

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ALIVECOR, INC.,
Petitioner,

v.

APPLE INC.,
Patent Owner

Case IPR2023-00950
U.S. Patent 10,076,257

PATENT OWNER'S RESPONSE

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LIST OF EXHIBITS

APPLE-2001	Declaration of Dr. Thomas Kenny
APPLE-2002	Curriculum Vitae of Dr. Thomas Kenny
APPLE-2003	Complaint, <i>Apple Inc., v Masimo Corporation, et al.</i> , Case No. 1-22-cv-01378 (D. Del., Oct. 20, 2022)
APPLE-2004	Second Declaration of Dr. Thomas Kenny
APPLE-2005	Definition of “embedded” from Wiley Electrical and Electronics Engineering Dictionary, IEEE Press, Wiley-Interscience (2004)
APPLE-2006	Finland Patent No. 119716 B (Application No. 20002304) (patent application to which Nissilä (EX1006) claims priority)
APPLE-2007	Certified English Translation of Finland Patent No. 119716 B (Application No. 20002304)
APPLE-2008	Definition of “bezel” from Wiley Electrical and Electronics Engineering Dictionary, IEEE Press, Wiley-Interscience (2004)
APPLE-2009	Definition of “bezel” from Merriam-Webster’s Collegiate Dictionary, Eleventh Edition (2006)
APPLE-2010	Definition of “bezel” from McGraw-Hill Dictionary of Scientific and Technical Terms, Sixth Edition (2002)
APPLE-2011	U.S. Patent Application Publication No. 2014/0171776 (“Lin”)
APPLE-2012	U.S. Provisional Application No. 61/111,498
APPLE-2013	Transcript of March 27, 2024 deposition of Dr. Ronald D. Berger

- APPLE-2014 Definition of “membrane” from ASM Materials Engineering Dictionary, ASM International (2006)
- APPLE-2015 Definition of “membrane” from Collins English Dictionary, HarperCollins Publishers (1998)

I. INTRODUCTION

AliveCor's Petition asserts three grounds challenging claims of U.S. Patent No. 10, 076,257 ("the '257 Patent"), with only Grounds 1 and 2 challenging the independent claims (claims 1 and 15). With respect to independent claim 1, however, **none** of the references relied upon by AliveCor disclose a first pad that is "positioned **underneath** the exterior surface of [a] first portion" of an enclosure of a device, as required by element [1.c.iii]. Indeed, as AliveCor's expert admitted during his deposition, the primary reference relied upon in every Petition ground – Markel – does not expressly disclose this element under its proper interpretation.

Against that admission, AliveCor insists that a POSITA would somehow have been compelled to modify Markel to position an electrode underneath an exterior surface of the enclosure of Markel's device, based either on Markel alone or in combination with Nissilä. APPLE-2013, 28:3-18. AliveCor's assertions are not, however, supported by the disclosures of either Markel or Nissilä. **Neither** Markel nor Nissilä disclose an electrode that is positioned **underneath** a conductive exterior portion of the enclosure of a device. Rather, the alleged "first pad" in both Markel and Nissilä is positioned **on** the exterior of a device, such that the electrodes themselves contact the user's skin, without a separate conductive pad positioned underneath.

For example, as discussed in the Patent Owner’s Preliminary Response (“POPR”) and acknowledged in the Institution Decision (and addressed in detail in Sections VI.A.1, *infra*), Markel exclusively describes its electrodes as being “***disposed on***” or “***placed on***” an exterior surface of Markel’s device in a manner allowing for direct “electrode contact with a user”, and Markel nowhere describes a second conductive pad positioned beneath such an electrode.¹ *See e.g.*, EX1005, [0042]-[0045]. That is, in every embodiment of Markel, the electrodes are advantageously placed ***on***—not ***underneath***—the exterior surface of Markel’s device. More, Markel nowhere teaches or suggests that an electrode could, let alone would, be placed “underneath the exterior surface of the first portion [of the enclosure]” in order to conceal or hide the electrode.

Markel does describe concealing the presence of electrodes, but through an entirely different approach from that of the ’257 Patent. Rather than place electrodes underneath an exterior surface, Markel’s electrodes are formed from a “molded conductive plastic” that ensures “little or no visible indication of the

¹ All emphasis added unless otherwise noted.

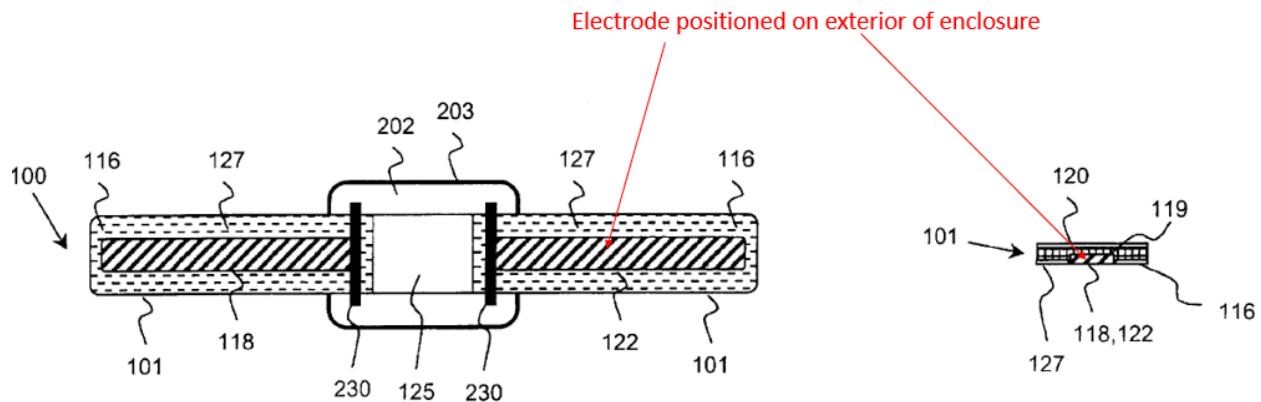
electrode presence” at the surface.² EX1005, [0040]. Indeed, every discussion of concealing an electrode in Markel requires this alternative to the ’257 Patent’s claimed approach. *See, e.g., id.* AliveCor fails to even acknowledge this critically relevant aspect of Markel, much less justify how or why a person of ordinary skill in the art (“POSITA”) would have considered it obvious to disregard Markel’s solution in pursuit of the approach disclosed only by the claims of the ’257 Patent, without any similar teaching in Markel. For at least that reason, AliveCor fails to establish that it would have been obvious to modify Markel’s device, based on the teachings of Markel alone, to position one or more electrodes underneath an exterior surface of the enclosure of Markel’s device.

AliveCor’s Ground 2 turns to Nissilä as allegedly disclosing the missing features of elements [1.c.i]-[1.c.iii], including the same feature missing from Markel (“first pad positioned underneath the exterior surface of the first portion [of the enclosure]”). Pet., 71-74. In that regard, however, Ground 2 is similarly deficient. There is simply no disclosure in Nissilä to support AliveCor’s assertion that Nissilä’s electrodes 118 and 122 are either positioned “underneath” or

² Concealment of the electrode, as alleged by AliveCor, is neither mentioned nor required by the claims, but rather is a concept that AliveCor erroneously conflates with the electrode being “underneath” another layer.

“enclosed by” a separate membrane, or that Nissila discloses a conductive pad positioned underneath an exterior facing electrode.

This is because, as detailed below, Nissilä’s “membrane 119” is the electrode. EX1006, 5:33-49; FIG. 5. AliveCor’s annotated figures in the Petition, which purport to show a separate membrane encircling electrode 118 and electrode 122 (Pet., 72.), are not based on the actual disclosures of Nissilä, but rather use the claims of the ’257 Patent as a guide for labeling structures that are simply not present in Nissilä. Just as in Markel, what Nissilä actually discloses is that the electrode, which can be formed from a membrane 119, is positioned **on**, not underneath, the exterior of the device, so as to allow for direct contact with a user’s skin. This is shown, for example, in Nissilä’s FIGs. 4 and 5:



In addition to these defects, which themselves sufficiently demonstrate that independent claim 1 and its dependent claims are patentable over the cited references, the Petition includes numerous other faults. As explained in more detail throughout this Patent Owner Response (“POR”) and in Dr. Kenny’s

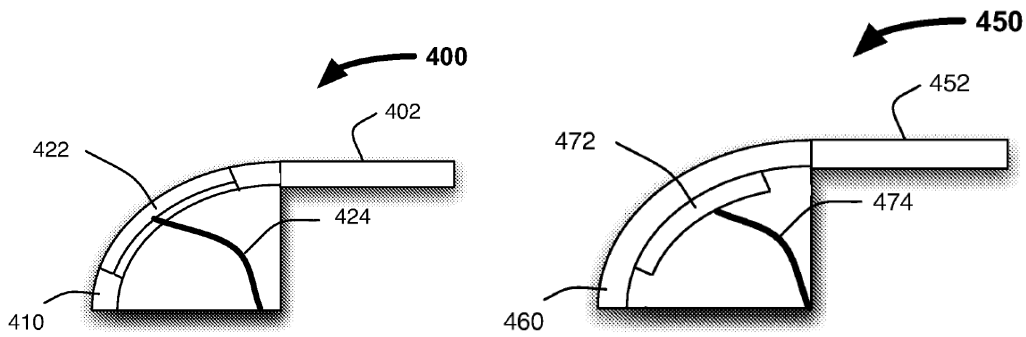
accompanying declaration (*see* APPLE-2004, ¶¶22-170), the '257 Patent's claims are patentable.

II. THE '257 PATENT

A. Overview of the Specification

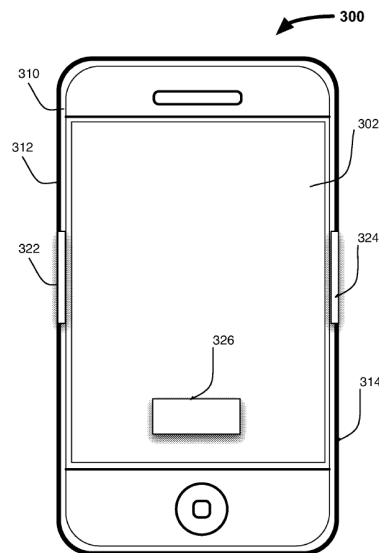
The '257 Patent describes a “heart sensor 112 [that] can include one or more leads connected to the exterior of the electronic device.” EX1001, 6:3-8. “The processor may then analyze the received signals and generate, from the received signals, one or more characteristic quantities of the user's heartbeat or heart rate for authentication.” *Id.*

“FIG. 4A is a cross-sectional view of an illustrative electronic device having a bezel with an embedded heart sensor lead,” where “lead 422 is exposed to the user.” *Id.*, 9:18-26. “FIG. 4B is a cross-sectional view of another illustrative electronic device having a bezel with an embedded heart sensor lead,” where lead 472 is placed “underneath the outer surface of the bezel.” *Id.*, 9:45-49. Each of lead 422 in FIG. 4A and lead 472 in FIG. 4B is coupled to a respective connector (424 and 474) that “transmit[s] the signals to a processor” of the device. *Id.*, 9:24-26, 9:51-52.



Left: '257 Patent, FIG. 4A; Right: '257 Patent, FIG. 4B

The '257 Patent also discloses an embodiment where “[a] lead 326 [is] embedded in or behind display 302.” EX1001, 8:40-52. “Lead 326 can be operative to detect a user's heart activity as the user moves a finger across display 302, for example in the vicinity of or directly over lead 326.”



'257 Patent, FIG. 3

B. Overview of the Prosecution History

The application leading to the '257 Patent was filed on December 20, 2013, claiming priority to application number 12/358,905 filed on January 23, 2009. The '257 Patent went through an examination that involved three substantive office actions including prior art rejections based on Ceballos (US 6,522,915), Gilles (US 4,635,646), and Weiss (US 5,632,926). Subsequently, the '257 Patent was allowed on May 22, 2018, and issued on September 18, 2018.

III. LEVEL OF ORDINARY SKILL

A person of ordinary skill in the art on or about the claimed priority date of the '257 Patent (“POSITA”) would have had at least a bachelor’s degree in electrical engineering, mechanical engineering, biomedical engineering, computer engineering, physics, or a related field, and would have had at least two years of relevant work experience with capture and processing of data or information, including but not limited to physiological information, or equivalents thereof. APPLE-2004, ¶¶23-24. Less work experience may be compensated by a higher level of education and vice versa. *Id.*

IV. CLAIM CONSTRUCTION

“**embedded in**” (claims 1, 15) – The term “embedded in” should be given its plain and ordinary meaning. APPLE-2004, ¶¶27-35. However, should the Board determine that the term “embedded in” requires an express construction,

consistent with the plain and ordinary meaning of this term, “embedded in” should be interpreted to mean “at least partially set in or partially surrounded by a material.”³ *Id.* For example, when describing the invention in general, the ’257 patent states that in embodiments where the device includes “a housing forming the exterior surface” that “one or more leads can be embedded in or adjacent to the housing.” EX1001, 10:24-29. This passage makes a clear distinction between a lead that is “embedded in” the housing and a lead that is merely “adjacent to” the housing. APPLE-2004, ¶28. From this discussion in the ’257 patent, it is apparent that it is not sufficient for two components to be merely in parallel contact or adjacent to each other, at least a portion of a first material or component (e.g., the embedded first pad) must be at least partially set in or partially surrounded by a second material or component (e.g., a portion of the enclosure). APPLE-2004, ¶31.

In another example, in a first arrangement described with respect to FIG. 4B, the ’257 patent describes that “lead 472 of the heart sensor can be *positioned against* the back surface of bezel 460.” EX1001, 9:44-45. The specification then goes on to state that “[a]lternatively, lead 472 can be *placed within the thickness of bezel* 460 (e.g., in a pocket within the bezel wall), but underneath the outer

³ Being “partially surrounded by” a material does not require direct contact with the material. APPLE-2004, ¶¶27-28.

surface of the bezel.” *Id.*, 9:45-48. This passage distinguishes a lead that is embedded in a portion of the enclosure from a lead that is merely “positioned against” or in parallel contact with a portion of the enclosure. APPLE-2004, ¶¶30-31, 95.

Extrinsic evidence further supports this plain and ordinary meaning for the term “embedded in.” For example, a POSITA would have been aware that in the context of computing devices and computing technology, the term “embedded” means “[t]hat which has been *incorporated into a surrounding mass or enclosure.*” APPLE-2005. This definition demonstrates that the term “embedded in” requires more than two materials or substrates that are merely positioned adjacent to, parallel, or against each other. *Id.*; APPLE-2004, ¶34. Indeed, AliveCor’s expert agreed that “‘embedded’ has a more specific meaning than just that [two components] touching each other.” APPLE-2013, 61:2-62:5.

Accordingly, the term “embedded in” should be interpreted to mean “at least partially set in or partially surrounded by a material” which is consistent with the plain and ordinary meaning for this term. APPLE-2004, ¶¶27-35.

“a first pad that is embedded in a first portion of the enclosure, wherein an exterior surface of the enclosure comprises an exterior surface of the first portion, wherein the first pad is positioned underneath the exterior surface of

the first portion” (claim 1) – This claim recitation should be given its plain and ordinary meaning, as it requires precisely what it says. APPLE-2004, ¶¶36-37. Specifically, this claim recitation requires that the first pad and the first portion of the enclosure be distinct components and that the first pad is both “embedded in [the] first portion of the enclosure” and “positioned underneath the exterior surface of the first portion” of the enclosure. *Id.*.

In the Petition, AliveCor first raises an invalidity theory based on what it calls “Apple’s interpretation” of this claim element, alleging that Apple has asserted an interpretation for this element in which a “surface of an exposed electrode pad that is configured to detect a cardiac signal via direct contact with the user’s skin” can satisfy both the claimed first pad and the claimed first portion of the enclosure which the first pad is both “embedded in” and “positioned underneath.” Pet., 16-17. AliveCor’s assertion is incorrect, and is based entirely on its misreading of out-of-context portions of Apple’s complaint in the related district court proceeding.⁴ Contrary to AliveCor’s statements, Apple has never alleged, in this or any other proceeding, that the claimed “first pad” and the “first

⁴ AliveCor’s expert agreed that this interpretation is incorrect and that he had not reviewed any infringement contentions or claim construction briefs when forming this construction that he ascribes to Apple. APPLE-2013, 84:8-89:8

portion of the enclosure”—in which the first pad is both “embedded in” and “positioned underneath”—can be met by “the surface of an exposed electrode pad” as AliveCor alleges in the Petition. *Id.*

The plain language of the claim confirms that AliveCor’s interpretation (which it erroneously attributes to Apple) is incorrect.⁵ The claim requires that the first pad be a distinct component from the first portion of the enclosure and that the first pad be both “embedded in” and “positioned underneath” the first portion of the enclosure. APPLE-2004, ¶37. As the Federal Circuit has repeatedly stated, “[w]here a claim lists elements separately, ‘the clear implication of the claim language’ is that those elements are ‘distinct component[s]’ of the patented invention.... In the absence of any evidence to the contrary, ***we must presume that the use of...different terms in the claims connotes different meanings.***” *Becton, Dickinson & Co. v. Tyco Healthcare Group, LP*, 616 F.3d 1249, 1254 (Fed. Cir. 2010) (citing *Engel Indus., Inc. v. Lockformer Co.*, 96 F.3d 1398, 1404-05 (Fed. Cir. 1996) (concluding that when a claim provides for two separate elements, “***they logically cannot be one and the same.***”)); *see also Kyocera Senco Indus. Tools*,

⁵ Indeed, AliveCor later admits that this claim interpretation is incorrect. *See* Pet., 16, 19-20.

