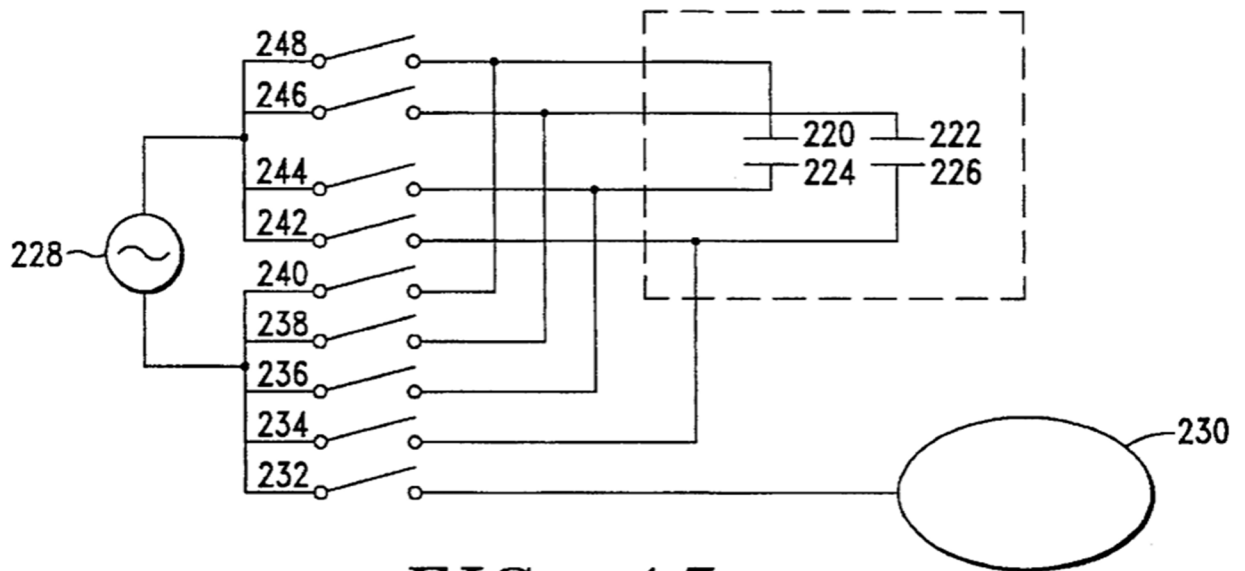


FIG. - 15

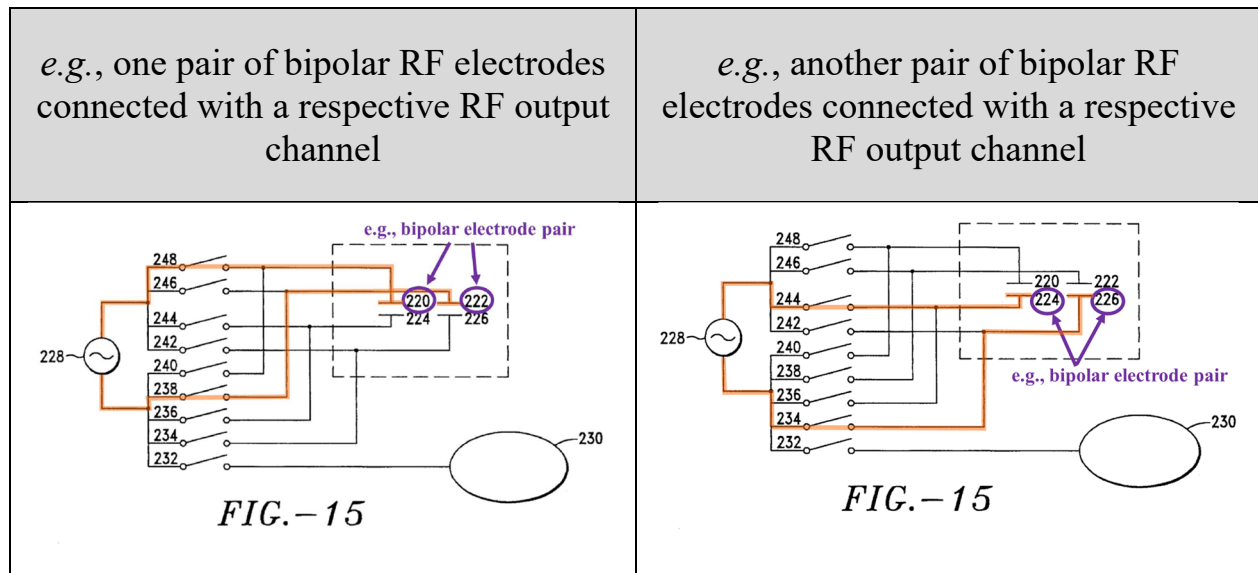
Ex.1033-Stern, FIG.15; 13:39-43 (“[A]ny pair or any combination of pairs of electrodes may be utilized together.”).

25. Dr. Bikson opines that only separate activation or energy delivery of each bipolar pair is contemplated by Stern because Stern teaches that its electrodes “are independently and sequentially energized,” Ex.1033-Stern, 2:31-33, 2:49-53, 10:48-52, 17:54-55, and, according to Dr. Bikson, sequential energization indicates that only two of Stern’s switches would be closed at one time, Ex.2001-Bikson, ¶¶66-69.

26. But in my First Declaration, I explained how **both** activation of bipolar electrode pairs at the same time or sequential activation of individual bipolar electrode pairs satisfy claim 1 and Stern’s stated goal of independent and sequential

energization. I described the ability to activate a single pair as an “example[]” of Stern’s configuration, and I also explained that Stern more generally discloses configurations where “various combinations of electrodes” are active. Ex.1004, ¶71. I further explained in my First Declaration how the ability to activate electrode pairs at a time contributes to a person of ordinary skill in the art’s motivation to combine the teachings of Stern and Edwards-’535. For example, one benefit of Stern’s selective control of bipolar pairs is the ability to “direct heat to one particular area and not others.” Ex.1004, ¶81; Ex.1033-Stern, 13:21-39 (“The bipolar arrangement allows various pairs of electrodes to be picked in order to heat uneven or rather asymmetrical areas.... That is, any unusual features within an area to be heated may be taken into account in a bipolar operation by selection of different pairs of electrodes for energization utilizing the circuitry of FIG. 15.”). For example, all pairs could initially be active, but if one area got too hot, the pairs in that area could be selectively turned off. Another benefit is to allow for “selective tissue destruction across an entire surface of tissue,” as opposed to a single discrete portion. Ex.1004, ¶83 (citing Ex.1033-Stern, 2:6-19, 6:44-62, 10:49-65). A person of ordinary skill in the art would have understood that the desired outcomes of even heating and destruction over an entire area of tissue are accomplished by activating electrode pairs at the same time.

