

AliveCor, Inc. (Petitioner)
v.
Apple Inc. (Patent Owner)
Patent Owner Demonstratives

Case No. IPR2023-00950
U.S. Patent No. 10,076,257

Before Hon. Ken B. Barrett, Josiah C. Cocks, and Robert L. Kinder
Administrative Patent Judges

FISH 

APPLE 2020
AliveCor v. Apple
IPR2023-00950

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

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1: Overview of the '257 Patent

Claim 1 of the '257 Patent

1. An electronic device for detecting a user's cardiac signal, comprising:

an enclosure;

a heart sensor configured to detect the user's cardiac signal, the heart sensor comprising:

a first lead comprising 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, and wherein 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; and

a second lead comprising a second pad that is embedded in a second portion of the enclosure, wherein the second pad is configured to detect a second electrical signal of the user's cardiac signal via the user's skin's contact with at least one of the second pad and the second portion of the enclosure; and

a processor coupled to the heart sensor and configured to receive and process the detected cardiac signal, wherein the first lead further comprises a first connector coupled to the first pad and configured to provide the first electrical signal detected by the first pad to the processor, and wherein the second lead further comprises a second connector coupled to the second pad and configured to provide the second electrical signal detected by the second pad to the processor.

a first lead comprising 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, and wherein 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; and

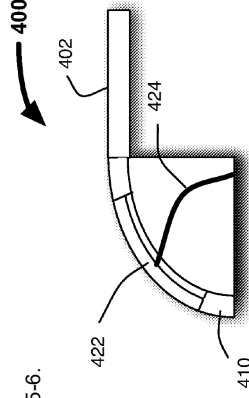
Overview of the '257 Patent

The '257 Patent

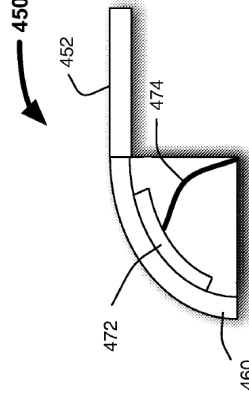
Heart sensor 112 can include any suitable sensor operative to detect a user's heartbeat, heart rate, or any other signal generated by the user's heart. In some embodiments, heart sensor 112 can serve as an EKG monitor. Heart sensor 112 can include one or more leads connected to the exterior of the electronic device such that the user may contact one or more of the leads to provide an electrical signal associated with the user's heart to heart sensor 112. The cardiac signals detected by the heart sensor leads can be coupled to a processor incorporated in heart sensor 112, or instead provided to processor 102. 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.

Alternatively, lead 472 can be placed within the thickness of bezel 460 (e.g., in a pocket within the bezel wall), but underneath the outer surface of the bezel. The short thickness of bezel 460 can allow electrical signals to propagate from the user to the outer surface of bezel 460, through bezel 460, and into lead 472, which may in turn transmit the signals to a processor using connector 474. In addition, if several leads are placed along different portions of bezel 460, the distance between adjacent leads can be sufficiently large (e.g., substantially larger than the thickness of bezel 460) that different leads of bezel 460 cannot detect the same electrical signal.

EX1001, 6:4-16; POR, 5-6.



EX1001, 9:45-57; POR, 5, 8-9.



EX1001, FIGS. 4A, 4B; POR, 6.

2: Plain and Ordinary Meaning of “embedded in”

Dr. Kenny
(Patent Owner's Expert):

“embedded in”

27. “embedded in” (claims 1, 15) – In my opinion, the term “embedded in” should be given its plain and ordinary meaning, which does not require an explicit construction. A POSITA would have known what it means for a first material, structure, or component to be “embedded in” a second material, structure, or component based on both the plain and ordinary meaning of this term and the way in which this term is used in the ’257 patent specification, which conforms with the plain and ordinary meaning. However, should it be necessary to define the parameters of the plain and ordinary meaning for this term, an express construction of the term “embedded in” that a POSITA would have recognized as consistent with the plain and ordinary meaning of this term is “at least partially set in or partially surrounded by a material.” This construction is both consistent with the plain and ordinary meaning of the term “embedded in” and supported by the use of the term “embedded in” in the specification and claims of the ’257 patent.