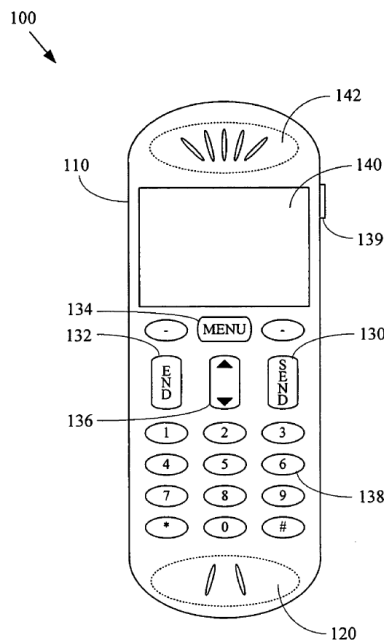
Inc. v. ITC, 22 F.4th 1369, 1382 (Fed. Cir. 2022); *HTC Corp. v. Cellular Communs. Equip., LLC*, 701 Fed. Appx. 978, 982 (Fed. Cir. 2017).

“**bezel**” (claims 12, 13, 19) – The term “bezel” means “[a] rim that secures a transparent covering for an indicating device such as a meter, oscilloscope, or watch.” APPLE-2008; *see also* APPLE-2009 (“a rim that holds a transparent covering (as on a watch, clock, or headlight)”); APPLE-2010; APPLE-2004, ¶38.

V. THE ASSERTED PRIOR ART

A. Overview of Markel (Primary Reference Relied Upon in All Three Grounds)

Markel generally discloses “electronic devices with cardiovascular monitoring capability.” EX1005, [0004]. Markel describes a “mobile communication device [(MCD)] 100” that includes electrodes (which AliveCor alleges as equating to the claimed “pads” (Pet., 11)) “adapted to detect cardiac activity of a user of the [mobile communication device, (MCD)] 100.” *Id.*, [0033], [0035]; APPLE-2001, ¶52.

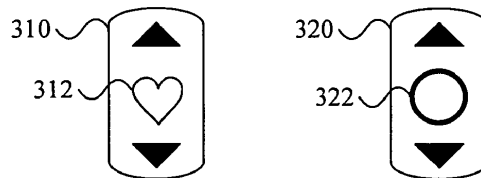


EX1005, FIG. 1

Markel's electrodes "comprise conductive material" such as electrodes "formed from conductive plastic (or another material)" that is integrated with various molded components of the mobile communication device. EX1005, [0037]. Markel explains that "various conductive plastics (e.g., graphite-impregnated plastic or the like)" "provide sufficient conductivity for an electrode to perform adequately." *Id.*; APPLE-2001, ¶53.

Markel explains that its electrodes may be "concealed from the user," and to this point, Markel describes forming its electrodes from "molded conductive plastic with little or no visible indication of the electrode presence" when "a user need not be aware of the presence of the electrode." EX1005, [0039]-[0040].

FIG. 3 depicts examples of *unconcealed* identifiable electrodes. “For example, the first pushbutton 310 comprises a heart-shaped indi[ci]um 312 (or other visible characteristic) to notify a user of the location of the electrode and also the function of the electrode.” EX1005, [0039]-[0040]. “Also for example, the second pushbutton 320 comprises a circular projection (or other tactile characteristic) to notify a user of the location of the electrode.” *Id.*; *see also* APPLE-2013, 37:14-38:2 (AliveCor’s expert agreeing that “the purpose of these patterns is to allow the user to visually identify the location of the electrodes”). In contrast, a *concealed* electrode would **not** include an indi[ci]um, e.g., indi[ci]um 312 or 322. *Id.*, [0039]-[0040] (“no visible indication of the electrode presence”). APPLE-2001, ¶¶54-55.



EX1005, FIG. 3

Markel also makes clear how the electrodes are “substantially concealed (or hidden) from a user.” Specifically, such concealment is achieved by forming an electrode from “molded conductive plastic with little or no visible indication of the electrode presence.” EX1005, [0040]. In all cases the electrodes are “positioned such that the one or more electrodes *contact a user* during normal (or typical) use

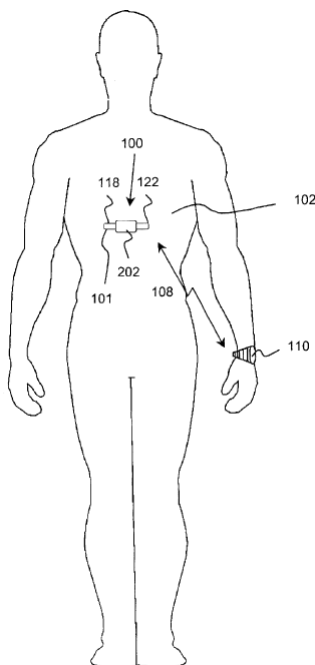
of the MCD 100” with no disclosure of an additional conductive pad positioned underneath. *Id.*, [0041].

Such exterior placement of the electrodes facilitates user engagement with the electrode during the use of the telephone (MCD). *See e.g., id.*, [0043] (“the MCD 100 [is] ***generally held in the hand*** during normal use of the MCD100”); *see also* [0045] “first and second electrodes may be ***disposed on*** a main body portion 110 of the MCD 100,” as presented in “FIG. 4”); [0046]-[0050]; APPLE-2001, ¶56.

B. Overview of Nissilä (Secondary Reference Relied Upon in Ground 2)

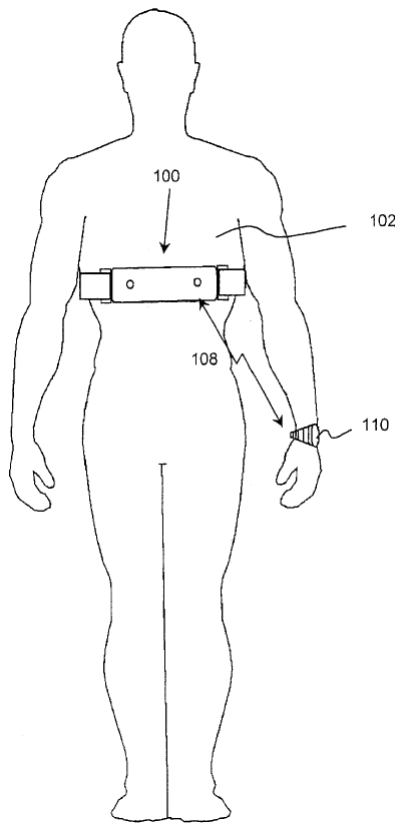
Nissilä is a U.S. Patent that claims priority to a Finnish patent filed Oct. 18, 2000 (APPLE-2006). Nissilä therefore appears to be an English translation from the original Finnish source material.

Nissilä is directed toward “an electrode structure and a heart rate measuring arrangement for measuring an ECG signal on the skin of a person’s chest.” EX1006, Abstract. As shown in FIG. 2, Nissilä’s “electrode structure (100) comprises a band-like component (101) that is fitted against the skin (102) of the person’s chest and that is made of soft and flexible material that follows the skin closely.” *Id.*



EX1006, FIG. 2

This design using “flexible, soft material that fits the skin closely” provides an electrode assembly that “is comfortable and inconspicuous to wear and does not chafe the skin” in contrast to the ridged, bulky design of prior art devices, as shown in FIG. 1. EX1006, 2:61-67.



EX1006, FIG. 1 (prior art to Nissilä's device)

It is the compact, flexible design of Nissilä's device that allows it to follow the skin, thus making the entire device inconspicuous to others as it is easily hidden under the wearer's clothing. APPLE-2004, ¶¶136, 52-53. There is no discussion in Nissilä of concealing or making inconspicuous one portion of the device (such as the electrodes) with respect to other portions of the device. APPLE-2004, ¶138.

Nissilä describes two primary embodiments/configurations for its chest-worn electrode structure. In a first embodiment "the electrodes located at the ends of the band-like component of the electrode structure are made of electrically

conductive adhesive.” EX1006, 3:18-23; *see also* 5:25-31. That is, in this embodiment, the electrically conductive adhesive ***is*** the electrodes. This embodiment is shown in FIG. 7.

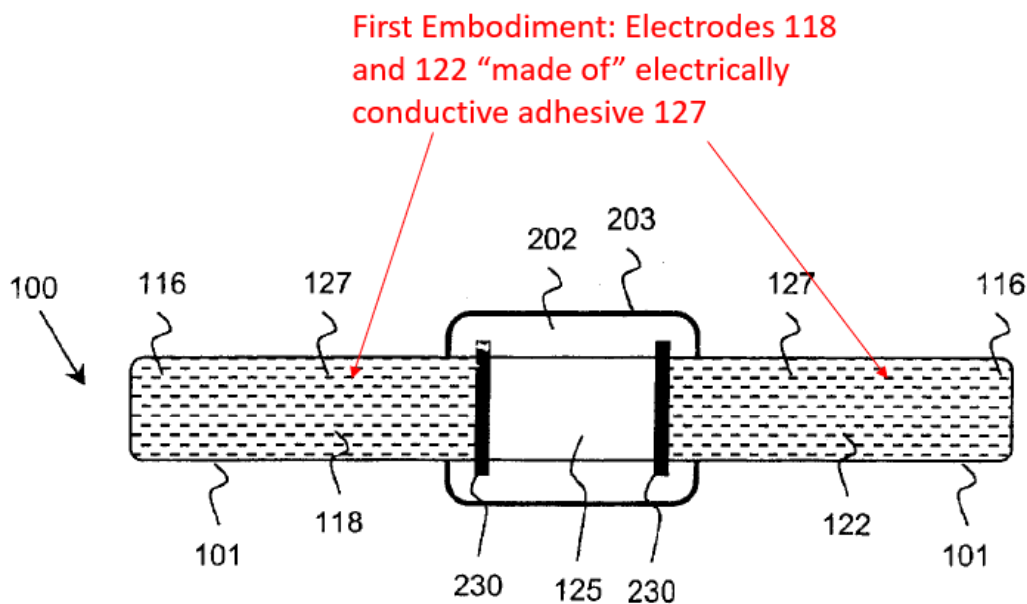
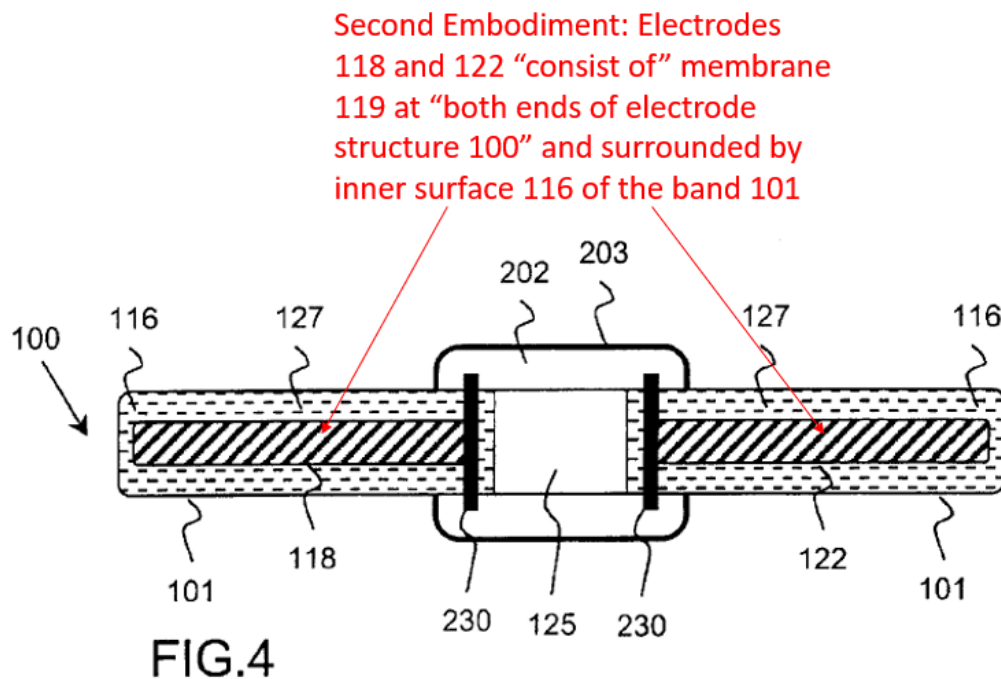


FIG.7

EX1006, FIG. 7 (annotated).

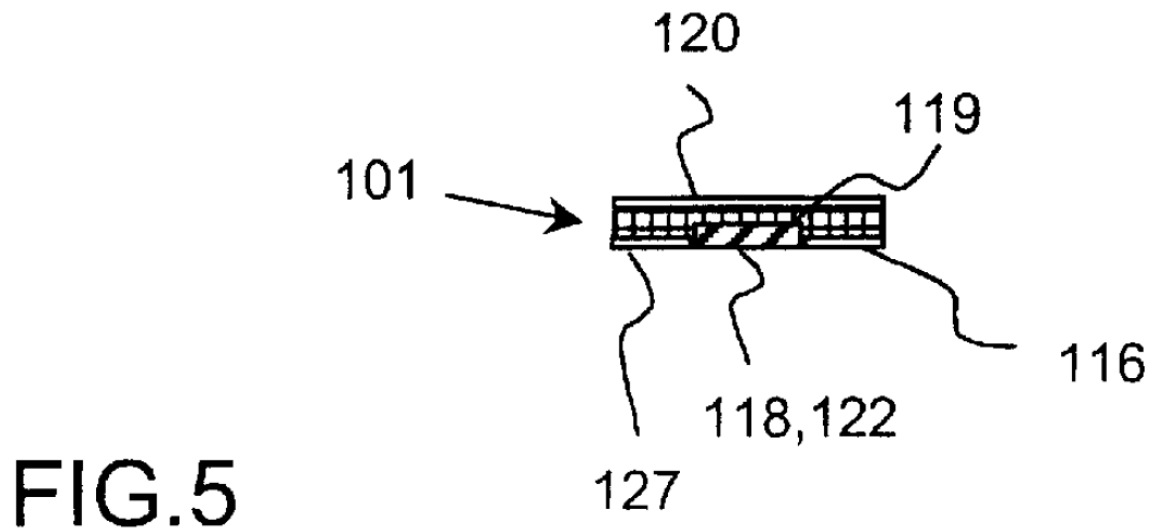
In a “second embodiment, as in FIGS. 3 to 6, the electrodes 118, 122 of electrode structure 100 **consist of a membrane 119** that is located at both ends of the electrode structure 100.” EX1006, 5:33-38; *see also* 3:31-40 (“the first electrode and the second electrode of the electrode structure ***consist of*** an electrically conductive membrane at both ends of the electrode structure, at the electrode, and the electrodes at both ends of the electrode structure are narrower than the band-like component”). That is, in this second embodiment, each of the

electrodes 118 and 122 is made of or “consist[s] of” a membrane 119 which can be “electrically conductive plastic or a similar conductive material.” EX1006, 5:33-38; APPLE-2004, ¶¶55-58, 105-106, 108-115. This configuration, in which the adhesive 127 is on an inner surface 116 of the band 101 surrounding the electrodes 118 and 122, is shown in FIG. 4:



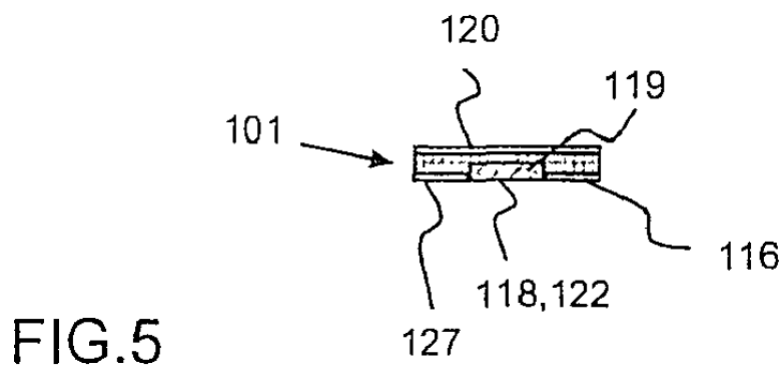
EX1006, FIG. 4 (annotated)

As shown in the cross-section of the embodiment of FIG. 4, the reference numeral 119 is pointing to the electrode 118, 122 and not a separate membrane structure surrounding or enclosing the electrode 118, 122:



EX1006, FIG. 5; 4:35-41

The fact that reference numeral 119 is pointing to the electrodes 118, 122, indicating that, as described in the specification, the electrodes 118, 122 “consist of” the membrane 119, is demonstrated even more clearly in the Finnish patent to which Nissilä claims priority (FI Patent No. 119716 B (Issued Patent of Application No. 20002304)):

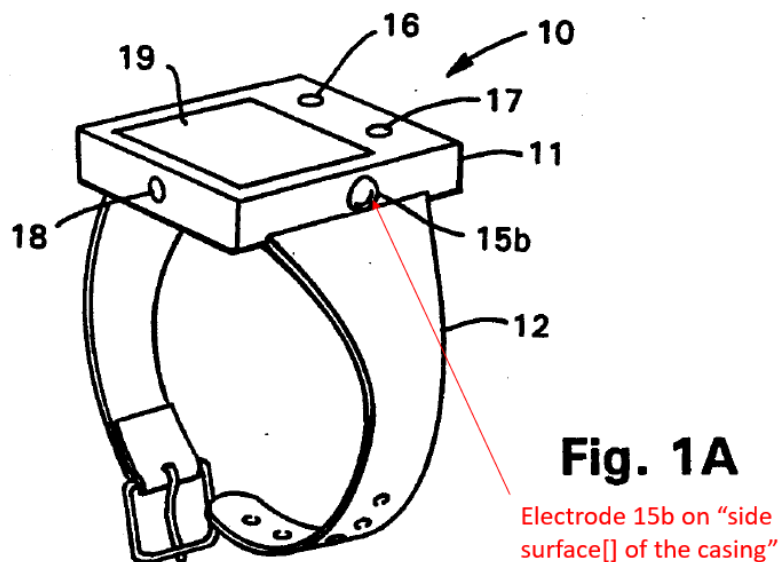


APPLE-2006, FIG. 5.