27. Dr. Bikson points to my annotation in my First Declaration where I showed one way to configure Stern's device as evidence that Stern teaches only the activation of only a single pair of electrodes at once. Ex.1004, ¶124. This annotation, however, was exemplary. Below I provide two examples of different pairs of electrodes that could be utilized together (i.e., at the same time).



28. Consistent with Stern's disclosure and my reading of the Stern reference, and in response to Dr. Bikson's opinion, I offer the following additional annotation, to show how closing switches 248, 238, 244, and 234 would result in the activation of electrode pairs at once—this is simply a “combination of pairs” that are “utilized together” as disclosed by Stern and is a combination of my two previous annotations (Ex.1002, ¶¶71, 73, :

e.g., two pairs of bipolar RF electrodes connected with respective RF output channels

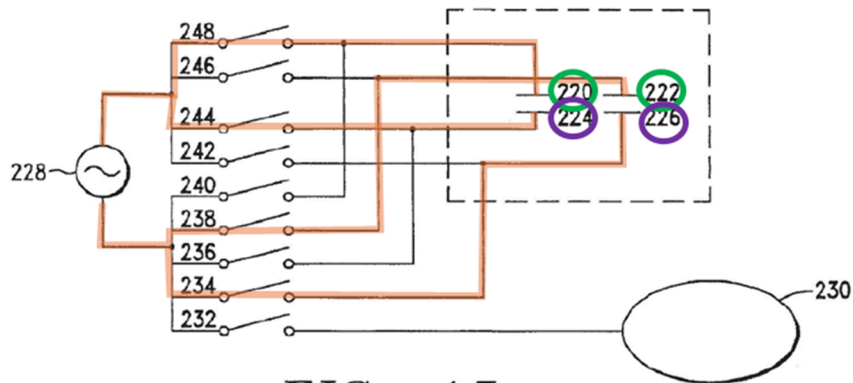


FIG. - 15

B. The combination of Edwards-'535 and Stern teaches limitation 1[a]: “bipolar electrode pairs”

29. Dr. Bikson also opines that Stern does not teach “two rows of bipolar electrode pairs” as claimed by the '271 patent because, in his view, limitation 1[a] requires bipolar “at least three electrodes in [each] row.” Ex.2001-Bikson, ¶¶74-75. I disagree that this is required by limitation 1[a]. However, even if the limitation does require “at least three electrodes in [each] row,” my opinion remains the same that Stern discloses “two rows of bipolar electrode pairs.”

1. **Limitation 1[a] does not require “two rows of bipolar electrode pairs” with “at least three electrodes in [each] row”**

30. Dr. Bikson’s opinion is that the prior art does not disclose “two rows of bipolar electrode pairs” because it does not disclose “at least three electrodes in [each] row.” Ex.2001-Bikson, ¶¶74-75. The requirement of “at least three electrodes in the row” does not appear in claim 1, and the claim does not otherwise recite language requiring the “two rows of bipolar electrode pairs” to include at least three electrodes each. Rather, the claims recite “two rows of bipolar electrode pairs,” in plural, meaning what is required is (1) more than one bipolar electrode pair that are (2) spread across two rows. As I explained in my First Declaration, Edwards-’535 in view of Stern discloses two rows of bipolar electrode pairs. Ex.1004, ¶¶65-97.

31. Dr. Bikson’s interpretation is inconsistent with the ’271 patent’s description. The only two locations that describe “rows” make clear that the pairs are formed *across* the rows with one electrode from the pair in one row, and the other in another row. Ex.1001-USP271, 8:21-25 (“[R]adio frequency energy travels from one row of electrodes to the other row of electrodes”), Abstract (“[T]he device is configured to deliver radiofrequency energy from one row of electrodes to the other row of electrodes”). That is precisely what is shown in Figure 8F, which I

cited in my First Declaration. Ex.1004, ¶45. The “rows” in Figure 8F are formed in a horizontal direction (green), whereas the “pairs of bipolar needles 252” (orange, purple) in Figure 8F are formed across those rows in a vertical direction. Ex.1001-USP271, 23:56-59, FIG. 8F. I also note that the patent contemplates “two ... pairs of bipolar needles,” which would still comprise “two rows of bipolar electrode pairs.” Ex.1001-USP2771, 23:40-43. To the extent that Dr. Bikson understands the rows to extend in the vertical, rather than horizontal direction, each of these rows has only two electrodes, not three. To the extent that Dr. Bikson understands the rows to extend in the horizontal direction, neither row has any pairs because there is only one electrode from any given pair in each row. Thus, Dr. Bikson’s definition would not cover any of the rows disclosed in Figure 8F.