“embedded in”

The '257 Patent:

“one or more leads can be ***embedded in or*** adjacent to the housing”

EX1001, 10:24-29; POR, 8.

“electronic device 300 can include additional lead 326 ***embedded in or*** behind display 302”

EX1001, 8:40-41; POR, 6.

“Alternatively, lead 472 can be ***placed within the thickness*** of bezel 460 (e.g., in a pocket within the bezel wall), but ***underneath the outer surface*** of the bezel.”

EX1001, 9:44-48; POR, 8-9.

“embedded in”

The claims of the '257 Patent distinguish “embedded in” from “embedded with”:

Claim 1:

a first lead comprising 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, and wherein 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; and

Claim 9:

a third lead embedded with the display, wherein the third lead is configured to detect a third electrical signal of the user's cardiac signal via the user's contact with at least one of the third lead and the display.

“embedded in”

Dictionary definition of “embedded” informs the plain and ordinary meaning of “embedded in”:

embedded That which has been incorporated into a surrounding mass or enclosure. For example, an embedded electronic component or device. Also, that which has been included within a larger entity.

APPLE-2005, 3; POR, 9.

“embedded in”

Dr. Berger (Petitioner’s Expert):

I think “embedded” has a more specific meaning than just that they’re touching each other.

APPLE-2013, 61:2-62:5; POR, 9.

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AliveCor's Expert:

“embedded in”

Q. So in that example, though, the two flat pads would be in electrical contact, would you agree?

MR. FERNANDO: Object to form.

THE WITNESS: If you're saying two conductive pieces of metal that are touching each other, I believe they're, then, in electrical contact with each other.

• • •

THE WITNESS: I don't think I'd use the term "embedded" there.

3: Plain and Ordinary Meaning of “bezel”

“bezel”

Dictionary definitions of “bezel”:

bezel A rim that secures a transparent covering for an indicating device such as a meter, oscilloscope, or watch. It may or may not have markings.

APPLE-2008; POR, 12.

be-zel \ˈbē-zəl, ˈbe-\ *n* [prob. fr. dial. form of *F biseau* bezel, fr. MF] (1611) **1** : a rim that holds a transparent covering (as on a watch, clock, or headlight) or that is rotatable and has special markings (as on a watch) **2** : the oblique side or face of a cut gem; *specif* : the upper faceted portion of a brilliant projecting from the setting — see BRILLIANT illustration **3** : a usu. metal rim of a piece of jewelry in which an ornament (as a gem) is set

APPLE-2009; POR, 12.

bezel [DES ENG] **1.** A grooved rim used to hold a transparent glass or plastic window or lens for a meter, tuning dial, or some other indicating device. **2.** A sloping face on a cutting tool. [LAP] The oblique face of a cut gem, between the table and the girdle. (ˈbez·əl)

APPLE-2010; POR, 12.

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“bezel”

The '257 Patent:

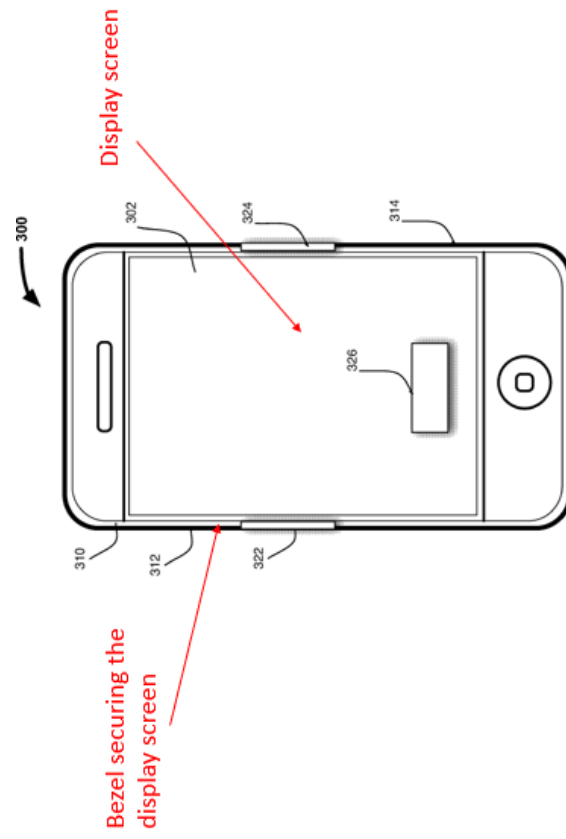


FIG. 3

EX1001, FIG. 3, 8:15-20; Sur-Rep., 4-5..

4: Market Only Discloses External Electrodes Configured for Direct User Contact

Claim 1 of the '257 Patent

1. An electronic device for detecting a user's cardiac signal, comprising:

an enclosure;

a heart sensor configured to detect the user's cardiac signal, the heart sensor comprising:

a first lead comprising 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, and wherein 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; and

a second lead comprising a second pad that is embedded in a second portion of the enclosure, wherein the second pad is configured to detect a second electrical signal of the user's cardiac signal via the user's skin's contact with at least one of the second pad and the second portion of the enclosure; and

a processor coupled to the heart sensor and configured to receive and process the detected cardiac signal, wherein the first lead further comprises a first connector coupled to the first pad and configured to provide the first electrical signal detected by the first pad to the processor, and wherein the second lead further comprises a second connector coupled to the second pad and configured to provide the second electrical signal detected by the second pad to the processor.

a first lead comprising 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, and wherein 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; and

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EX1001 ('257 Patent), Claim 1.

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

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Markel's Electrodes Are External

Dr. Berger
(Petitioner's Expert):

119. Second, *Markel* renders obvious that the first lead comprises a first pad that is embedded in a first portion of the enclosure. For example, *Markel* discloses various configurations for placement of the electrodes, including the configuration illustrated in *Markel*'s Figure 6 (annotated below). In this configuration, the “*second electrode* [(yellow)] may be . . . *molded into the audio output portion 610* or positioned on the main body portion 610” of the electronic device (Ex-1005, [0050] (emphasis added)). From this, a person of ordinary skill in the art would have understood that *Markel*'s “second electrode” comprises a first pad that is “molded into the audio output portion 610” (i.e., embedded in a first portion of the enclosure).

Markel's Electrodes Are External

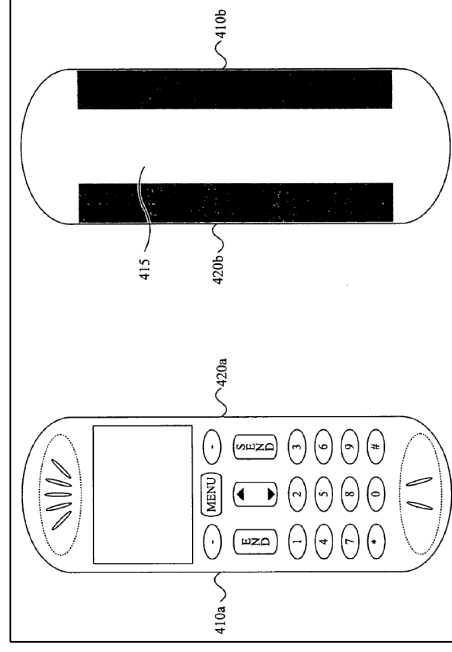
Markel:

[0043] Also for example, an electrode (or other sensor) may be placed on a main body portion 110 of the MCD 100. For example, such a main body portion 110 may comprise the portion of the MCD 100 that is generally held in the hand during normal use of the MCD 100. As will be shown in later figures, one or more electrodes may be placed on side or rear portions of the main body portion 100. Such placement may, for example, provide for electrode contact with a user's hand during use of the MCD 100.