As discussed in greater detail in Section VI.A.2, *infra*, there is no disclosure in Nissilä of a separate membrane 119, distinct from the electrodes 118 and 122, that surrounds, encloses, or otherwise comes between the electrodes 118 and 122 and the skin of the wearer. APPLE-2004, ¶¶58, 105-106.

C. Overview of Righter (Secondary Reference Relied Upon in Ground 3)

Righter, which is only asserted in Ground 3 and not used for any independent claim, describes “a portable ECG monitor/recorder 10 which is adapted to be worn on the wrist of a user.” EX1007, 2:50-53. As shown in FIG. 1A, Righter’s device includes a “pair of conductive electrodes 15b, 15c...on opposing side surfaces of the casing 11,” “push-buttons 16, 17 on its top surface,” and a “serial output port 18.” EX1007, 2:65-67, 3:20-24.



VI. THE PETITION FAILS TO DEMONSTRATE THAT THE CITED REFERENCES, SINGLY OR IN COMBINATION, DISCLOSE OR RENDER OBVIOUS ALL ELEMENTS OF THE CHALLENGED CLAIMS

A. None of the Grounds Demonstrate Obviousness of Claim 1

The Petition asserts two grounds challenging independent claim 1, with Ground 1 based on Markel alone and Ground 2 based on Markel in view of Nissilä. However, neither Markel nor Nissilä discloses a configuration in which a first pad “is embedded in a first portion of the enclosure” and “positioned *underneath* the exterior surface of the first portion [of the enclosure]” as required by claim 1. The Petition also fails to demonstrate that it would have been obvious to modify the references to position the electrodes underneath an exterior surface of the enclosures of the Markel and Nissilä devices.

1. *Markel neither anticipates nor renders obvious claim 1 (Ground 1)*

Ground 1 fails with respect to claim 1 because Markel does neither teaches nor suggests concealing an electrode (which AliveCor equates to the claimed “first pad”) underneath the exterior surface of the device. APPLE-2004, ¶¶61-94. Specifically, Ground 1 fails to demonstrate that Markel discloses “wherein [a] first pad is positioned underneath [an] exterior surface of [a] first portion” of the

enclosure, as required by element [1.c.iii].⁶ The Petition provides two theories of how Markel allegedly provides element [1.c.iii]: one based on what AliveCor alleges is “Apple’s interpretation of [1.c.iii]” and one based on AliveCor’s alleged “Correct interpretation of [1.c.iii].” Pet., 16-21. Both of AliveCor’s theories fail for the below reasons.

a. Ground 1 fails to provide element [1.c.iii] under the broad interpretation erroneously ascribed to Apple

As addressed in Section IV, *supra*, element [1.c.iii] should be given its plain and ordinary meaning, and therefore requires that the first pad and the first portion of the enclosure be distinct components and that the first pad is “positioned underneath the exterior surface of the first portion” of the enclosure. APPLE-2004, ¶¶36-37. There is no support for AliveCor’s assertion that element [1.c.iii] can be satisfied by “the surface of an exposed electrode pad that is configured to detect a cardiac signal via direct contact with the user’s skin” alone, without that pad being “positioned underneath the exterior surface” of the first portion of the enclosure. APPLE-2004, ¶70.

AliveCor’s juxtaposition of this broader interpretation with a narrower interpretation that AliveCor identifies as “correct” makes clear that AliveCor and

⁶ Apple adopts AliveCor’s claim element numbering for this Response.

its expert do not actually believe the broader interpretation (that AliveCor erroneously attributes to Apple) is correct. *See* Pet., 16-19; EX1003, ¶127 (AliveCor’s expert expressing: “I disagree” with the broader interpretation); APPLE-2013, 84:19-85:21.

Even under AliveCor’s broader interpretation, AliveCor’s asserted obviousness theory fails, as it relies improperly upon the mapping of a single prior art component to two distinct features of claim 1.

In more detail, AliveCor provides two mappings of Markel to element [1.c.iii] under this broader interpretation. In a first mapping, AliveCor states that “Markel teaches that the second electrode is ‘*positioned on the audio output portion 610*’ of the electronic device” and that “[s]uch electrode placement may, for example, provide for *user contact*’ with the second electrode ‘during the process of listening’ to the electronic device.” Pet., 17 (emphasis in original). In a second mapping, AliveCor states that “[w]ith respect to Markel’s Figure 4 configuration, the second electrode is ‘*placed on the right side portion 420*’ of the electronic device” and “[s]uch electrode placement allows the electrode to ‘*contact a user* during normal (or typical) use of the [electronic device].” Pet., 18 (emphasis in original). AliveCor then argues that because “Markel discloses that its ‘second electrode’ may include an exposed electrode pad that is configured to

detect a cardiac signal via direct contact with the user's skin," Markel renders obvious this element. Pet., 16, 19; APPLE-2001, ¶¶67-70; APPLE-2004, ¶¶72-75.

In both cases, AliveCor improperly maps two distinct features of claim 1—i.e., “first pad” and “exterior surface of the first portion”—to the same component in Markel—i.e., an “audio output portion 610” (in mapping one) or “the right side portion 420” (in mapping two) in Markel. Pet., 17-19. By contrast, not only are the “first pad” and the “exterior surface of the first portion” of the enclosure two separate components of claim 1, claim 1 also recites a specific arrangement of the first pad with respect to the “exterior surface of the first portion” of the enclosure. Specifically, claim 1 requires that the first pad is both “embedded in [the] first portion of the enclosure” and “positioned underneath the exterior surface of the first portion” of the enclosure. APPLE-2004, ¶¶75-76. This claimed physical arrangement of the first pad with respect to the exterior surface of the first portion of the enclosure makes clear that these are two distinct components of the claimed electronic device. APPLE-2001, ¶71; APPLE-2004, ¶75.

The Federal Circuit has held that mapping a single claim component to two distinct components of an invention is legally improper. *See, e.g., Becton, Dickinson*, 616 F.3d at 1254 (“Where a claim lists elements separately, ‘the clear implication of the claim language’ is that those elements are ‘distinct component[s]’ of the patented invention...In the absence of any evidence to the

contrary, we must presume that the use of...different terms in the claims connotes different meanings.”); *Engel Indus*, 96 F.3d at 1404-05 (concluding that when a claim provides for two separate elements, “they logically cannot be one and the same.”). AliveCor neither alleges nor offers sufficient evidence to justify non-application of this legal presumption.

For at least these reasons, AliveCor’s theory on how Markel provides element [1.c.iii] under the alleged broader interpretation fails.

b. Ground 1 fails to provide element [1.c.iii] under plain and ordinary meaning

The Petition also fails to demonstrate that Markel provides element [1.c.iii] under what AliveCor identifies as the “[c]orrect interpretation of [1.c.iii].” Pet., 19-21. There is no disclosure or suggestion in Markel that would have motivated a POSITA to place an electrode pad ***underneath*** an enclosure of a device, as explained below, for multiple reasons. APPLE-2001, ¶¶72-73; APPLE-2004, ¶¶77-94.

As an initial matter, AliveCor identifies no motivation in Markel to place an electrode pad ***underneath*** a conductive plastic layer or other portion of the enclosure, because none exists, and because disclosure of the underlying concept itself is similarly missing from Markel. AliveCor insists that Markel’s discussion of “substantially conceal[ing]” the presence of electrodes would have led a POSITA to alter Markel to position an internal electrode pad under an external

conductive layer of the device. Pet., 20. However, these arguments ignore the actual disclosures of Markel (discussed in greater detail below) which reveal that the presence of electrodes is concealed by forming the electrodes of a “conductive plastic” that visually blends in with the surrounding plastic housing. EX1005, [0037]-[0040], [0045], [0047]; APPLE-2001, ¶77; APPLE-2004, ¶¶78-79, 81. There is simply no disclosure in Markel of concealing the presence of electrodes by positioning them under the exterior surface of the device.

Indeed, all three of the electrodes from various different embodiments of Markel that AliveCor identifies as allegedly reading on the claimed “first pad” are expressly described as being on the *exterior* of the device for direct contact with the skin of the user. APPLE-2004, ¶¶82, 85-88, 64. Specifically, in various different mappings of Markel to claim 1, AliveCor identifies the electrode “disposed on the audio output portion 610” of the MCD shown in FIG. 6, the “second electrode 122” shown in FIG. 10, and the electrode “placed on the right side portion 420” of the MCD shown in FIG. 4. Pet. 11-14, 18-19, EX1005, [0050], [0058], [0045]. All of these three mappings presented in the Petition fail because they are all *external* electrodes positioned for direct contact with the user’s skin. APPLE-2004, ¶¶85-88.

For example, the electrode “disposed on the audio output portion 610” in FIG. 6 “provide[s] for *user contact with* [the] electrodes during the process of

listening to the MCD 100.” EX1005, [0050], *see also* [0044] (“...**provide for electrode contact with an ear or cheek of a user** of the MCD 100.”). AliveCor’s expert stated that Markel’s description of the electrode being “placed on an audio output portion 142...mean[s] that it's on the -- on the outside of the 18 audio portion.” APPLE-2013, 64:6-18.

Continuing to FIG. 10, the “second electrode 1022” is clearly depicted as being positioned on, and extending from, the exterior of the device:

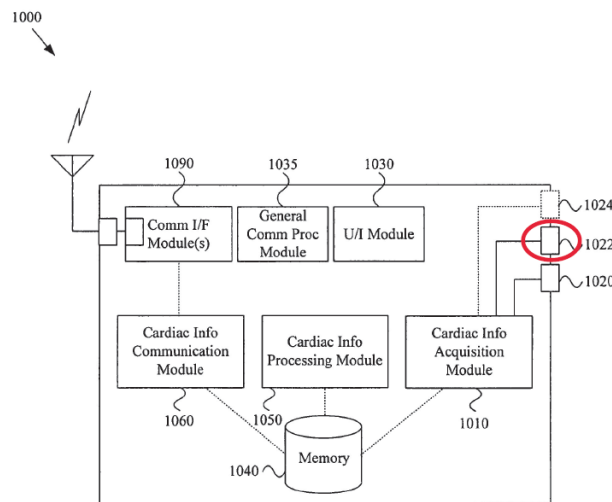


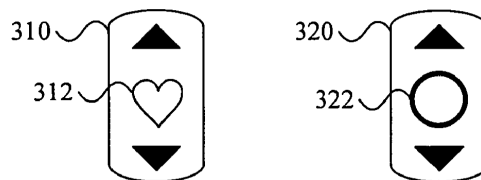
Figure 10

EX1006, FIG. 10 (annotated)

Finally, the electrodes of FIG. 4 are positioned “on a main body portion 110 of the MCD 100” to “provide for **electrode contact with a user's hand** during use of the MCD 100.” EX1005, [0043]-[0045]; APPLE-2013, 73:19-74:3 (AliveCor’s expert stating that electrode 420B “would constitute the first pad of Claim 1 of the ’257”). Therefore all three readings of Markel on the “first pad” of claim 1

presented by AliveCor show electrodes that are positioned on the *exterior* of the device, and not underneath a portion of the enclosure. APPLE-2004, ¶¶85-88.

Markel discloses two scenarios for its electrodes: one where the electrodes are identifiable by the user, and the other where the electrodes are “concealed from the user.” EX1005, [0039]; APPLE-2001, ¶75; APPLE-2004, ¶¶80-81. In its illustrative examples of both identifiable and concealed electrodes, the electrodes are positioned on the exterior of the device. APPLE-2004, ¶¶80-82. For identifiable electrodes, “an electrode may comprise *a visible or tactile indicium* to indicate the location of the electrode to a user.” *Id.* For instance, in FIG. 3 (reproduced below) “the first pushbutton 310 comprises a heart-shaped indium 312 (or other visible characteristic)” and “the second pushbutton 320 comprises a circular projection (or other tactile characteristic) to notify a user of the location of the electrode.” *Id.*



EX1005, FIG. 3.

Regarding *concealed* electrodes, Markel explains that “an electrode (or all electrodes) or other sensor may be substantially concealed (or hidden) from a user” by having the electrode made of “*molded conductive plastic with little or no*

visible indication of the electrode presence.” Id., [0040]. Specifically, Markel uses a “molded conductive plastic” to ***make or form*** its electrode such that the plastic will serve to “conceal (or hide)” the presence of the electrode with respect to the rest of the device enclosure. APPLE-2001, ¶76; APPLE-2004, ¶¶135.

AliveCor’s expert agreed that in Markel’s embodiment in which “the electrodes are made from molded conductive plastic, the presence of the electrodes is concealed because they are visually similar or possibly even visually identical to the surrounding nonconductive plastic of the enclosure.” APPLE-2013, 63:21-64:5, 109:5-9, 168:2-5 (“I think simply saying that something is hidden, by itself does not explain fully how it's hidden.”).

This is consistent with the rest of Markel, which discloses ***forming an electrode from*** “conductive plastic,” and molding the conductive plastic into the corresponding portion of the device. *See, e.g.*, EX1005, [0037] (“an electrode may be ***formed from*** a conductive plastic”); [0045] (disclosing that first and second electrodes are placed on, e.g., ***molded*** into, regions 410b and 420b of the main body, where those regions, too, are ***made of*** conductive plastic and are separated by an insulating region 415); [0047] (disclosing multiple exemplary pushbuttons that can be ***made of*** conductive plastic to form an electrode). In other words, the concealed alleged electrode in Markel *is* “***made of***” or “***formed from***” the

conductive plastic, and is not *underneath* a conductive plastic layer. APPLE-2001, ¶77; APPLE-2004, ¶82.

From this, it is unsurprising that AliveCor failed to cite any teaching or suggestion in Markel of concealing an electrode pad by positioning it underneath an enclosure of a device, as there is none. Instead, Markel describes concealing electrodes by making them from conductive plastics not discernible by a user and placing them on the exterior of the device. A POSITA would find nothing in cited portions of Markel to inform or encourage placement of an electrode underneath an exterior layer. APPLE-2001, ¶78; EX1005, [0040]; APPLE-2004, ¶83.

Moreover, AliveCor fails to identify any portion of Markel that suggests modifying Markel's teachings to position an electrode pad under the exterior for several reasons. First, AliveCor fails to provide any reasoning as to why a POSITA would have found Markel's method of concealment to be deficient, or why a POSITA would have been motivated in light of Markel's manner of concealment to nevertheless place an electrode underneath the exterior portion of the device. APPLE-2001, ¶79; APPLE-2004, ¶84. Although AliveCor's expert contends that hiding the electrode underneath a plastic conductive layer is a form of concealment taught by Markel, his opinion is not supported by Markel's actual disclosures. EX1003, ¶¶122, 135-139.