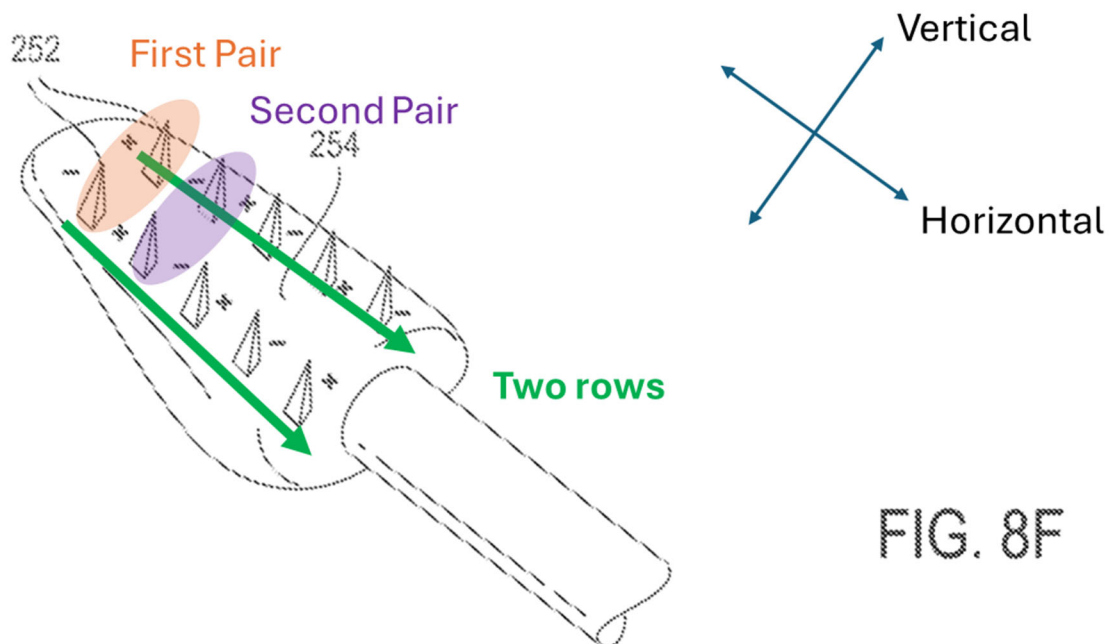


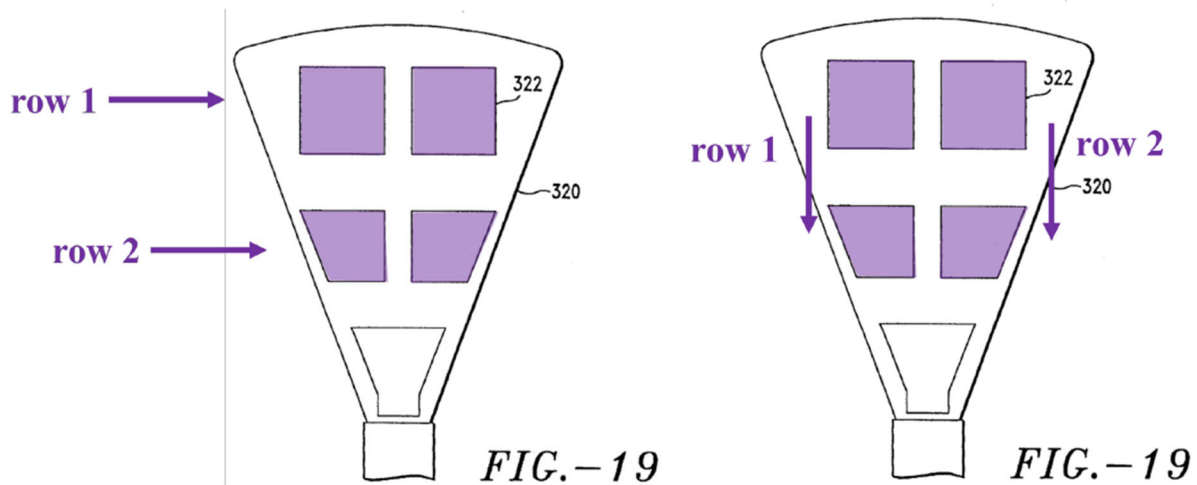
FIG. 8F

Ex.1001-USP271, FIG. 8F (annotated). It is therefore my opinion that “two rows of bipolar electrode pairs” simply requires (1) that there are more than one pair of electrodes (i.e. “pairs”) (2) that are arranged in two rows, irrespective of how many electrodes are in any given row.

32. Dr. Bikson overlooks this disclosure in the '271 patent in reaching his opinion regarding this claim scope. Ex.2001-Bikson, ¶77. Rather, he simply annotates Figures 8F, 8G, and 18 of the '271 patent without considering the location of where the “pairs” are disclosed to be in those figures. Ex.2001-Bikson, ¶77. He also does not evaluate the '271 patent description, much less the description of those figures. I therefore disagree with Dr. Bikson that claim 1 of the '271 patent requires the “two rows of bipolar electrode pairs” to have “at least three electrodes in [each] row.”

33. Dr. Bikson also offers the opinion that because the claims require “ordered” arrangements, rows with just two electrodes cannot fall within the scope of the claims. I do not follow his logic and disagree with his opinion. The claims can require ordered arrangements without placing any particular requirement on the number of electrodes in a row. I note that Dr. Bikson does not disagree that the arrangements in Stern that I relied upon, pictured below, are ordered arrangements.

Thus, even if disordered arrangements are excluded from the claims, Stern's ordered arrangement still falls within the claims' scope.



Ex.1004, ¶73.

34. Dr. Bikson also offers the opinion that because “two rows of electrodes” is required to have a different meaning than “two rows of electrode pairs,” interpreting “two rows of bipolar electrode pairs” must have multiple pairs in each row. Ex.2001-Bikson, ¶79. I again do not follow his logic. “Two rows of electrodes” clearly has different meaning from “two rows of electrode pairs” without any need to count the number of electrodes in the rows. That is, “two rows of electrodes” encompasses rows of monopolar electrodes, whereas “two rows of electrode pairs” requires bipolar arrangements or some other form of electrode pairing. I therefore disagree that the need for a distinction between “two rows of

electrodes” requires “two rows of electrode pairs” the latter to have at least three electrodes in each row.

35. I understand that the Patent Owner cites my deposition testimony as support for interpreting the claims to require “at least three electrodes in [each] row.” POR, 24, 25-26. I disagree that my testimony supports this reading of the claims, and it is not my opinion that “at least three electrodes in [each] row” is required. I have reproduced that testimony below along with my responses.

Testimony Cited by the Patent Owner	Response
<p>Q. So again, now asking about the term “pairs” of bipolar radiofrequency electrodes: What do you understand that term to mean in the context of the ’318 and ’286 patents?</p> <p>...</p> <p>A. So I would say you’d have to have at least three individual electrodes to do a multiple -- multiple pairs of bipolar electrodes.</p> <p>Q. Sorry. My question wasn’t about the “multiple” part. So if you take “multiple” out and you just have pairs of bipolar radiofrequency electrodes, what does that mean in the context of the ’318 and ’286 patents?</p> <p>A. Well, I guess to say “multiple pairs” is redundant. If you say “pairs,” it’s already plural. So that would mean if you have multiple pairs, that would be four electrodes.</p>	<p>I agree that multiple pairs requires at least three electrodes, but the claims do not require two rows of electrodes with multiple pairs in each row. While one row of multiple pairs of electrodes would require at least three electrodes in that row, two rows could be satisfied by two rows of two electrodes, where the total number of electrodes includes multiple pairs of electrodes.</p>

<p>Q. “Multiple pairs” implied there has to be at least four electrodes? A. You could define it as maybe three, depending on how you operate it.</p> <p>Q. So in other words to have multiple pairs, it sounds like you agree you need at least three electrodes?</p> <p>...</p> <p>A. Yeah.</p> <p>(Ex-2003 at 244:1-245:4)</p>	
<p>Q. Let me ask you this: If I say “bipolar electrode pairs,” that means multiple pairs; right?</p> <p>A. Sure.</p> <p>Q. Is that a yes? If I say “bipolar electrode pairs,” does that mean multiple pairs?</p> <p>...</p> <p>Q. Was the answer yes?</p> <p>A. Yeah.</p> <p>(Ex-2003 at 285:2-9)</p>	<p>I agree that bipolar electrode pairs requires multiple electrodes, but I disagree that bipolar electrode pairs as recited in the '271 patent claims must be in a single row. That is, two rows of bipolar electrode pairs can have multiple electrode pairs spread across the two rows without having three or more electrodes in each row.</p>
<p>Q. And you agree that row 3 of what you drew does not show a single row of bipolar electrode pairs; correct?</p> <p>...</p> <p>A. Correct.</p> <p>(Ex-2003 at 287:13-17)</p>	<p>Based on my drawing (Ex.2006) I agreed that just two electrodes would not be a single row of bipolar electrode pairs. But the claims do not require a single row of bipolar electrode pairs, they instead require two rows of bipolar electrode</p>

	pairs. Each of these rows need not be a single row of bipolar electrode pairs; rather, the pairs of electrodes may be spread across the rows, like in Stern.
<p>Q. So the last thing you drew there on this piece of paper, where it's just a row of two electrodes, that's just one pair; correct?</p> <p>A. One pair, yeah.</p> <p>Q. That's not electrode pairs plural; correct?</p> <p>A. Correct.</p> <p>Q. Now, the two rows you drew above it, where there's one row with three and one row with four, you believe that those two show rows of bipolar electrode pairs; correct?</p> <p>A. Correct.</p> <p>...</p> <p>Q. But the third thing you drew does not; correct?</p> <p>A. Correct.</p> <p>Q. I guess go ahead and put your initials somewhere on that. And can you just write row 1, row 2, row 3," just next to kind of what you drew, just in the order that you drew it. Just so the record is clear: So you agree that row 1 of what you drew depicts a single row of bipolar electrode pairs; correct?</p> <p>...</p>	<p>Based on my drawing (Ex.2006) I agreed that just two electrodes in row three would not be a row of bipolar electrode pairs, but rows with three or more electrodes could. But the claims do not require a row of bipolar electrode pairs, they instead require two rows of bipolar electrode pairs. Each of these rows need not be a single row of bipolar electrode pairs; rather, the pairs of electrodes may be spread across the rows, like in Stern.</p>

<p>A. Correct.</p> <p>Q. And you agree that row 2 of what you drew shows a single row of bipolar electrode pairs; correct?</p> <p>...</p> <p>A. Correct.</p> <p>Q. And you agree that row 3 of what you drew does not show a single row of bipolar electrode pairs; correct?</p> <p>...</p> <p>A. Correct.</p> <p>(Ex-2003 at 286:6-287:17)</p>	
<p>Q. So, I mean, do you think that placing electrode pairs at random would be considered two rows of bipolar electrode pairs?</p> <p>...</p> <p>A. I don't think you would call it two rows, no.</p> <p>(Ex-2003 at 270:15-19)</p>	<p>As I explained above, Stern does not disclose electrodes placed at random. Stern clearly discloses two rows of bipolar electrode pairs in an ordered arrangement.</p>

<p>A. I think “row” requires some measure of order -- right? -- in the placement of the devices, some, let’s say, call it regular pattern.</p> <p>Q. What do you mean by “regular pattern”?</p> <p>A. Again, I’m not going to offer a definition, but I’ll be descriptive: something that has some kind of repeating dimensional aspect, whether it’s the spacing between the electrodes, their positioning, their location on the substrate in which they’re mounted.</p> <p>Q. I guess when you say “repeating dimensional aspect,” what do you mean by that?</p> <p>A. I’m trying to find a better way to explain it, maybe. Well, I would say that there’s some form of alignment -- right? -- between the electrodes. I think that would constitute a row.</p> <p>(Ex-2003 at 270:21-271:15)</p>	<p>As I explained above, Stern does not disclose electrodes placed at random. Stern clearly discloses two rows of bipolar electrode pairs in an ordered arrangement. For example, Stern clearly discloses some form of “alignment”—which is one way to think of order.</p>
<p>Q. Got it. And I think you say in the end of Paragraph 74 that you think there would still be two rows even if the electrodes in figure 19 were paired diagonally; is that right?</p> <p>A. Correct, yes.</p> <p>(Ex-2003 at 275:14-18)</p>	<p>It makes no difference that Stern’s Figure 19 could show diagonal rows—it also discloses ordered rows in the vertical and horizontal directions. Dr. Bikson does not dispute that ordered rows fall within the scope of the claims.</p>

Q. Do you believe that there would still be two rows of electrode pairs in figure 19 even if you swapped out one of the highlighted electrodes for the fifth electrode at the bottom?

...

A. Possibly -- yes.

Q. Why do you say that?

A. So if you look in the case where we've defined the vertical rows -- right? -- depending on how you set the switches, you still have two rows.

Q. Okay. This might be another helpful one for you to draw it in that same area where you were drawing before. Page 34. Can you draw for me using this pen a version where you're swapping out one of the four highlighted ones with the one at the bottom and you still have two rows of electrode pairs?

...

A. You have one row, and you have another row -- depending on how you actually pair them.

Q. I assume you could have different versions, but what you drew is one example, is what you're saying?

A. Yeah.

(Ex-2003 at 278:5-279:6.)