Markel does not disclose or suggest that its method of concealment involves placing an electrode pad *underneath* an enclosure of a device, as alleged by AliveCor (Pet., 20) because Markel's invention is instead directed to *exposing* its electrodes to *enable a user to directly contact them*. APPLE-2001, ¶81. To this point, Markel specifies throughout its disclosure that its electrodes are “disposed on” or “placed on” the exterior surface of the device to “provide for *user contact*” with the electrode. EX1005, [0045], [0050]. For example, in the configurations in Figures 4 and 6, which AliveCor attempts to map to claim 1, the electrode is “*placed on* the right side portion 420,” and “*disposed on* the audio portion 610.” EX1005, [0045], [0050]. “Such electrode placement” in Markel is to “*provide for user contact with both electrodes*” when the user uses the device. *Id.*, [0050]. Although AliveCor argues that “a POSITA would recognize that the pad of an electrode can be conductively coupled to a user through an intermediate conductive material” the Petition identifies no support for this assertion in Markel, only a nearly identical statement from its expert. Pet., 20. The Petition also fails to explain *why* a POSITA would have been motivated to include an extra conductive layer under the electrodes of Markel's device.

Markel uses the same strategy for its electrode placement on the device's exterior throughout its disclosure, with no discussion of any additional electrodes or pads placed under the exterior. APPLE-2001, ¶82. Markel starts with providing

an “exemplary mobile communication device 100 (‘MCD’).” EX1005, [0033]-[0034]. The electrodes in MCD 100 are “***disposed on*** any, any combination of, or all of” the example external device components of MCD 100. *Id.*, [0042]. “Such electrode placement may, for example, provide for ***electrode contact with a user*** while the user is pushing a particular one or more pushbuttons.” *Id.*; *see also*, [0045] (“A first electrode may, for example, be ***placed on*** the left side portion 410...”); [0046] (“a first electrode 510 ***positioned on a send button***, and a second electrode ***disposed on*** the back 520 of the mobile communication device.”); [0047] (“electrodes may be ***disposed on*** a same pushbutton...”); [0050].

Even for devices that Markel discloses beyond MCD 100, Markel describes disposing or placing the electrode ***on*** an exterior surface of the device. *See e.g.*, *id.*, [0057] (“one or more cardiac sensors (e.g., electrodes) may be ***disposed on*** a steering wheel...”); *id.*, (“each of the left and right hands may ***advantageously contact respective cardiac sensors***...”); *id.*, [0076] (“keyboard 1300 may, for example, comprise one or more cardiac sensors 1310 (e.g. electrodes and/or acoustic sensors) ***on a main body portion***.”); *id.*, [0077] (“an electrode 1410 ***on a central main*** body portion of the mouse 1400.”); APPLE-2001, ¶83.

In fact, AliveCor’s expert admitted during his deposition that his belief that a POSITA would have configured Markel’s device to include a second electrode/pad positioned underneath each exterior electrode of Markel’s device is not rooted in

the disclosures of Markel, but is rather based on his unsupported belief that in the “molded from conductive plastic” embodiments of Markel “it would be necessary to have something more conductive that makes contact with that molded plastic.” APPLE-2013, 18:10-18, 28:3-18 (insisting that “a conductive plastic surface alone, would be inadequate” without identifying support for this assertion in the record).

Dr. Berger repeatedly refused to identify any portions of Markel that actually disclose a second, internal pad positioned underneath the exterior electrode, and instead repeatedly insisted that his belief that Markel would require such a dual-layered electrode is based a POSITA’s alleged understanding “that plastic alone, without the use of more conductive material making contact with that plastic, would not serve adequately and would require more conductive materials to make that electrical integrity work.” APPLE-2013, 33:4-9, 30:18-22, 34:21-35:7, 35:15-18 (insisting that “a POSITA would understand that anything less conductive than metal is going to require combining a metal in the full form of the electrode” without identifying any support for this assertion in the record), 101:11-22, 108:21-109:3, 111:22-112:7.

Yet neither the Petition nor Dr. Berger’s declaration contains any analysis or evidence to demonstrate that an additional electrode/pad “would be necessary” when Markel’s electrodes are themselves molded from conductive plastic. Instead, both Markel itself, as well as other evidence of record, contradicts Dr. Berger’s

position. Markel is express that “*various conductive plastics* (e.g., graphite-impregnated plastic or the like) may *provide sufficient conductivity for an electrode to perform adequately*”, and nowhere describes Dr. Berger’s alleged requirement for an additional metal layer positioned underneath the conductive plastic. EX1005, [0037]. Similarly, Nissilä discloses that an electrode formed of “electrically conductive plastic” alone is sufficient to detect a user’s heart signal. EX1006, 5:33-37.

More, that Markel already teaches concealing the electrode by other means (i.e., molded from conductive plastic) would render also placing the electrodes under the exterior layer to conceal them in a second manner redundant and unnecessary. This further indicates that a POSITA would not be motivated to modify Markel in the manner AliveCor argues. Indeed, contrary to AliveCor’s contention, nothing in Markel suggests placing an electrode “underneath” another layer. APPLE-2001, ¶83; APPLE-2004, ¶88. Markel’s lack of any disclosure or suggestion to place an electrode underneath the enclosure of Markel’s device indicates that AliveCor’s obviousness theory in Ground 1 is faulty. *In re Warner*, 379 F.2d 1011, 1017 (CCPA 1967) (a showing of obviousness must rest on a factual basis, and it may not resort to speculation, unfounded assumptions or hindsight reconstruction to supply deficiencies in the factual basis); *W.L. Gore & Assocs., Inc. v. Garlock, Inc.*, 721 F.2d 1540 (Fed. Cir. 1983) (warning against

“fall[ing] victim to the insidious effect of a hindsight syndrome wherein that which only the inventor taught is used against its teacher”).

And, even if one accepts for the sake of argument that Markel’s electrodes could be placed underneath the exterior of its device, the mere fact that the prior art *could* be modified does not make that modification obvious unless it is suggested by the prior art. *In re Fritch*, 972 F.2d 1260 (Fed. Cir. 1992); *In re Gordon*, 733 F.2d 900, 902 (Fed. Cir. 1984). There must be some teaching or suggestion in the references to support the modification proposed by AliveCor, yet here, there is none. *Smithkline Diagnostics, Inc. v. Helena Labs Corp.*, 859 F.2d 878, 886 (Fed. Cir. 1988).

Moreover, the fact that Markel expressly describes how to conceal the presence of its external electrodes (by forming them of molded conductive plastic) and includes no suggestion to place a second electrode under the external electrode gives rise to an especially strong “inference of nonobviousness.” *DePuy Spine, Inc. v. Medtronic Sofamor Danek, Inc.*, 567 F.3d 1314, 1326 (Fed. Cir. 2009) (“An *inference of nonobviousness is especially strong* where the prior art’s teachings undermine the very reason being proffered as to why a person of ordinary skill would have [modified] the known elements.” (emphasis added)); *Sony Corp. v. Fujifilm Corp.*, IPR2018-01751, Paper 14, 11 (PTAB April 12, 2019) (finding a lack of obviousness when the primary reference “already address[ed] the problem”

purportedly motivating the modification and “it is not evident why [the primary reference] would have benefited from modifications.”).

AliveCor’s modification of Markel’s device involves interjecting an unnecessary intermediate layer under the exterior electrode. APPLE-2001, ¶¶78-80; APPLE-2004, ¶91. However, a POSITA reading Markel’s disclosure as a whole would have understood that, contrary to AliveCor’s arguments, Markel does not teach a method of concealing an electrode by placing the electrode “underneath the exterior surface of” a first portion of the enclosure. APPLE-2001, ¶80; *see* Pet., 20.

It is AliveCor’s burden to specifically identify, in the Petition, where the cited references disclose each and every element of the challenged claims. 37 C.F.R. § 42.104(b)(4); *see also Microsoft Corp. v. Global Touch Solutions, LLC*, IPR2015-01024, Paper 11 at 7 (PTAB Sept. 23, 2015). AliveCor has failed to identify any disclosure in Markel of a pad positioned ***underneath*** an exterior surface of the enclosure of the device, and therefore AliveCor has not met its burden to “specify where each element of the claim is found in the prior art.” *Id.*

c. The Petition fails to demonstrate that a lower pad is embedded in an exterior portion of the enclosure as required by element [1.c.i]

As addressed in Section IV, *supra*, the proper construction of the term “embedded in” requires more than two materials or substrates that are merely

positioned adjacent to, parallel, or against each other but rather, the plain and ordinary meaning of the term “embedded in” means “at least partially set in or partially surrounded by a material.” APPLE-2004, ¶¶27-35, 95. And the claims here require more than that the first pad be merely embedded in the device, but rather that the first pad is specifically “embedded in a *first portion* of the enclosure” and that “the first pad is configured to detect a first electrical signal of the user’s cardiac signal *via the user’s skin’s contact with the exterior surface of the first portion of the enclosure.*”

AliveCor has proposed no configuration of the inner and outer electrodes in its proposed (and entirely unsupported) two-electrode configuration for Markel. Therefore the Petition fails to demonstrate that the first pad is “embedded in” a first portion of the enclosure which the user contacts to detect the user’s cardiac signal. Even if Markel were modified to add a second intermediate conductive layer under the electrodes of Markel’s device, AliveCor makes no attempt to demonstrate why such an intermediate layer would have been “embedded in” the external electrode rather than the two layers being merely in parallel contact with no portion of the outer electrode at least partially surrounding the lower electrode/pad. APPLE-2004, ¶¶96-97. AliveCor’s expert agreed that he would not “use the term ‘embedded’” to describe two flat pads in parallel contact. 61:8-62:5. Because the Petition includes no description of a specific relationship between the

lower and external electrodes in the proposed, modified version of Markel's device, the Petition has failed to demonstrate that the lower electrode is "embedded in" the external electrode. APPLE-2004, ¶¶95-101.

For at least these reasons, AliveCor fails to demonstrate that Markel renders obvious claim 1 and its respective dependent claims.

2. **Markel in view of Nissilä does not render obvious claim 1 (Ground 2)**

Ground 2 fails because, as with Markel, Nissilä includes no disclosure of a pad or electrode positioned *underneath* the exterior surface of a first portion of the enclosure of Nissilä's device. APPLE-2004, ¶¶102-132. All of AliveCor's assertions that Nissilä discloses a conductive membrane that is distinct from the electrode 118 or the electrode 122 and positioned between the electrode 118 or the electrode 122 and the skin of the user are based on nothing more than AliveCor's expert's unsupported assertions, using the claims of the '257 patent as a guide. To be clear, there is no disclosure anywhere in Nissilä of a separate membrane positioned between the electrodes 118 and 122 of Nissilä and the skin of the user wearing Nissilä's device. APPLE-2004, ¶¶58, 105-106.

AliveCor's entire argument is based on the following disclosure of Nissilä:

According to a second embodiment, as in FIGS. 3 to 6, the electrodes 118, 122 of the electrode structure 100 consist of a membrane 119 that is located at both ends of the electrode structure 100, at the electrode

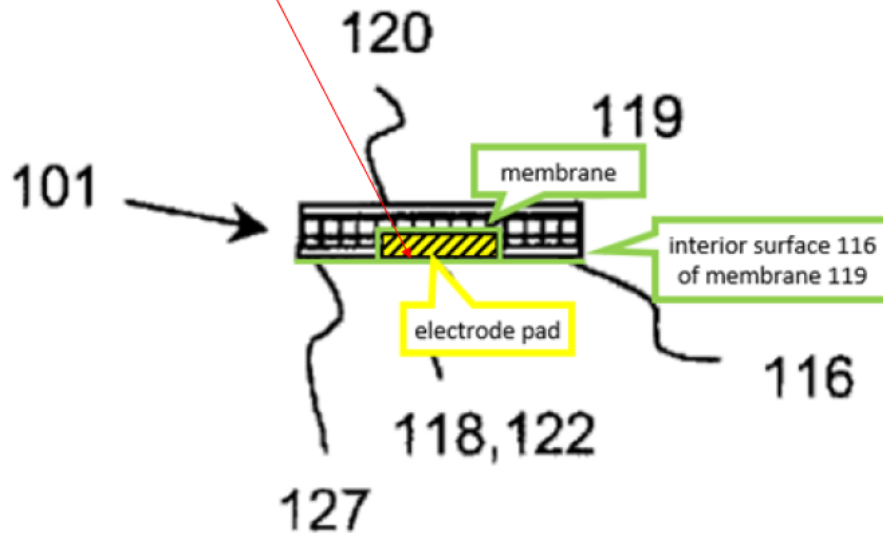
118, 122, and is made of metal, electrically conductive plastic or a similar conductive material.

EX1006, 5:32-37 (cited at Pet., 71-72). AliveCor relies on this disclosure of Nissilä alone to support its assertion that “the electrode pad is *underneath* the ‘membrane 119,’ which includes an ‘exterior surface of the enclosure’ and ‘exterior surface of the first portion.’” Pet., 71-72. However, as discussed in Section V.B., *supra*, in this embodiment of Nissilä “the electrodes 118, 122 of electrode structure 100 ***consist of a membrane 119.***” EX1006, 3:18-40; 5:25-38. There is simply no discussion in Nissilä that the electrodes 118 and 122 are distinct from the membrane 119 and certainly no disclosure that they are somehow embedded in, enclosed within, or surrounded by a separate membrane 119, as AliveCor asserts. APPLE-2004, ¶¶105, 110, 113, 118-119.

AliveCor’s assertions that Nissilä discloses a separate conductive membrane positioned over the electrodes 118 and 122 are based entirely on an altered version of Nissilä’s FIG. 5 reproduced repeatedly throughout the Petition in which AliveCor has drawn an ***additional layer*** that is ***not present in the actual FIG. 5 of Nissilä*** and for which there is no support in the specification of Nissilä. APPLE-2004, ¶¶103-105.

No support in Nissilä for this
additional green layer drawn by
AliveCor between electrode
118, 122 and the wearer's skin

Ex. 1006, Fig. 5 (annotated)



Pet. 72 (AliveCor's altered version of FIG. 5 of Nissilä in which AliveCor has drawn an extra layer) (additional annotation in red by Apple)

AliveCor has taken a limited disclosure from Nissilä of a conductive membrane 119 that *forms* the electrodes 118 and 122 and used the recitations of the claims of the '257 patent itself to create an extra layer out of whole cloth that is neither depicted nor described anywhere in Nissilä. As such Ground 2 fails with respect to claim 1 at least because neither Markel nor Nissilä discloses a “first pad [that] is positioned *underneath* the exterior surface of the first portion [of the enclosure].” APPLE-2004, ¶¶110-123. Rather, as discussed in greater detail

below, just as with Markel, Nissilä discloses electrodes positioned on the exterior of its respective device positioned to contact the wearer's skin.

a. Nissilä's electrodes 118 and 122 are formed from the membrane 119

In its Ground 2 arguments, AliveCor asserts that Nissilä allegedly provides the disclosure missing from Markel of “a pad that is positioned underneath the exterior surface of an enclosure.” Pet. 71. AliveCor goes on to erroneously assert that Nissilä discloses an “electrode pad [that] is underneath” a separate “‘membrane 119,’ which includes an ‘exterior surface of the enclosure’ and ‘exterior surface of the first portion.’” *Id.*, 72. AliveCor further asserts that “Nissilä discloses a ‘second electrode’ embedded in and enclosed by ‘membrane 119’ (i.e., a first portion of the enclosure).” *Id.*

Following these unsupported assertions, AliveCor includes its altered version of Nissilä's FIG. 5 with an extra layer drawn by AliveCor between the electrodes 118, 122, as discussed on pages 40-41, *supra*. As discussed below, there is no support for AliveCor's assertion that Nissilä discloses a separate membrane 119 that is distinct from the electrodes 118 and 122. Indeed, the terms “underneath,” “embedded” and “enclosed” appear nowhere in Nissilä. *See e.g.*, APPLE-2013, 141:12-13 (“I don't find the word ‘enclose’ in Nissila.”), 141:14-21 (“I don't find that term [embedded]” in Nissilä).

In stark contrast to AliveCor's assertions, what Nissilä actually discloses is that, in the embodiment of FIGs. 3-6 (the embodiment relied on by AliveCor in the Petition), each of the electrodes 118 and 122 is a membrane 119 made of metal, electrically conductive plastic or a similar conductive material.⁷ EX1006, 5:32-49; APPLE-2013, 129:10-16 (AliveCor's expert stating that the electrodes 118 and 122 are "[m]ade of metal, electrically conductive plastic or a similar conductive material").