I see no reason that this ordered arrangement in Stern, where one of the electrodes was swapped for the electrode at the bottom of Figure 19, should be excluded from the claims. But this makes no difference because, as I explained above, Stern's Figure 19 clearly discloses an ordered arrangement of electrode pairs in two rows, which I relied on in my declaration.

<p>Q. I'm going to give you a piece of paper. Hold on to that red pen for a second. Here you go. So go ahead and draw just a big circle on that piece of paper for me.</p> <p>Q. And let's go ahead and assume that the big circle represents the surface of a device basically similar to the surface of the device shown in Stern figure 19. So inside that circle can you draw for me four large dots. Go ahead and place the dots anywhere you want, but just make sure they're not touching the circle or each other.</p> <p>A. You're saying four large circles or dots?</p> <p>A. So a circle that's filled in?</p> <p>Q. Could I have the pen? So, for example, like that.</p> <p>A. Okay.</p> <p>Q. Just a big dot. For those, anywhere you want, totally at random, just not touching each other or the larger circle.</p> <p>Q. Now go ahead and place a plus sign next to any of the two dots, whichever ones you want.</p> <p>A. Any two?</p> <p>Q. Yes, whatever you want.</p> <p>...</p> <p>Q. And place a minus sign next to the other two dots. So now assume that one of the dots with a plus sign and one of the dots with a minus sign, that that's a bipolar electrode pair and that the other two dots are a second bipolar electrode pair. With that</p>	<p>As I explained above, Stern does not disclose electrodes placed at random. Stern clearly discloses two rows of bipolar electrode pairs in an ordered arrangement. It therefore makes no difference whether the arrangement shown in Exhibit 2005 would also fall within the scope of the claims.</p>
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assumption, can you please draw a straight dashed line

Q. Just like a big dot between the electrodes of one of the pairs.

...

A. One question I have is: So these electrodes, positive and negative, are they all on at the same time, or are they off, on, off different times?

Q. When you drew this, what were you assuming? Again, I'm pointing to your annotations on figure -- on Page 34 of the '271 declaration.

A. So in the case -- figure 19 is being controlled by figure 15; right? And so the actual plus/minus configurations are determined by the switch settings.

Q. So assume it's something similar, where you can just make -- you can make the plus and the minus with a similar switching arrangement and they can all be on at the same time or you can do one pair at a time and then go to a different pair or something like that.

A. So, now, what was the question? What was the next thing you wanted me to do?

Q. So basically draw a straight dashed line between one dot that you labeled plus and one dot that you labeled minus.

A. Okay.

...

<p>Q. And then do the same thing between the other two dots.</p> <p>...</p> <p>Q. So now, looking at this drawing that you made, do you believe that this drawing depicts two rows of bipolar electrode pairs?</p> <p>...</p> <p>A. Yes.</p> <p>Q. Can you please label one of the rows as row 1 and the other row as row 2.</p> <p>...</p> <p>Q. And can you please put your initials somewhere next to the drawing.</p> <p>...</p> <p>MR. GILFORD: And let's have the court reporter mark that drawing as Martin Exhibit 2.</p> <p>(Ex-2003 at 279:8-283:1)</p>	
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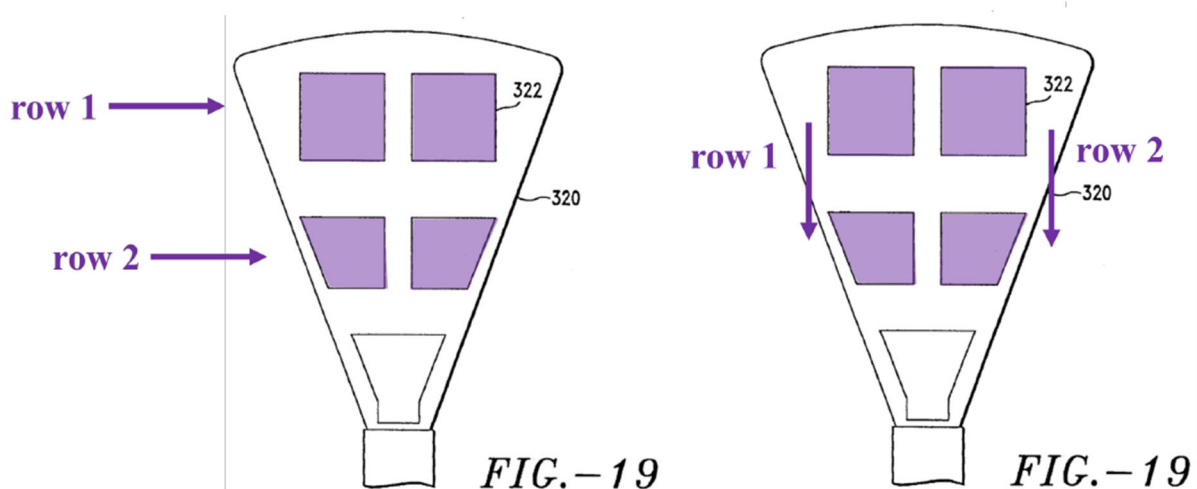
I therefore disagree that my deposition testimony supports the Patent Owner's interpretation of limitation 1[a].

36. I therefore disagree with Dr. Bikson that claim 1 of the '271 patent requires the "two rows of bipolar electrode pairs" to have "at least three electrodes in [each] row."