Nissilä only discusses "a membrane" in two narrow instances: one paragraph of the Summary section in column 3 and one paragraph of the Detailed Description in column 5. EX1006, 3:24-40; 5:33-49. Both of these passages disclose that the membrane is the material that makes up the electrodes, not a separate material that encloses the electrodes. APPLE-2004, ¶¶112-114. In column 3, Nissilä states that "*the first electrode and the second electrode* of the electrode structure consist of an electrically conductive membrane." EX1006, 3:24-27; 3:32-37. Similarly, Column 5 states that "*the electrodes 118, 122* of the electrode structure 100 consist

⁷ As discussed in Section V.B, *supra*, in Nissilä's other embodiment, depicted in FIGs. 7-9, the electrodes "are made of electrically conductive adhesive." EX1006, 3:18-23; 5:25-31. There is no embodiment in Nissilä in which a separate membrane encloses an electrode. APPLE-2004, ¶¶110-123.

of a membrane 119 that is located at both ends of the electrode structure 100, at the electrode 118, 122, and is made of metal, electrically conductive plastic or a similar conductive material.” *Id.*, 5:32-38.

Each of these disclosures in Nissilä means exactly what it says—the electrodes 118, 122 positioned on either end of Nissilä device “***consist of***” (or are “made of”) an electrically conductive membrane. APPLE-2004, ¶¶108-109, 113-115, 55-58. Nothing in Nissilä contradicts this clear disclosure that electrodes are made from the electrically conductive membrane or otherwise describes the membrane as a separate component from the electrodes themselves. APPLE-2004, ¶113. Notably, the Petition completely ignores this language in Nissilä that “the first electrode and the second electrode of the electrode structure consist of an electrically conductive membrane” by failing to even mention the word “consist.” EX1006, 3:24-27; 3:32-37; Pet., 71-74. Rather, AliveCor mischaracterizes the teachings of Nissilä by replacing “consist,” as used in Nissilä, with terms such as “embedded in” and “enclosed by” that appear nowhere in Nissilä. Pet., 71-72.

Several courts, including the Federal Circuit, have repeatedly found that the terms “consist of” and “consisting of” are synonymous with the terms “made of,” “formed of,” and “composed of.” *See e.g., Hoskins Mfg. Co. v. General Elec. Co.*, 212 F. 422, 428 (N.D. Ill. 1913) (“***formed of*** and ‘***composed of***’ are the same; they ***both mean consisting of***.”); *In re Bertsch*, 30 C.C.P.A. 813, 820; 132 F.2d

1014 (CCPA 1942) (we hold that the words ‘composed of’ should be regarded as synonymous with ‘consisting of.’); *Multilayer Stretch Cling Film Holdings, Inc. v. Berry Plastics Corp.*, 831 F.3d 1350, 1358 (Fed. Cir. 2016) (Taranto, dissenting) (describing the majority opinion: “As the court’s opinion explains, in patent law (and probably in the dominant strand of formal English), ‘**consisting of**’ means ‘**including only**’ (‘**containing only**,’ ‘**composed of only**,’ ‘**made of only**’).”); *Unimed Pharms., LLC v. Perrigo Co.*, LEXIS 29703, *14-15 (D. Del. 2015) (“**consisting of describes what the composition is made from**”); *Norian Corp. v. Stryker Corp.*, 432 F.3d 1356, 1361 (Fed. Cir. 2005) (describing that the term “consisting of” in a patent indicates what something is “made from”); *Azurity Pharms., Inc. v. Alkem Labs. Ltd.*, 2023 U.S. Dist. LEXIS 77839, *36-37 (D. Del. 2023) (equating the terms “consisting of” and “made from”); *Manuli Stretch USA, Inc. v. Pinnacle Films, Inc.*, 2010 U.S. Dist. LEXIS 146029, *29-30 (E.D. Ten. 2010) (equating the terms “consisting of” and “made from”).

In light of this long-held understanding that the terms “consisting of” or “consist of” are used to indicate what a component or compound is “made of,” “formed of,” and “composed of” it becomes even more clear that Nissilä’s disclosure that “***the first electrode and the second electrode*** of the electrode structure ***consist of an electrically conductive membrane***” indicate that each of the electrodes 118 and 122 is “made of,” “formed of,” or “composed of,” an

electrically conductive membrane, not enclosed by a membrane distinct from the electrode itself, as AliveCor alleges. EX1006, 3:24-27; 3:32-37; APPLE-2004, ¶¶113-116.

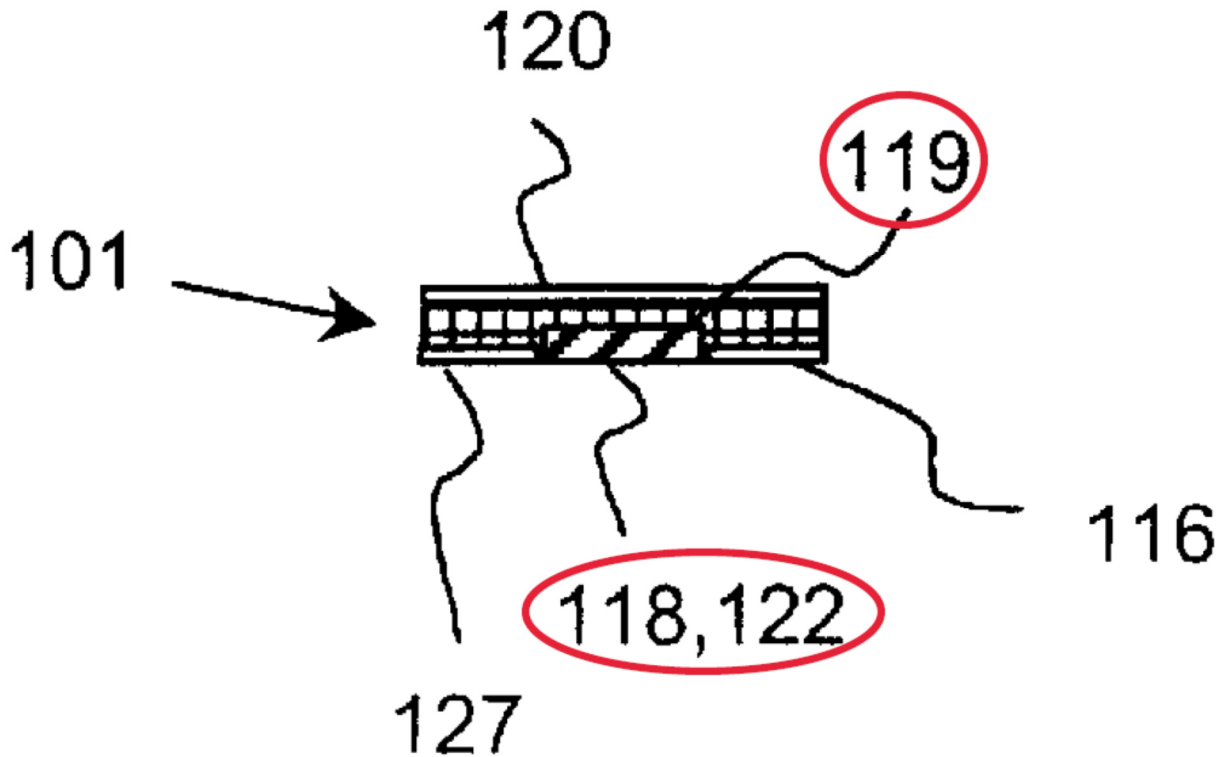
The Federal Circuit has also long held in the context of claim construction that “use [of] the phrase ‘consisting of,’ or ‘consists of,’ ... ‘creates a **very strong presumption** that that claim element is ‘**closed**’ and therefore ‘exclude[s] any elements, steps, or ingredients not specified in the claim.’” *Multilayer Stretch Cling*, 831 F.3d at 1358 (quoting *AFG Indus., Inc. v. Cardinal IG Co.*, 239 F.3d 1239, 1245 (Fed. Cir. 2001)). For similar reasons, Nissilä’s disclosure that “**the electrodes 118, 122** of the electrode structure 100 **consist of** **a membrane 119** that is located at both ends of the electrode structure 100, at the electrode 118, 122, and is made of metal, electrically conductive plastic or a similar conductive material” without identifying any other materials that make up the electrodes 118 and 122 other than the membrane 119 once again clearly indicates that each of the electrodes 118 and 122 **is** a membrane 119. EX1006, 5:32-38; APPLE-2004, ¶115. The inventors of Nissilä could have used an open ended term such as “comprising” and yet chose not to. The use of the closed term “consist of” therefore strongly indicates that each of the electrodes ***is*** a membrane 119.

This proper interpretation of Nissilä, that the electrodes 118 and 122 are ***made of*** a membrane 119 that can be “metal, electrically conductive plastic or a similar conductive material” is further indicated by the fact that Nissilä expressly identifies the materials used to form the other portions of Nissilä’s device. APPLE-2004, ¶116. For example, Nissilä expressly describes the materials used to make the band 101, stating that “the band **101** can be of plastic, textile fibre, a combination thereof or the like.” EX1006, 5:20-25. Similarly, Nissilä expressly describes that “[t]he adhesive 127 is preferably a conductive glue, such as conductive Solgel or a conductive Silicone glue.” *Id.*, 5:44-45.

In this context, a POSITA would have recognized that Nissilä’s discussion that “the electrodes 118, 122 of the electrode structure 100 ***consist of*** a membrane 119 that is located at both ends of the electrode structure 100, at the electrode 118, 122, and is ***made of metal, electrically conductive plastic or a similar conductive material***” is simply a description of the material used to manufacture the electrodes (metal or electrically conductive plastic), similar to the description of the materials used for the band 101 and adhesive 127. EX006, 5:33-38; APPLE-2004, ¶¶115-116.

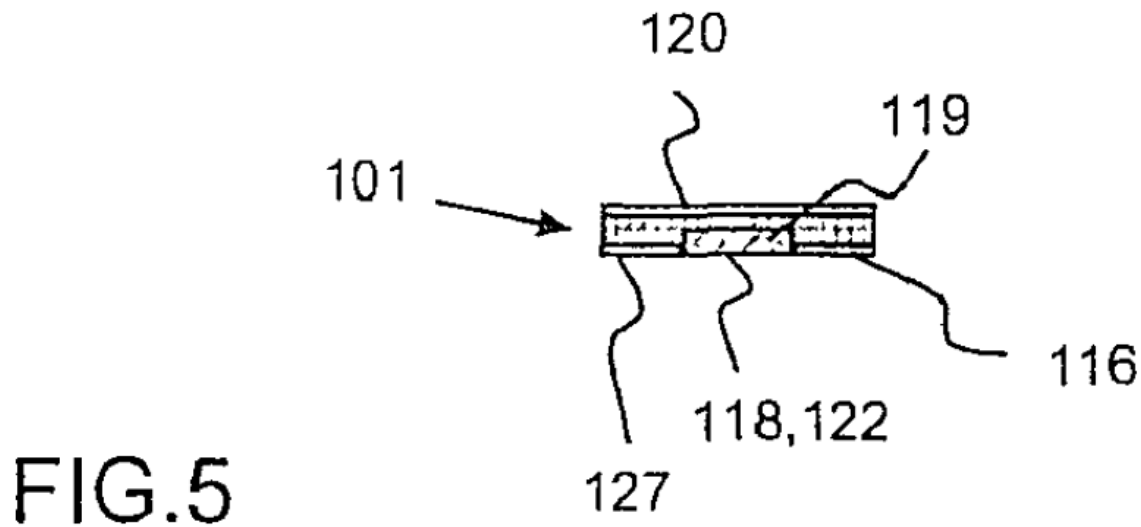
The Figures of Nissilä further support the correct interpretation that each of the electrodes 118 and 122 ***is*** a membrane 119. The reference numeral 119 appears in only one figure in Nissilä—FIG. 5. As shown in FIG. 5, the reference numerals

119, 118, and 122 are all pointing to the same structure, the electrode positioned on the user facing exterior surface of Nissilä's device. APPLE-2004, ¶¶117-118.



EX1006, FIG. 5 (annotated)

The fact that reference numeral 119 is pointing to the electrodes 118, 122, indicating that, as described in the specification, the electrodes 118, 122 “consist of” the membrane 119, is demonstrated even more clearly in the Finnish patent to which Nissilä claims priority:



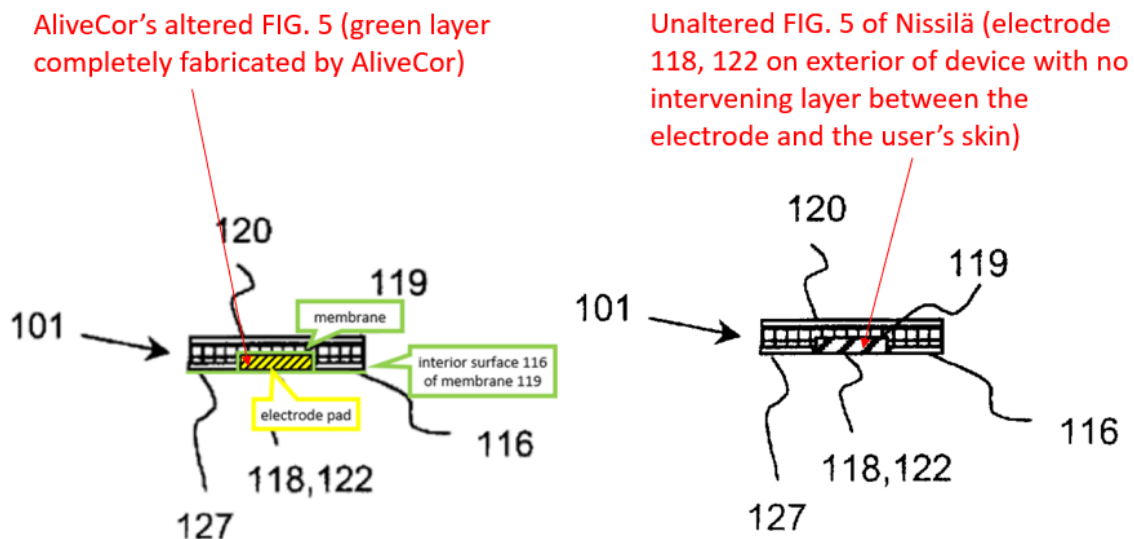
APPLE-2006, FIG. 5.

The Figures of Nissilä (and the patent application to which it claims priority) therefore confirm the disclosures of the specification that the electrodes 118 and 122 are made of or formed of an electrically conductive membrane, not enclosed by a separate membrane. APPLE-2004, ¶¶118-119.

This correct interpretation of Nissilä’s disclosure—that the membrane 119 is the electrodes 118 and 122—is further supported by the English translation of the Finnish patent to which Nissilä claims priority (APPLE-2007). APPLE-2004, ¶120. This translation of the original source document states “the first electrode and the second electrode of the electrode structure **are formed of** an electrically conductive film.” APPLE-2007, 7:4-8, 7:14-17. Similarly, in describing FIGs. 3-6, the original Finnish patent to which Nissilä claims priority states that “the electrodes 118, 122 of the electrode structure 100 **are formed of** an electrically

conductive film 119 at the position of the electrodes 118, 122 at both ends of the electrode structure 100; for example, the film is metal, electrically conductive plastic, or a comparable electrically conductive material.” APPLE-2007, 11:9-15. These disclosures of the original Finnish patent to which Nissilä claims priority once again demonstrate that discussion of the “membrane 119” in Nissilä (“film 119” in the original patent) is a description of the material used to make the electrodes 118, 122 and not a description of a second structure that is distinct from the electrodes. APPLE-2004, ¶120.

As discussed above, the green line positioned between the electrode 118, 122 and the user’s skin in AliveCor’s altered figures is completely fabricated by AliveCor as no such intervening layer appears in the actual FIG. 5 of Nissilä and the specification provides no support for such a layer. APPLE-2004, ¶¶121, 123, 103-105.



AliveCor's expert admitted during his deposition that he was "not sure" of a difference between the terms "comprising" and "consisting of" and that "I think they're very similar." APPLE-2013, 54:9-21, 139:18-140:7. He also stated that his opinions were based on a belief that the term "membrane" must refer to a "material that covers something." *Id.*, 145:13-18. However, this understanding is narrower than the plain and ordinary meaning of this term, which simply refers to "[a]ny thin sheet or layer." APPLE-2014; APPLE-2015. These admissions by Dr. Berger once again demonstrate that his altered version of Nissilä's Figure 5 is based on a misinterpretation of Nissilä's disclosures and a misunderstanding of patent law.

Other disclosures of Nissilä confirm that the electrodes are positioned on the external, user facing surface of Nissilä's device without an intervening layer between the electrodes and the user's skin. APPLE-2004, ¶122. For example, Nissilä states that "[b]ecause the inner surface 116 of the electrode structure 100 is the portion which is against the person's skin, *the electrodes 118, 122 are preferably located on the inner surface 116 of the band 101*." EX1006, 5:50-59 ("the electrodes 118, 122 are located on the inner surface 116 of the band"); 3:41-44 ("the electrodes are preferably located on the inner surface of the band.").

AliveCor's assertions lack any support from Nissilä and fail to address the clear "consist of" language in Nissilä, confirming that AliveCor's Ground 2 obviousness theory fails. *See In re Warner*, 379 F.2d at 1017 (a showing of

obviousness must rest on a factual basis, and it may not resort to speculation, unfounded assumptions or hindsight reconstruction to supply deficiencies in the factual basis); *W.L. Gore*, 721 F.2d at 1540 (“to fall victim to the insidious effect of a hindsight syndrome wherein that which only the inventor taught is used against its teacher”); *Smithkline Diagnostics*, 859 F.2d at 886.

As demonstrated above, each of the electrodes 118 and 122 consists of (i.e., is made from, formed of, or composed of) an electrically conductive membrane 119. APPLE-2004, ¶¶108-109, 113-123, 55-58. There is simply no support for AliveCor’s assertion that either of Nissilä’s electrodes is “embedded in and enclosed by” a separate and distinct membrane. Pet., 71-76; APPLE-2004, ¶¶105-106, 108-120. As such, Ground 2’s additional arguments with respect to Elements [1.c.i]-[1.c.iii] and [1.d.i]-[1.d.ii] fail.

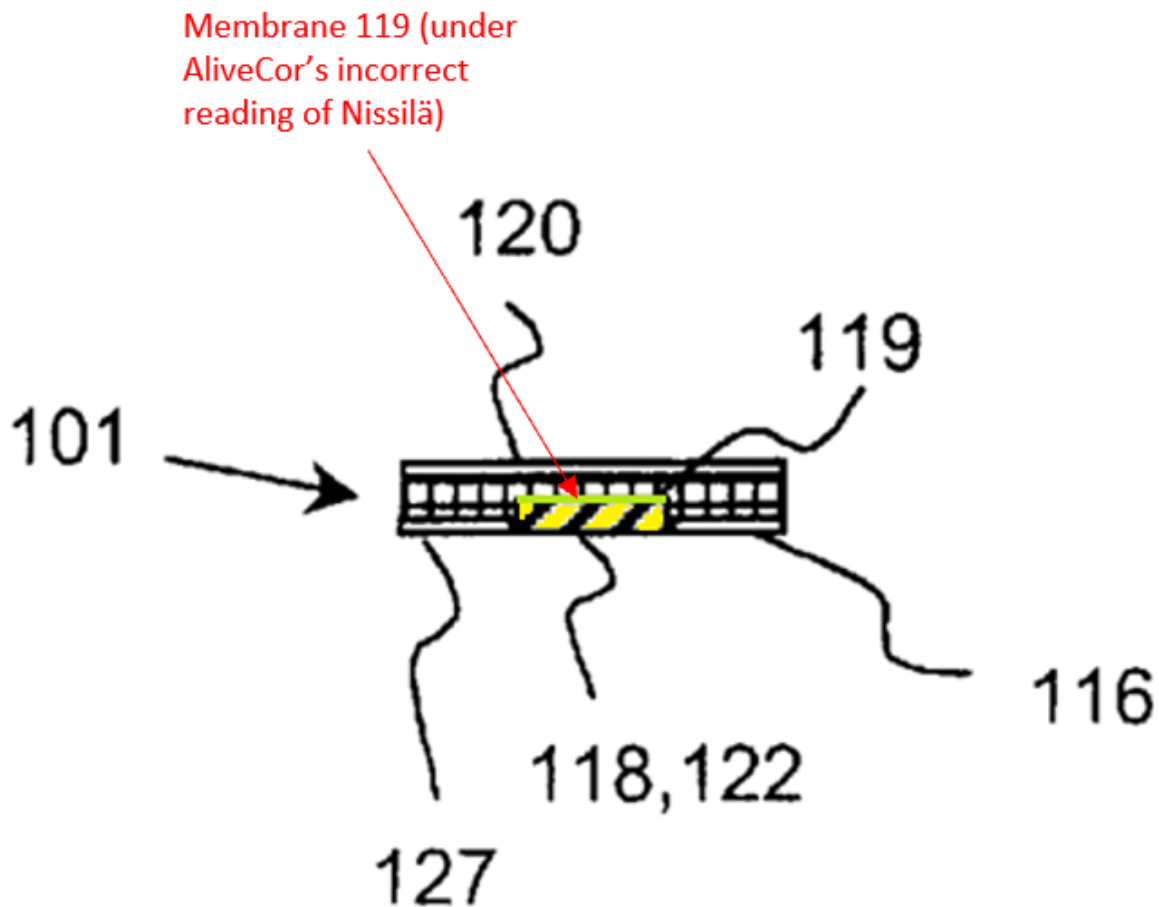
b. Even under AliveCor’s interpretation of Nissilä, there is no disclosure of a membrane being positioned between the electrodes 118 and 122 and the user’s skin

As discussed in the previous section, Nissilä discloses that the membrane 119 is the electrodes 118 and 122 of Nissilä’s device. However, even if one were to ignore the clear “consist of” language in Nissilä and adopt AliveCor’s fabricated reconstruction of Nissilä in which the membrane 119 is a separate and distinct

component from each of the electrodes 118 and 122,⁸ there is still no teaching or suggestion in Nissilä of the membrane 119 being positioned between the electrodes and the skin of the user. APPLE-2004, ¶¶124-132.

As previously discussed, Nissilä discloses that “the electrodes 118, 122 of the electrode structure 100 consist of a membrane 119 that is located at both ends of the electrode structure 100, at the electrode 118, 122, and is made of metal, electrically conductive plastic or a similar conductive material.” *Id.*, 5:32-38. FIG. 5 shows the reference numeral 119 pointing to the top of the electrode 118, 122, and therefore, under AliveCor’s improper interpretation of Nissilä in which the membrane 119 is distinct from the electrodes 118, 122, at most discloses the membrane 119 positioned in an internal portion of the electrode structure 100, not between the electrodes 118, 122 and the user’s skin. APPLE-2004, ¶125.

⁸ Apple once again emphasizes that this reading of Nissilä is **not** correct.



EX1006, FIG. 5 (annotated based on AliveCor's incorrect reading)

As AliveCor notes in the Petition (Pet., 72), Nissilä goes on to state “[t]he membrane 119 can thus come into contact with the person’s skin surface 102 or on the inner surface 116 of the membrane 119 which is against the person’s skin there can be an electrically conductive adhesive 127.” EX1006, 5:40-44. This portion of Nissilä therefore describes that the “membrane 119” can contact the user’s skin “on the inner surface 116.” APPLE-2004, ¶126. FIGs. 4 and 5 of Nissilä show that the “inner surface 116” surrounds the electrodes 118, 122:

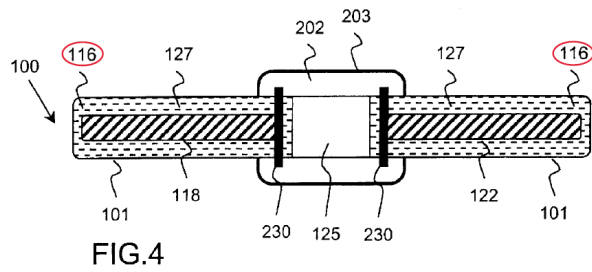
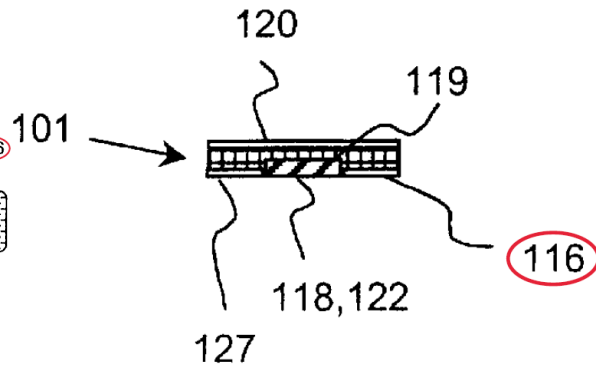


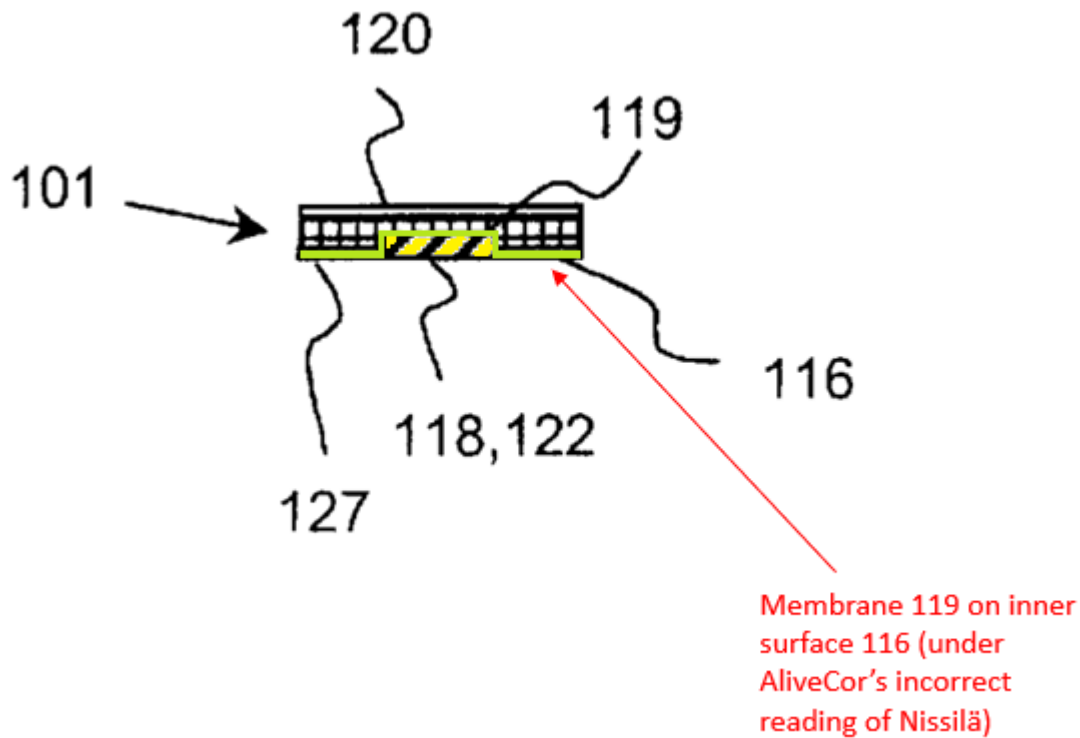
FIG. 4

EX1006, FIG. 4



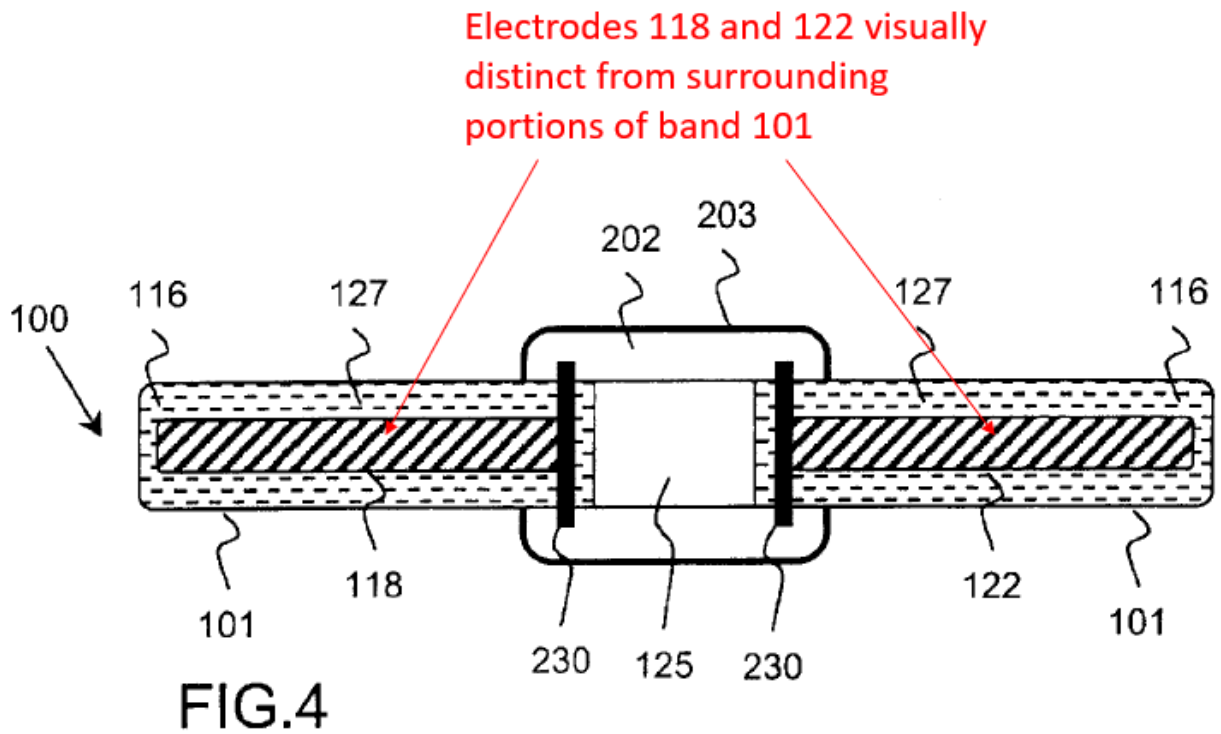
EX1006, FIG. 5

Therefore, even under AliveCor's flawed reading of Nissilä in which the membrane 119 is distinct from the electrodes 118, 122, at most Nissilä discloses the membrane 119 contacts the user's skin at the inner surface 116, not by being positioned between the electrodes 118, 122 and the user's skin. APPLE-2004, ¶¶127-128. Therefore, even if AliveCor's flawed interpretation of Nissilä is adopted, at most, Nissilä teaches only the following configuration for the membrane 119 under AliveCor's incorrect theory:



This configuration, in which the electrodes 118, 122 are positioned on the exterior of Nissilä's device, is supported, for example, by Nissilä's disclosure that "the electrodes 118, 122 are preferably located on the inner surface 116 of the band 101." EX1006, 5:50-53. Once again, there is simply no disclosure in Nissilä of an intermediate layer positioned between the electrodes 118, 122 and the skin of the wearer. APPLE-2004, ¶128.

Furthermore, FIG. 4 of Nissilä, which "shows an inner surface of the electrode structure" shows that the electrodes 118 and 122 are not only visible on the "inner surface" of Nissilä's device but are visually distinct from the surrounding portions of the band 101. EX1006, 4:38-39; APPLE-2004, ¶¶129-130.

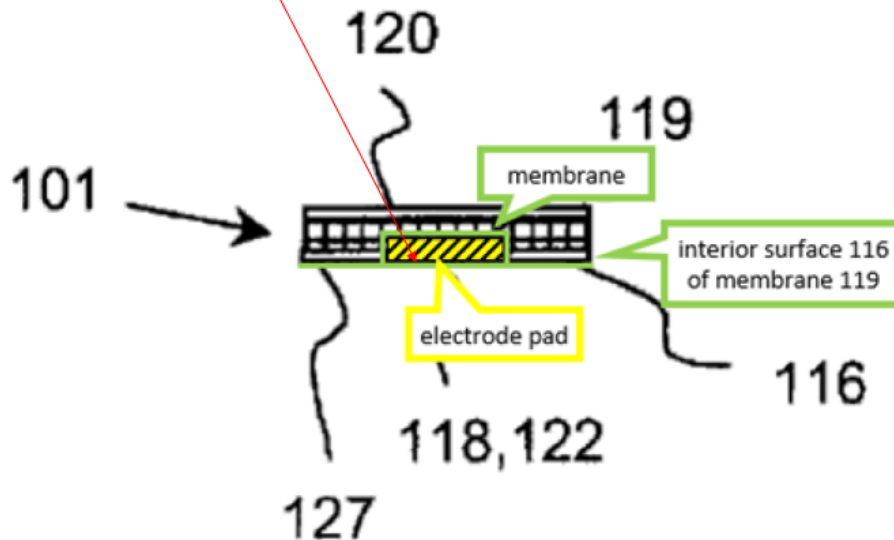


EX1006, FIG. 4 (annotated)

By contrast, AliveCor's altered version of Nissilä's FIG. 5, repeated throughout the Petition, incorrectly shows the membrane extending across the entire inner surface of Nissilä's device:

AliveCor's incorrect
interpretation of Nissilä with
membrane extending across
entire surface of the device

Ex. 1006, Fig. 5 (annotated)



Pet. 72 (AliveCor's altered version of FIG. 5 of Nissilä in which AliveCor has drawn an extra layer) (additional annotation in red by Apple)

This interpretation of FIG. 5 cannot be accurate because if Nissilä really did include a membrane extending along the entire inner surface of the device, the inner surface of the device would appear uniform throughout. APPLE-2004, ¶¶131-132. However, the fact that FIG. 4 shows the electrodes 118 and 122 as being visually distinct from the surrounding portions of the band 101 (as shown above) clearly indicate that AliveCor's assertion of a membrane that extends across the entire inner surface of the band, including over the electrodes 118 and 122, is

incorrect. APPLE-2004, ¶131; APPLE-2013, 124:10-16 (AliveCor’s expert agreeing that Figure 4 shows “the surface that makes contact with the skin”).