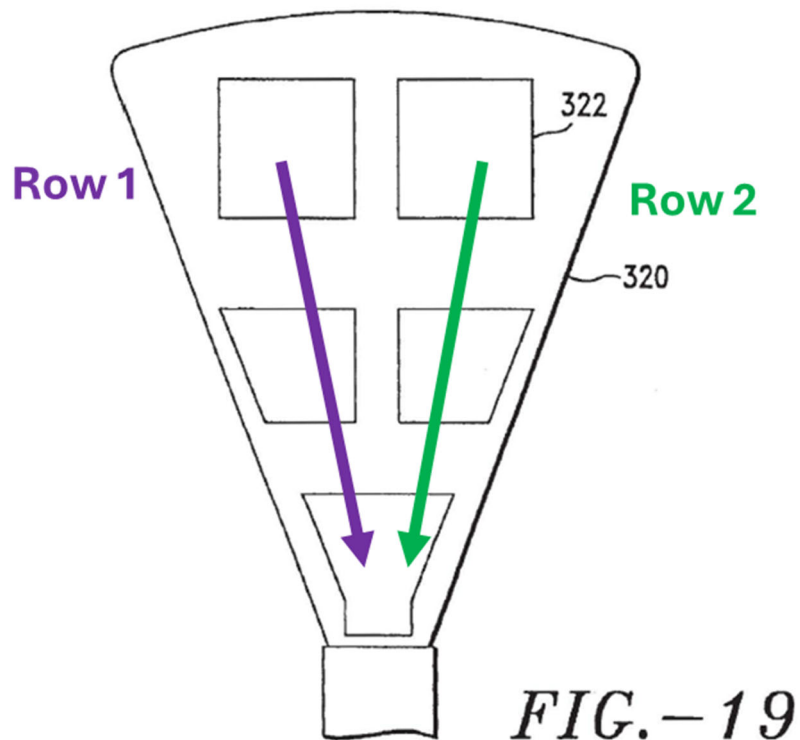
2. **Stern teaches “bipolar electrode pairs” that include “at least three electrodes in [each] row”**

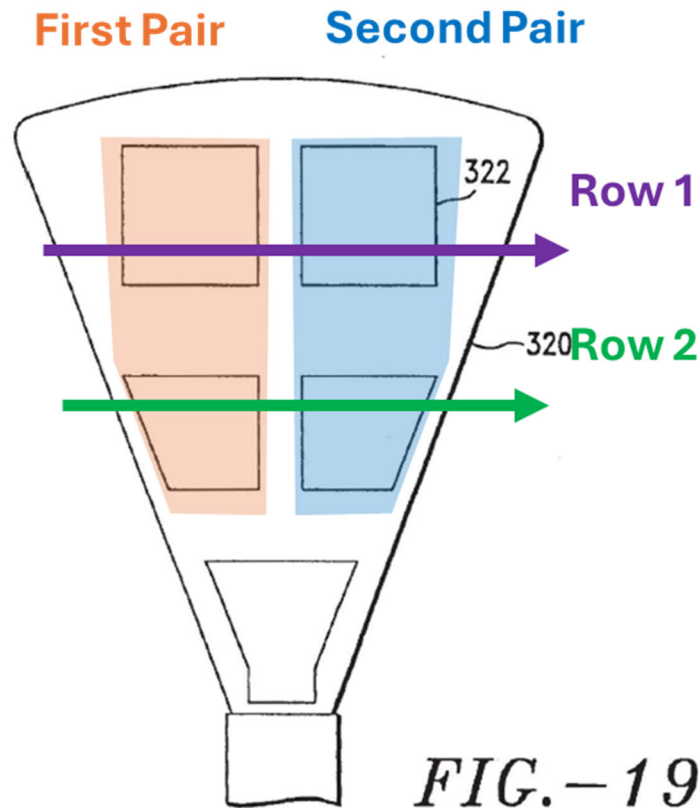
37. As I explain above, I disagree with Dr. Bikson that the claims require at least three electrodes in each row. However, even if his interpretation was correct, that would not change my opinion that Stern discloses “two rows of bipolar electrode pairs.” Though I disagree, for the purposes of the following analysis, I assume that limitation 1[a] requires two rows of bipolar electrode pairs that include “at least three electrodes in [each] row,” as Dr. Bikson proposes. Even under this interpretation, Stern teaches at least three electrodes in each row.

38. In my declaration, I indicated that my annotations to Figure 19 of Stern were just one “example” of rows in Stern. Ex.1004, ¶73.



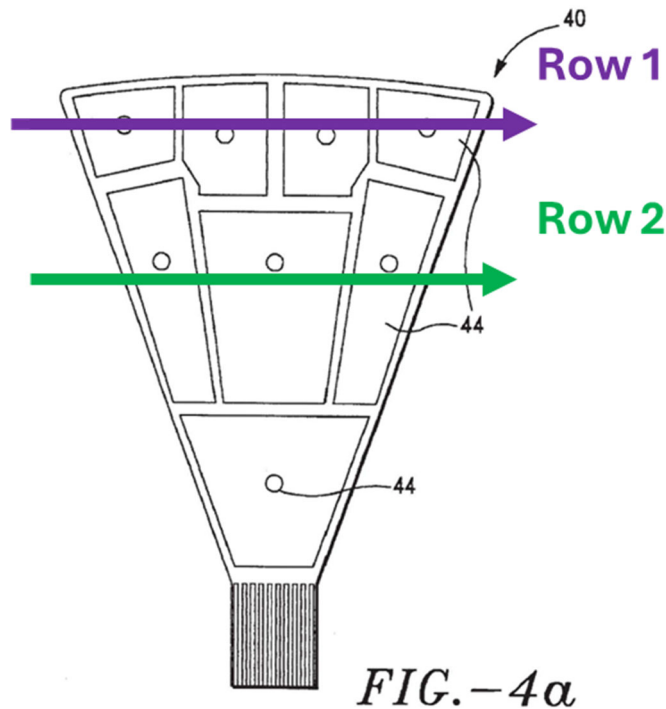
39. Even if these annotated versions of Figure 19 do not satisfy the claims as is, Figure 19 discloses at least two arrangements of electrode pairs that would satisfy the requirement that there be more than one pair in each row:





40. Moreover, I also referenced other Figures in Stern, such as Figure 4A. Figure 4A, annotated below, plainly shows rows of electrodes with more than two electrodes in each row. This is consistent with Stern's disclosure that any of its figures can be used in a bipolar operation, including monopolar operation with reference to Figure 5 and both mono and bipolar operation described in Figure 15. Ex.1033-Stern 12:7-25 (disclosing use of Figure 5 for a bipolar construction); *see also id.* 8:66-9:2 (disclosing that the circuitry of Figure 5 controls the electrodes of

Figure 4a); 5:48-50 (describing bipolar operation), 12:49-52 (same), 13:39-43 (same).



41. I therefore disagree with Dr. Bikson that Stern fails to disclose two rows of bipolar electrode pairs, where each row includes at least three electrodes.

C. A person of ordinary skill in the art would have been motivated to combine Edwards-'535 and Stern

42. In my First Declaration, I explained that a person of ordinary skill in the art would have been motivated to combine Edwards-'535 and Stern with a reasonable expectation of success to arrive at limitation 1[a]. Ex.1004, ¶¶75-97. Dr. Bikson does not appear to disagree with many of the reasons I presented in my

analysis. He does, however, state that he disagrees with three portions of my analysis that relate to why a person of ordinary skill in the art would have been motivated to arrange the electrodes of Edwards-'535 into two rows of bipolar pairs in view of Stern. Ex.2001-Bikson, ¶¶84-89. Dr. Bikson's disagreements rely on misinterpretations of my declaration and testimony. My opinion remains the same that the combination would have been obvious to a person of ordinary skill in the art.

43. Dr. Bikson first disagrees with my discussion of the Baker Application because "the Baker Application" is not incorporated "in its entirety" into Edwards-535. Ex.2001-Bikson, ¶87. Dr. Bikson appears to misunderstand my reliance on Edwards-535's incorporation of the Baker Application. As I explained in my First Declaration, Edwards-535 incorporates the Baker Application, which contains many similarities with the Stern reference. Ex.1004, ¶¶89-91. Dr. Bikson does not appear to disagree with me on either of these points. I therefore concluded that Edwards-'535's incorporation of the Baker Application demonstrates that a person of ordinary skill in the art would look to references like Baker and Stern to fill in implementation details generally in Edwards-'535's disclosure. Ex.1004, ¶91. This is consistent with my experience and the prior art of record. Ex.1004, ¶92. I understand that whether a patent incorporates another reference "in its entirety" versus some smaller

portion of the cited reference is a legal question. However, it makes no difference to my opinions which portion of the Baker Application was incorporated into Edwards-'535. The incorporation in any form suggests that a person of skill in the art would have looked to prior art like the Baker Application and Stern and expected success in doing so. Dr. Bikson does not appear to disagree with me on this broader point.

44. Dr. Bikson's second disagreement is with my opinion that a person of ordinary skill in the art would have been motivated to use more "ordered" arrangements of electrodes like in Stern. Ex.2001-Bikson, ¶88. Dr. Bikson again appears to misunderstand my testimony. As I explained in my First Declaration, Stern's disclosure of more ordered electrode arrangements would have provided "simplified spatial resolution" as compared with more random arrangements. Ex.1004, ¶95. That is, Stern discloses using flexible pairings of bipolar electrodes (consistent with Edwards-'535's disclosure for multiplexing) that can respond to variations in tissue morphology and adjust energy delivery accordingly, for example to deliver more even heating or target particular locations. Ex.1004, ¶¶79-83. Ordered arrangements of electrodes (e.g., those in rows like in Stern) directly support that process by making it easy to determine (1) the location and proximity of electrodes that could be paired and (2) sense the characteristics of energy

application local to such pairs. In more random arrangements, it would be challenging to target particular locations or provide even heating because the spacing and location of the electrodes would vary. Using two electrodes or a single row as Dr. Bikson suggests (Ex.2001-Bikson, ¶88) would not achieve that goal, as the operator would have to move the device if a desired target location was not adjacent to the electrodes. Two rows provides even more tissue that can be ablated in a controlled fashion, thereby allowing for more even heating of larger swaths of tissue (or, for smaller devices, more even heating than two larger electrodes might apply). I don't disagree that one row or one single electrode would have also been obvious, but two rows provide additional advantages that would have motivated a person of ordinary skill in the art to pursue devices with electrode arrangements like those in Stern.

45. Dr. Bikson's third disagreement is that the proposed combination would not involve a "duplication of parts" because Edwards-'535 discloses ring electrodes, which are different from Stern's surface electrodes. Ex.2001-Bikson, ¶89. Dr. Bikson again misunderstands my testimony. As explained in my First Declaration, my analysis was not limited to Edwards-535's use of ring electrodes. *See, e.g.*, Ex.1004, ¶76 ("Edwards-'535 exemplifies that using RF ablation devices with multiple bipolar surface electrodes in body cavities was well-known."). It

would have been a mere duplication to add another row of surface electrodes, given both Edwards-'535 and Stern discloses bipolar surface electrodes with Stern showing bipolar pairs can be in two rows. Ex.1004, ¶¶94-97. Thus, I maintain my opinion that the combination of Edwards-'535 with Stern would have amounted to merely duplicating Edwards-'535's electrodes. Ex.1004, ¶¶95.

VIII. LEVEL OF ORDINARY SKILL IN THE ART

46. As explained in my First Declaration, a person of ordinary skill in the art at all relevant times (2011) would have had (1) a Doctor of Medicine (M.D.) or at least a bachelor of science degree in engineering or a related discipline and (2) at least three years of experience in the clinical use, design, development, and/or testing of medical devices, including medical devices that deliver energy to tissue. A higher level of education may compensate for less work experience, and vice versa. Ex.1004, ¶¶27.

47. In his declaration, Dr. Bikson provides a different definition:

“(1) a Doctor of Medicine (M.D.) or at least a bachelor of science degree in engineering or a related discipline and (2) at least three years of experience in the design and development of medical devices, including medical devices that deliver energy to tissue.”

Ex.2001-Bikson, ¶41. I understand that the Patent Owner proposes this definition as well. POR, 8-9.

48. Dr. Bikson agrees with me in many regards. For example, he agrees that a person of ordinary skill in the art’s educational background would include “a Doctor of Medicine (M.D.) or at least a bachelor of science degree in engineering or a related discipline.” Ex.2001-Bikson, ¶38. Moreover, he agrees that a person of ordinary skill would have had three years’ experience. *Id.* However, Dr. Bikson appears to disagree that three or more years of experience in the *clinical use* of medical devices or *testing* of such medical devices would have qualified an individual as a person of ordinary skill in the art. Ex.2001-Bikson, ¶38. Dr. Bikson appears to be of the opinion that a person who has not designed or developed medical devices would not have ordinary skill sufficient to consider issues relevant to the ’271 patent as one skilled in the art. I highlight that difference in blue text below:

My Definition of a Person of Ordinary Skill in the Art (Ex.1004, ¶27)	Dr. Bikson’s Definition of a Person of Ordinary Skill in the Art (Ex.2001-Bikson, ¶41)
(1) a Doctor of Medicine (M.D.) or at least a bachelor of science degree in engineering or a related discipline and (2) at least three years of experience in the clinical use, design, development, and/or testing of medical devices,	(1) a Doctor of Medicine (M.D.) or at least a bachelor of science degree in engineering or a related discipline; and (2) at least three years of experience in the design and development of medical devices, including medical devices that deliver energy to tissue.

including medical devices that deliver energy to tissue.	
A higher level of education may compensate for less work experience, and vice versa.	