As demonstrated in this section and the preceding sections, there is no disclosure in Nissilä (or Markel) of “wherein the first pad is positioned *underneath* the exterior surface of the first portion” of the enclosure, as required by element [1.c.iii]. APPLE-2004, ¶¶102-103, 110, 132. AliveCor has therefore failed to meet its burden to “specify where each element of the claim is found in the prior art.” 37 C.F.R. § 42.104(b)(4). For at least this reason, Ground 2 fails to demonstrate that Markel in view of Nissilä provides all elements of claim 1 and its dependent claims. As such, claims 1-14 are patentable over all grounds of the Petition.

B. Ground 2 Additionally Fails Because a POSITA Would Not Have Combined Markel and Nissilä in the Proposed Manner

In addition to the faults in Ground 2 discussed in Section VI.A.2, *supra*, Ground 2 also fails with respect to all challenged claims because a POSITA would not have combined Markel and Nissilä in the manner proposed.

1. Nissilä would hinder Markel’s goals

As an initial matter, in presenting its alleged motivation for combining Markel and Nissilä, AliveCor asserts that such a modification would “accomplish Markel’s stated goal of an electrode that is ‘substantially concealed (or hidden) from a user ... with little or no visible indication of electrode presence.’” Pet., 70;

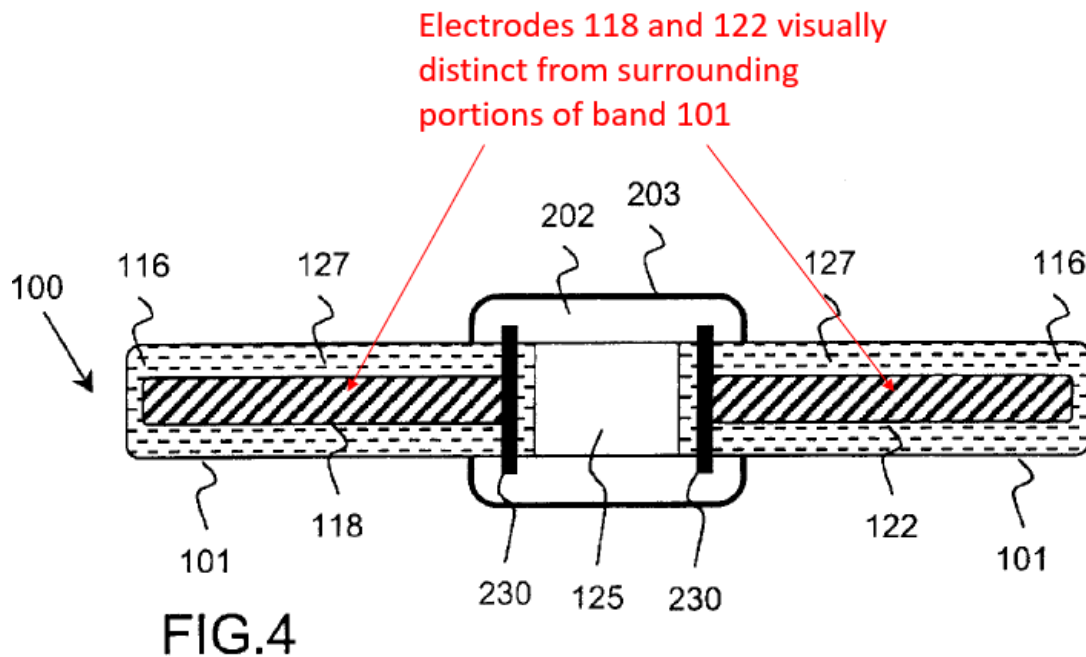
APPLE-2004, ¶¶139-143. However, this assertion is based on a faulty premise because Nissilä’s electrodes are visible and the application of Nissilä’s visible electrodes to Markel would hinder Markel’s goal of making the electrode “substantially concealed (or hidden) from a user ... with little or no visible indication of electrode presence.” EX1005, [0040]; APPLE-2004, ¶¶140-141;

As discussed above, Markel discloses a configuration where *the electrode* is visually “concealed (or hidden) from a user” with respect to the rest of the device’s exterior surface when “*a user need not be aware of the presence of the electrode.*” See Section BI.A.1.b, *supra*; EX1005, [0039]-[0040]. That is, Markel conceals the presence of *an electrode* with respect to the rest of the exterior of the mobile device. APPLE-2004, ¶135.

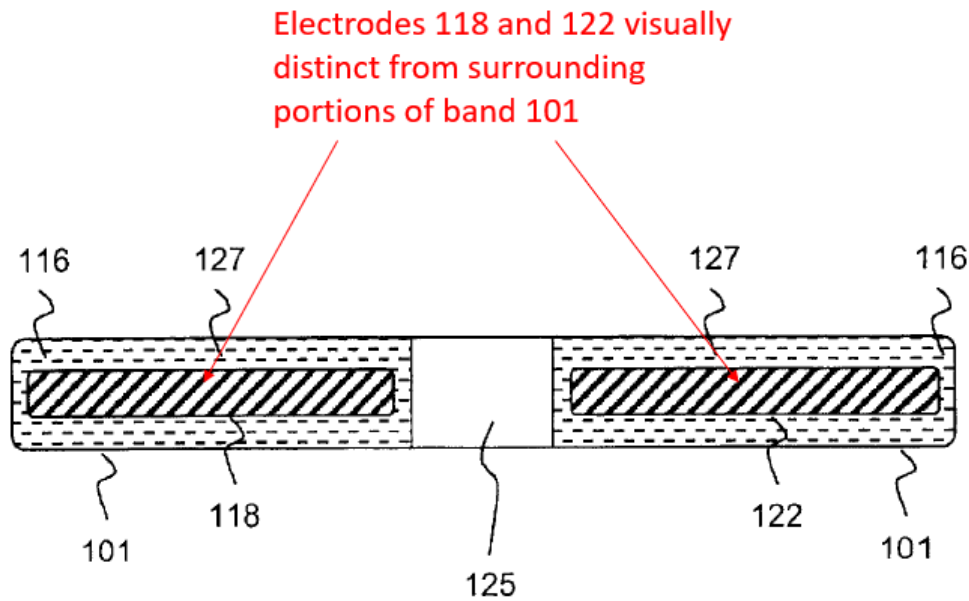
In contrast to Markel, nothing in Nissilä’s disclosure describes visually concealing the electrodes with respect to the rest of its device. In fact, Nissilä teaches the opposite—it intentionally makes its electrodes visually distinct from the surrounding portions of the device. This is shown in FIGs. 4 and 6 of Nissilä, which illustrate “an *inner surface* of the electrode structure,” not a cross section,⁹

⁹ Nissilä makes clear when a Figure is a cross section, expressly identifying FIGs. 5 and 9 as cross sections and by contrast expressly identifying FIG. 4 as depicting the “inner surface” of the device. EX1006, 4:40-50.

with electrodes 118 and 122 that are *visually distinct and recognizable* from the other portions of Nissilä's device. EX1006, 4:38-43; APPLE-2013, 126:13-16 (AliveCor's expert agreeing that the electrodes are "visually distinct from the surrounding portions of the band"); APPLE-2004, ¶¶140-141.



EX1006, FIG. 4 (annotated)



EX1006, FIG. 6 (annotated)

Because Nissilä's electrodes are visibly identifiable with respect to the rest of Nissilä's device, a POSITA would **not** have been motivated to apply Nissilä to Markel in the manner advanced by AliveCor. In fact, the application of Nissilä to Markel would have failed to meet Markel's intended goal of visually concealing the presence of electrodes because Nissilä's electrodes are not concealed, as shown above. EX1005, [0040]; APPLE-2004, ¶¶141; Pet., 70.

Additionally, AliveCor's proposed combination of Nissilä's flexible electrode in Markel's device fails because Nissilä's electrodes are not suitable for the exterior surface of a handheld device. Specifically, Markel is directed to electrodes of a handheld device that is neither intended to conform nor adhere to

the user's skin. Thus, Markel's electrodes do not need to be designed for adherence or flexible conformity to a user's body and a POSITA would have been dissuaded from using such electrodes on Markel's handheld device. APPLE-2001, ¶90; APPLE-2004, ¶¶136, 141-142. Moreover, AliveCor's assertion that "both references disclose an *intermediate* conductive material made of conductive plastic" is also unconvincing as neither reference includes such a teaching, as demonstrated in Sections VI.A.1-2, *supra*. APPLE-2004, ¶¶81, 91, 128.

Finally, AliveCor's proposed reason for modifying Markel based on Nissilä ignores that *Markel already achieves its stated goal* of making the electrode "substantially concealed (or hidden) from a user ... with little or no visible indication of electrode presence" by forming the external electrode from "molded conductive plastic." EX1005, [0040]. Even AliveCor's expert agreed, stating that "I don't think one needs to" modify Markel based on Nissilä because Markel already discloses how to visually conceal electrode presence. APPLE-2013, 170:9-171:3.

The fact that Markel's device is already configured to achieve its goal gives rise to an especially strong "inference of nonobviousness." *DePuy Spine, Inc. v. Medtronic Sofamor Danek, Inc.*, 567 F.3d 1314, 1326 (Fed. Cir. 2009) ("An *inference of nonobviousness is especially strong* where the prior art's teachings undermine the very reason being proffered as to why a person of ordinary skill

would have combined the known elements.”). Critically, the Petition ignored the fact that Markel’s original solution already served to conceal the presence of electrodes. *Sony Corp. v. Fujifilm Corp.*, IPR2018-01751, Paper 14, 11 (PTAB April 12, 2019) (finding nonobviousness where the primary reference “already address[ed] the problem” purportedly motivating the combination and “it is not evident why [the primary reference] would have benefited from modifications based on [the secondary reference].”); APPLE-2004, ¶141.

For at least the reasons discussed above, the proposed combination in Ground 2 fails.

2. *Markel and Nissilä’s alleged “similar goals” fails to provide a motivation to combine*

AliveCor and its expert further assert that a POSITA would have been motivated to combine Markel and Nissilä because “[they] share similar goals.” Pet., 70; EX1003, ¶353; APPLE-2001, ¶86. This argument, however, is not supported by the record, as Markel’s goal with respect to concealment of electrodes *on a surface of a device* is distinct from Nissilä’s goal relating to concealment of *the device itself*, as explained below. APPLE-2004, ¶¶133-138.

As discussed above, Markel aims to conceal the presence of *an electrode* with respect to the rest of the exterior of the device. APPLE-2004, ¶135. In contrast, Nissilä’s goal is to make the entire device—independent from the

electrodes—“comfortable and *inconspicuous to wear*” such that others cannot tell that the user is wearing the device. EX1006, 2:61-67, 5:18-20; APPLE-2001, ¶87; APPLE-2004, ¶¶136-138. Nissilä achieves this goal by making the device using “flexible, soft material that fits the skin closely” such that the device is inconspicuous when the user is wearing clothing over the device. EX1006, 2:61-67. This is demonstrated by comparing the prior art device depicted in FIG. 1, which is large and bulky and would be apparent through the user’s clothing, with Nissilä’s much smaller, form fitting device in FIG. 2. APPLE-2004, ¶¶136-138.

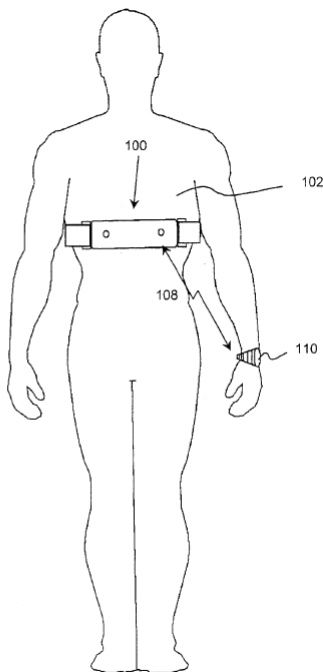


FIG. 1
Prior Art

EX1006, FIG. 1
(prior art)

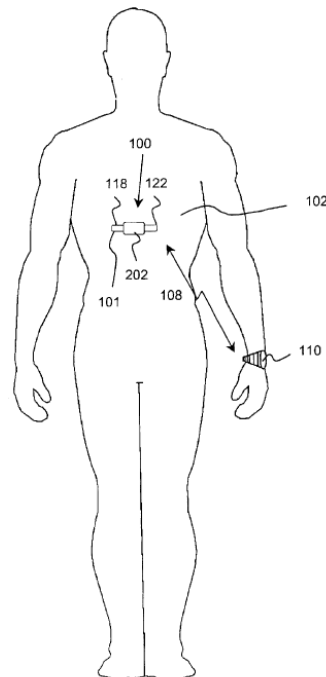


FIG. 2

EX1006, FIG. 2
(Nissilä's device)

So while Markel aims to conceal the presence *of electrodes* on the device with respect to the exterior surface of the device, Nissilä discusses making the presence of *the whole device itself* inconspicuous (which it achieves by making the device small, form fitting, and concealable under clothing). But Nissilä’s electrodes are “inconspicuous” *to others*—not the user—because they are placed underneath a user’s shirt. APPLE-2004, ¶¶136-139; 2:61-67 (“the band-like component of the electrode structure is of *flexible, soft material that fits the skin closely, and as a consequence it is* comfortable and *inconspicuous to wear* and does not chafe the skin.”). Accordingly, a POSITA would have viewed Nissilä’s technique for making its device inconspicuous—i.e., concealment using clothing—to be inapplicable to Markel’s goal of concealing the electrodes on the surface of its mobile device. APPLE-2001, ¶89; APPLE-2004, ¶¶138-139; EX1006, 5:3-17.

But even if Markel and Nissilä had similar goals (which they do not), an observation that two references share a common or similar goal does not alone justify their combination. *See Hirsch Glass Corp., D/B/A Spectrum Quartz vs. Cambria Company LLC*, IPR2022-00583, Paper 7 at 19-20 (“The mere fact that [prior art reference #1] and [prior art reference #2] *share a common goal* of producing products that [achieves a desired trait] *fails to identify* what would have prompted the skilled artisan to arrive at the combination in the first place.”).

Therefore, for these additional reasons, Ground 2 fails with respect to all challenged claims. APPLE-2001, ¶¶85-91; APPLE-2004, ¶¶133-143.

C. The Petition Fails to Demonstrate That the Relied Upon Grounds Provide the Additional Recitations of Claim 5

The Petition fails to demonstrate how Markel alone renders obvious Claim 5, which requires that the “second pad is constructed from a silver based compound.” APPLE-2004, ¶¶145-149. Markel includes only a single sentence regarding the insulating region 415 (which AliveCor equates to the claimed third portion having the first conductivity), stating that “an insulating region 415 may separate regions 410b and 420b.” EX1005, [0045]. There is no discussion or suggestion as to what material would be used for the insulating region 415. There is also no disclosure in Markel of using “a silver based compound” for any components, let alone for anything AliveCor identifies as the alleged “second pad.” APPLE-2004, ¶¶147-148. To correct for this complete lack of disclosure, AliveCor appears to propose an additional four-way combination of Markel with Hobson, Sujdak, and Geddes that is not clearly identified in the Petition. Pet., 35-36. AliveCor provides no analysis regarding a motivation to modify Markel based on any of Hobson, Sujdak, or Geddes or on whether or not a POSITA would have had a reasonable expectation of success in making such modifications. Pet., 35-36; APPLE-2013, 159:19-161:22 Through this lack of analysis, AliveCor has put the

burden on Apple, and the Board, to dig through the evidence of record in search of a theory that supports AliveCor's assertions. The Board should decline such an undertaking. *See e.g., Amazon.com, Inc., et al. v. Avago Technologies General IP (Singapore) PTE. LTD.*, IPR2017-01112, Paper 11 at 13 (PTAB Aug. 23, 2017) ("Petitioner is inviting us to assume the role of archeologist of the record, which invitation we decline."); *QuantifiCare, Inc. v. The Proctor & Gamble Co.*, IPR2017-02113, Paper 11 at 10 (PTAB March 16, 2018) ("[W]e will not 'attempt to fit evidence together into a coherent explanation that supports an argument that demonstrates a reasonable likelihood that Petitioner would prevail.'" (quoting *Zetec, Inc. v. Westinghouse Elec. Co.*, IPR2014-00384, Paper 10 at 15 (PTAB July 23, 2014)));

AliveCor does not present any additional arguments based on Nissilä with respect to claim 5 in Ground 2.