49. I have extensive relevant experience developing and designing medical devices, including those that deliver energy to tissue, nor does he dispute that I would have qualified as a person of ordinary skill in the art under either definition. Indeed, as I explained in my First Declaration, I have been focused on designing and developing technology that delivers energy to tissue, with a particular focus on ablating tissue, throughout almost my entire career. Ex.1004, ¶5. I have offered opinions in this matter consistent with my experience and the experience that a person in the field with ordinary skill would have had as of 2011. As detailed in my First Declaration, my qualifications and experience exceeded those of a person of ordinary skill in the art as defined above in 2011. Ex.1004, ¶28. My opinions in my First Declaration and this Reply declaration remain the same regardless of which definition applies.

IX. AVAILABILITY FOR CROSS-EXAMINATION

50. In signing this declaration, I recognize that the declaration will be filed as evidence in a contested case before the Patent Trial and Appeal Board of the

United States Patent and Trademark Office. I also recognize that I may be subject to cross examination in the case and that cross examination will take place within the United States. If cross examination is required of me, I will appear for cross examination within the United States during the time allotted for cross examination.

X. RIGHT TO SUPPLEMENT

51. I reserve the right to supplement my opinions in the future to respond to any arguments that the Patent Owner raises and to take into account new information as it becomes available to me.

XI. JURAT

52. I declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code.

Dated: January 17, 2025



Gregory T. Martin, Ph.D.

Martin Declaration: Appendix A (Materials Considered)

APPENDIX A

Appendix A: Materials Considered

Exhibit No.	Description
1001	U.S. Patent No.11,241,271 (“’271 patent”)
1010	U.S. Patent No. 6,517,535 (“Edwards-’535”)
1011	U.S. Patent No. 5,575,788 (“Baker”)
1012	U.S. Patent No. 5,891,134 (“Goble”)
1015	U.S. Patent No. 6,033,397 (“Laufer”)
1016	U.S. Patent No. 6,273,886 (“Edwards-’886”)
1017	Chen et al., Radiofrequency Treatment of Nasal Posterior-Under Nerve, Ethmoidal Nerve and Infratubinal for Perennial Allergic Rhinitis Under Nasal Endoscope, CHINA J. ENDOSCOPY 11:3 (2005) (English translation) (“Chen”)
1021	U.S. Patent App. No. 2005/0240147 (“Makower”)
1022	U.S. Patent App. No. 2006/0064086 (“Odom”)
1023	Coste et al., Radiofrequency Is a Safe and Effective Treatment of Turbinate Hypertrophy, LARYNGOSCOPE, 111(5) (2001) (“Coste”)
1024	WO1999030655A1 (“Hovda”)
1031	Hytönen et al., Radiofrequency Thermal Ablation for Patients with Nasal Symptoms: A Systematic Review of Effectiveness and Complications, 266 EUR. ARCH. OTORHINOLARYNGOL. (2009) (“Hytonen”)
1033	U.S. Patent No. 5,562,720 (“Stern”)
1035	M. Philipppson, Principles of Electrical Resistance of Living Tissue, BULL. CL. SCI. ACAD. R. BELG. ser. 5, vol. 7 (1921) (English Translation) (“Philipppson”)

Martin Declaration: Appendix A (Materials Considered)

Exhibit No.	Description
1038	U.S. Patent No. 6,109,268 (“Thapliyal”)
1040	Kong et al., Clinical Observation on Radiofrequency Ablation Treatment in Perennial Allergic Rhinitis, J. CLIN OTORHINOLARYNGOL (China) Vol.19, No.5 (2005) (English translation) (“Kong”)
1050	Hong, Radiofrequency Ablation: Mechanism of Action and Devices, J. VASC. INTERV. RADIOL. 21 (2010) (“Hong”)
1051	Haemmerich, Biophysics of Radiofrequency Ablation, CRITICAL REVIEWS IN BIOMEDICAL ENGINEERING, 38(1) (2010) (“Haemmerich”)
1052	Sackenheim, Radio Frequency Ablation the Key to Cancer Treatment, J. DIAGNOSTIC MEDICAL SONOGRAPHY Vol.19, No. 2 (2003) (“Sackenheim”)
1053	Bronzino, Medical Devices and Systems, Chapter 13, THE BIOMEDICAL ENGINEERING HANDBOOK 3E (2006) (“Bronzino”)
1054	Koyyalagunta et al., Radiofrequency and Cryoablation for Cancer Pain, TECHNIQUES IN REGIONAL ANESTHESIA & PAIN MANAGEMENT Vol.14 (2010) (“Koyyalagunta”)
1058	U.S. Patent App. No. 2002/0016588 (“Wong”)
1059	Chinese Patent No. 2225227 (“Liang ’227”)
1062	Sedra et al., MICROELECTRONIC CIRCUITS (3d Ed. 1991) (“Sedra”)
1084	Transcript of the January 7, 2024, Deposition of Dr. Marom Bikson
1094	Errata Sheet for the Transcript of the September 24, 2024 Deposition of Dr. Gregory Martin (“Martin-Tr.I-Errata”)

Martin Declaration: Appendix A (Materials Considered)

Exhibit No.	Description
1095	Errata Sheet for the Transcript of the September 25, 2024 Deposition of Dr. Gregory Martin (“Martin-Tr.I-Errata”)
/	Patent Owner Preliminary Response in IPR2024-00277
/	Institution Decision in IPR2024-00277
/	Patent Owner Response in IPR2024-00277
2001	Declaration of Dr. Marom Bikson
2002	Curriculum Vitae of Dr. Marom Bikson
2003	Transcript of the September 24, 2024, Deposition of Dr. Gregory T. Martin
2004	Transcript of the September 25, 2024, Deposition of Dr. Gregory T. Martin
2005	Exhibit 6 to the Deposition of Dr. Gregory T. Martin
2006	Exhibit 7 to the Deposition of Dr. Gregory T. Martin