D. The Petition Fails to Demonstrate That the Relied Upon Grounds Provide the Additional Recitations of Claim 6

Claim 6 requires "the second conductivity is defined such that the second electrical signal is not able to be transmitted through material having the second conductivity over a distance larger than the thickness of the second portion." The Petition does not even attempt to demonstrate that Markel discloses this limitation of claim 6. There is simply no analysis as to the conductivity of the insulating

region 415 of Markel and certainly not in comparison to the thickness of the second portion of the enclosure of Markel's device. APPLE-2004, ¶¶150-151; APPLE-2013, 162:2-164:21. Rather, AliveCor merely points to Markel's disclosure that the electrodes "provide sufficient conductivity for an electrode to perform adequately." Pet., 38 (quoting EX1005, [0037]). AliveCor provides no actual analysis to demonstrate that Markel discloses or suggests element [6.e]. Pet., 38-39; APPLE-2004, ¶¶150-151.

While AliveCor addresses Claim 6 in Ground 2, it relies on Nissilä only for the (incorrect) premise that a second electrode can allegedly be positioned underneath the exterior of the device. AliveCor presents no additional analysis with respect to element [6.e] in Ground 2 and therefore Ground 2 fails with respect to Ground 6 for the reasons discussed above.

E. The Petition Fails to Demonstrate That the Relied Upon Grounds Provide the Additional Recitations of Claim 7

Markel includes no disclosure regarding the configuration or dimensions of the internal components of its device, nor does Markel include any discussion of the thickness of the disclosed electrodes. Because there is no disclosure of the thickness of Markel's electrodes, it is impossible for Markel to disclose "the first pad and the second pad are positioned apart from one another at *a distance larger than the thickness of the second portion*" as required by claim 7. APPLE-2004,

¶152. Furthermore, the Petition makes no attempt to demonstrate that the alleged first and second pads of Markel are positioned apart a distance larger than the thickness of the second portion. Pet., 39-40. AliveCor does not present any additional arguments based on Nissilä with respect to claim 7 in Ground 2. As such, AliveCor has failed to meet its burden with respect to claim 7.

F. Ground 1 Fails With Respect to Claim 8

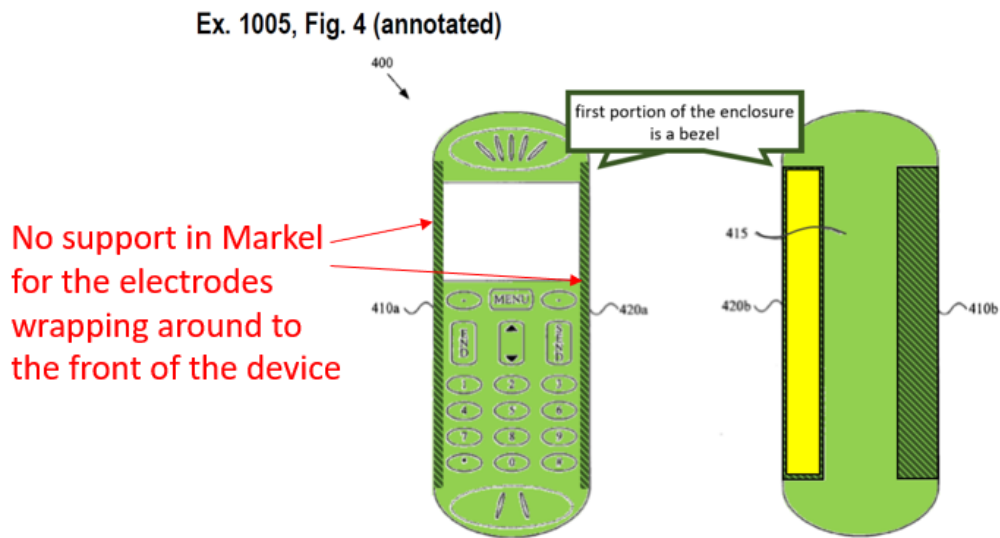
There is no disclosure or suggestion in Markel of a “pocket underneath the exterior surface of the enclosure” in which the first or second pad is placed, as required by claim 8. APPLE-2004, ¶153. In fact, Markel includes no disclosure whatsoever of the configuration or arrangement of the internal components of Markel’s device. APPLE-2004, ¶¶153. AliveCor’s contrary assertion that “the electronic device *would require* a pocket underneath the exterior surface of the enclosure” is based on nothing but unsupported speculation from AliveCor’s expert. Pet., 41. Furthermore, AliveCor has not even attempted to demonstrate that the claimed pocket is “necessarily present” in Markel’s device and thus Ground 1 fails with respect to claim 8. *Continental Can Co. USA v. Monsanto Co.*, 948 F.2d 1264, 1268 (Fed. Cir. 1991) (“Such evidence must make clear that the missing descriptive matter is necessarily present in the thing described in the reference, and that it would be so recognized by persons of ordinary skill.”); *In re Rijckaert*, 9 F.3d 1531, 1534 (Fed. Cir. 1993).

**G. The Petition Fails to Demonstrate That the Relied Upon Grounds
Provide the Additional Recitations of Claim 9**

As to Claim 9, AliveCor asserts that “at least a portion of the exterior surface of the electronic device is behind the ‘display 140’” of Markel yet cites to no disclosure in Markel to support this assertion. Pet., 43. AliveCor’s only support for this assertion is an equally unsupported assertion from its expert. EX1003, ¶228. The Petition therefore fails to demonstrate that Markel provides “wherein at least a portion of the exterior surface of the enclosure forms at least a portion of an exterior surface of the electronic device *behind the display*” as required by claim 9. AliveCor does not present any additional arguments based on Nissilä with respect to claim 9 in Ground 2.

**H. The Petition Fails to Demonstrate That the Relied Upon Grounds
Provide the Additional Recitations of Claims 12, 13, and 19**

In addressing claim 12, AliveCor insists that “the second electrode extends to the rim that encircles Markel’s electronic device” along with altered versions of FIG. 4 showing portions of the electrodes that are not actually present in FIG. 4 or described in the specification. Pet., 48; APPLE-2004, ¶¶155-156.



Pet. 49 (additional annotation in red by Apple)

The unaltered FIG. 4 of Markel shows only electrodes positioned on the back side, including a slight gap between the electrodes and the edge of the device.

APPLE-2004, ¶157.

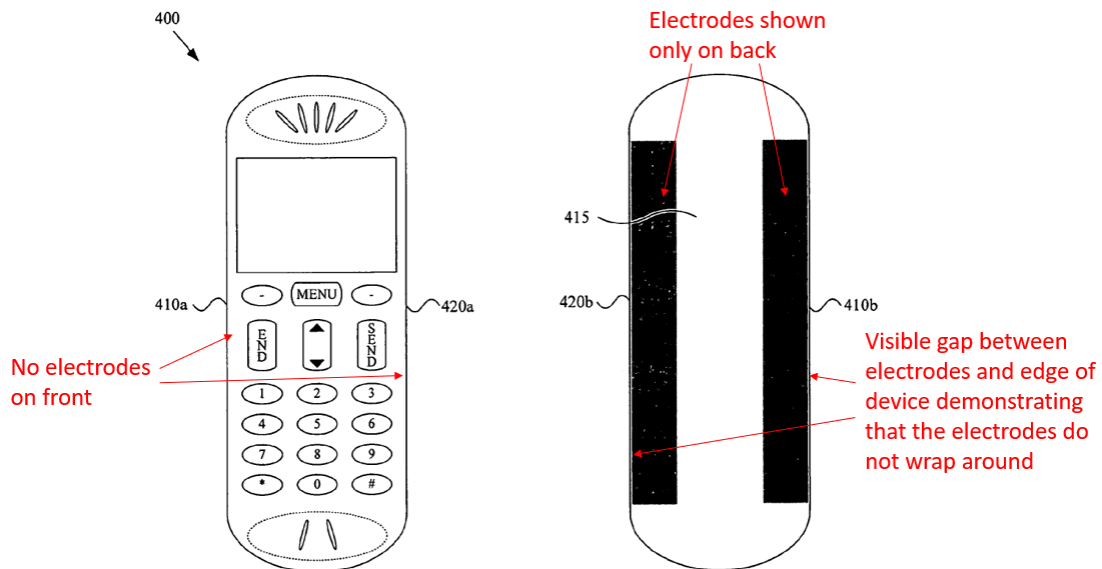


Figure 4

EX1005, FIG. 4 (annotated)

In an attempt to correct for this lack of disclosure in Markel, AliveCor asserts that it “would have been a trivial modification well-within the general knowledge of a POSITA” to wrap the electrodes 420b and 410b around to the front of the device. Pet., 49-50. However, the Petition identifies no prior art of record that discloses such a configuration for the electrodes. APPLE-2004, ¶158.

Furthermore, Markel provides no basis or suggestion to make this modification. Just because something *could* have been done, that does not mean that a POSITA would have known to do so based on the cited prior art. *See In re McLaughlin*, 443 F.2d 1392, 1395 (CCPA 1971); *In re Dembiczak*, 175 F. 3d 994, 999 (Fed. Cir. 1999); *In re Gartside*, 203 F.3d 1305, 1319 (Fed. Cir. 2000). It is AliveCor’s burden to “specify where each element of the claim is found in the prior art.” 37 C.F.R. § 42.104(b)(4). The Petition fails to demonstrate that the electrodes identified by AliveCor as corresponding to the claimed “first portion” and “second portion” of the enclosure are a bezel and therefore Ground 1 fails with respect to claims 12, 13, and 19.

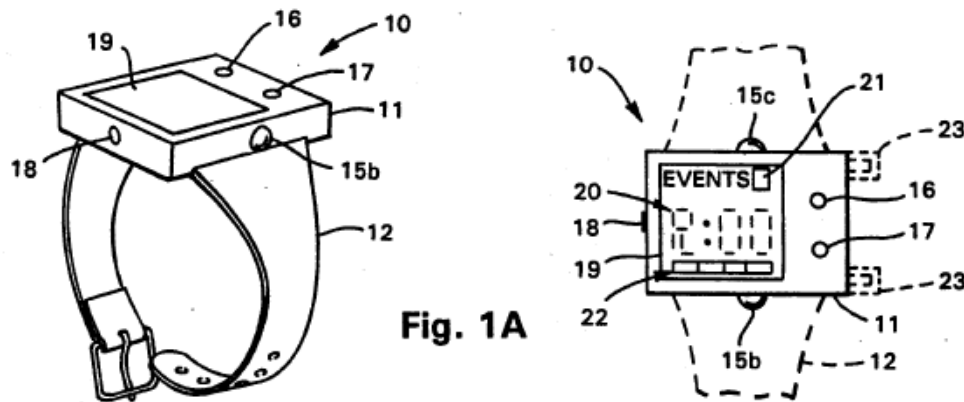
Furthermore, with respect to claim 19 specifically, AliveCor identifies an “insulating region” between the two electrodes positioned on the back of Markel’s device but does not identify “a non-conductive component positioned between *the bezel* and the *display screen*” as required by claim 19. Pet., 66-67; APPLE-2004, ¶159. Even if AliveCor’s general assertion that “Markel further teaches that its

electrodes would be electrically isolated” *and* its assertion that the electrode 420b would somehow form part of the bezel (Pet., 65-67) were both accepted as true, AliveCor still has shown no teaching in Markel that would instruct a POSITA to isolate an electrode embedded in the display and an electrode embedded in the bezel in the precise manner recited by claim 19, rather than electrically isolating the two electrodes in another manner. APPLE-2004, ¶159.

AliveCor presents no additional arguments with respect to claims 12, 13, and 19 in Ground 2.

With respect to Ground 3, as discussed in Section IV, *supra*, the term “bezel” means “A rim that secures a transparent covering for an indicating device such as a meter, oscilloscope, or watch.” APPLE-2008; APPLE-2004, ¶¶38, 161. Ground 3 fails with respect to claims 12, 13, and 19 because Righter fails to disclose an electrode embedded in a bezel.

AliveCor identifies Righter’s “pair of conductive electrodes 15b, 15c [] provided *on opposing side surfaces of the casing 11*” as allegedly satisfying claims 12, 13 and 19. Pet., 87 (quoting EX1007, 2:65-3:2). FIGs. 1A and 1B shows that these electrodes are positioned on the sides of the device and not the bezel:



EX1007, FIGs. 1A-1B.

While it is possible, in some device designs, for the sides of a device to act as a bezel, that is not the configuration disclosed by Righter. APPLE-2004, ¶¶162-163. Rather, as shown in FIGs. 1A-1B, the “rim that secures” the LCD display screen 19 of Righter is positioned on the front of the watch and not the sides of the watch, which AliveCor has not established is a “bezel” of the enclosure. APPLE-2004, ¶163.

Even under AliveCor’s improperly broad construction for the term “bezel” (“a rim that encircles an electronic device” (Pet., 87)), Righter fails to disclose that the electrodes are embedded in a bezel. Specifically, the sides and top face of Righter’s watch appear to be made from one piece and not from a front face supported by a “rim” defined by the sides. APPLE-2004, ¶164. AliveCor has made no effort to identify that Righter discloses such a configuration in which the

sides form a “rim” that supports the front of the watch and therefore Ground 3 fails even under AliveCor’s improper construction.

Furthermore, with respect to claim 19 specifically, in Ground 3 AliveCor has not even attempted to demonstrate that Righter provides “a non-conductive component positioned *between the bezel and the display screen* for electrically isolating the first lead from the second lead” as required by element [19.b]. Pet., 90-91; APPLE-2004, ¶165. For this additional reason, Ground 3 fails with respect to claim 19.

I. The Petition Fails to Demonstrate That the Relied Upon Grounds Provide the Additional Recitations of Claim 20

Grounds 1 and 2 fail with respect to claim 20 for the same reasons as claim 1. As discussed with respect to claim 1, *supra*, neither Markel alone nor Markel in view of Nissilä discloses or renders obvious a pad or electrode positioned under a portion of the enclosure. APPLE-2004, ¶¶166-170. As previously discussed, each of Markel’s electrodes is positioned on the exterior of the device such that the “electrodes contact a user during normal (or typical) use of the MCD 100.” EX1005, 4:49-51. Therefore, for the reasons discussed in Section VI.A.1, *supra*, the electrodes in Markel’s device detect the first electrical signal of the user’s cardiac signal via direct contact between the electrode and the user’s skin, *not* “via

the user's contact with the first portion of the enclosure.” APPLE-2004, ¶¶166-168.

With respect to Ground 2, as discussed in Section VI.A.2, *supra*, Nissilä does not disclose a separate membrane positioned between the electrodes 118, 122 and the user's skin. Rather, Nissilä is express that “[b]ecause the inner surface 116 of the electrode structure 100 is the portion which is *against the person's skin, the electrodes 118, 122 are preferably located on the inner surface 116 of the band 101*.” EX1006, 5:50-59; APPLE-2004, ¶170. As with Markel, Nissilä discloses that the electrodes make direct contact with the user's skin, without an intervening “membrane” layer, to detect the first electrical signal of the user's cardiac signal. APPLE-2004, ¶170. Nissilä therefore also fails to disclose or suggest that the electrodes “detect the first electrical signal of the user's cardiac signal via the *user's contact with the first portion of the enclosure*” as required by claim 20 for the reasons discussed with respect to claim 1. APPLE-2004, ¶170.

VII. CONCLUSION

For the foregoing reasons, Patent Owner respectfully requests a final written decision confirming patentability of the Challenged Claims.

Respectfully submitted,

Date: April 11, 2024

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CERTIFICATION UNDER 37 CFR § 42.24(d)

Under the provisions of 37 CFR § 42.24(d), the undersigned hereby certifies that the word count for the foregoing Patent Owner Response totals 13,973, which is less than the 14,000 allowed under 37 CFR § 42.24(b)(1).

Respectfully submitted,

Date: April 11, 2024

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CERTIFICATE OF SERVICE

Pursuant to 37 C.F.R. § 42.6(e)(4), the undersigned certifies that on April 11, 2024, a complete and entire copy of this Patent Owner's Response and its supporting exhibits were provided via email, to the Petitioner by serving the email correspondence addresses of record as follows:

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