EX1005, [0043]; POR, 28

[0045] A plurality of electrodes (or other sensors) may be disposed in any of a variety of locations, non-limiting examples of dual-electrode placement will now be presented. For example, first and second electrodes may be disposed on a main body portion 110 of the MCD 100.

EX1005, [0045]; POR, 23



EX1005, FIG. 4; POR, 27-28

Markel's Electrodes Are External

Markel:

A first electrode may be disposed on the main body portion 620 (e.g., molded into the main body portion 620 or positioned on the main body portion 620). A second electrode may be disposed on the audio output portion 610 (e.g., molded into the audio output portion 610 or positioned on the audio output portion 610). Such electrode placement may, for example, provide for user contact with both electrodes during the process of listening to the MCD 100.

EX1005, [0050]; POR, 27-28, 32

[0044] Further for example, an electrode (or other sensor) may be placed on (or proximate to) an audio output portion 142 (e.g., a speaker) of the MCD 100. Such a placement may, for example, provide for electrode contact with an ear or cheek of a user of the MCD 100. Also for example, an electrode may be disposed on a video display device 140 (e.g., a border of the display or integrated into a touch screen).

Dr. Berger (Petitioner's Expert):

What does Markel mean by "placed on an audio output portion 142"?

A. I think "placed on," I would take to mean that it's on the -- on the outside of the audio portion.

APPLE-2013, 64:6-18; POR, 28

Markel's Electrodes Are External

Markel:

[0042] For example, an electrode (or other sensor) may be disposed on a pushbutton of the MCD 100. As illustrated in FIG. 1, an electrode may be disposed on any, any combination of, or all of alphanumeric pushbuttons (e.g., pushbutton 138), a send button 130, an end button 132, a menu button 134, a scroll button 136 (or other cursor moving feature, for example, a touch pad, thumbwheel, track ball, eraser tip, a scroll wheel, a volume control button 139 (or other volume-control feature), etc. Such electrode placement may, for example, provide for electrode contact with a user while the user is pushing a particular one or more pushbuttons.

EX1005, [0042]; POR, 32-33

[0047] In yet another exemplary configuration, electrodes may be disposed on a same pushbutton of the mobile communication device 100. In such an exemplary configuration, a user may, for example, contact both electrodes while operating the pushbutton. FIG. 2 provides non-limiting examples of such placement. A first exemplary pushbutton 210 comprises a single electrode 212 (e.g., metallic or conductive plastic) disposed on the pushbutton 210.

EX1005, [0047]; POR, 33

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In one example, a first cardiac sensing electrode may be disposed on a left side of a steering wheel, and a second cardiac sensing electrode may be disposed on a right side of a steering wheel. In such an exemplary configuration, each of the left and right hands may advantageously contact respective cardiac sensors for extended periods of time and also during stressful situations.

EX1005, [0057]; POR, 33

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DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

Markel's Electrodes Are External

Markel:

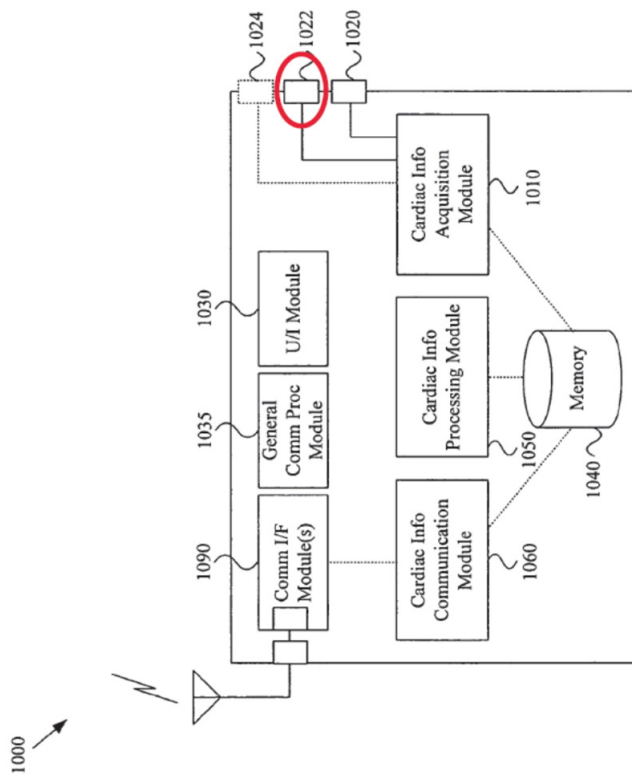


Figure 10

EX1005, FIG. 10; POR, 28

Markel's Electrodes Are External

Markel:

[0035] The exemplary mobile communication device 100 may comprise at least one cardiac sensor (e.g., one or more electrodes, an audio monitoring or acoustical detection device, etc.) that is adapted to detect cardiac activity of a user of the MCD 100. Such electrodes may, for example, be adapted to detect cardiac activity of a user that is conductively coupled to the electrodes (e.g., by touching the electrodes). Such electrodes may be incorporated into the MCD 100 in any of a variety of manners. The following discussion will present various exemplary electrode placements.

EX1005, [0035]; POR, 12, 32; Pet. 20.

Markel's Electrodes Are External

Dr. Kenny
(Patent Owner's Expert):

88. Nowhere does Markel 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 *provide for the user contact with the electrodes*. In fact, every discussion in Markel regarding placement of the electrodes reveals that they are located on the external surface of the device to “provide for electrode contact with a user's hand during use of the MCD 100,” “provide for electrode contact with an ear or cheek of a use,” or otherwise provide direct contact with the skin of the user. EX1005, [0043]-[0044].

Markel's Electrodes Are External

Dr. Berger
(Petitioner's Expert):

130. Similarly, *Markel's* Figure 1 (annotated below) discloses that “*an electrode (or other sensor) may be placed on (or proximate to) an audio output portion 142 (e.g., a speaker)*” of the electronic device, which “may, for example, provide for *electrode contact with an ear or cheek* of a user of the [electronic device]” (Ex-1005, [0044] (emphasis added)).

131. Also with respect to *Markel's* Figure 4 configuration, the “*second electrode* may be . . . *placed on the right side portion 420*” of the electronic device (Ex-1005, [0045]). Such electrode placement allows the electrode to “*contact a user* during normal (or typical) use of the [electronic device]” (Ex-1005, [0041] (emphasis added)). This is illustrated in at least *Markel's* Figure 4 (annotated below):

Markel's Electrodes Are External

Dr. Berger
(Petitioner's Expert):

When “integrated into various molded components of the mobile communication device,” this “electrode may be formed from *conductive plastic* (or another material)” (Ex-1005, [0037] (emphasis added)). From this, a person of ordinary skill in the art would have been motivated to place the pad of the “second electrode” underneath the conductive plastic of the “audio output portion.” This would have “substantially concealed (or hidden)” the pad of the electrode from the user, which would have been desirable to increase aesthetics of the device while protecting the electrode.

No support in the
record for this assertion

Markel's Electrodes Are Visually Concealed, Not Positioned Under The Exterior Surface

Markel:

[0040] As mentioned above, in various non-limiting configurations, an electrode (or all electrodes) or other sensor may be substantially concealed (or hidden) from a user. For example and without limitation, an electrode may comprise molded conductive plastic with little or no visible indication of the electrode presence. In various exemplary scenarios, a user need not be aware of the presence of the electrode.

Dr. Berger (Petitioner's Expert):

EX1005, [0050]; POR, 29-30

Q. In this configuration 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; is that correct?

A. Yes.

Markel's Electrodes Are Visually Concealed, Not Positioned Under The Exterior Surface

Dr. Berger
(Petitioner's Expert):

83. As another example, *Markel* discloses that electrodes can “may be generally concealed from the user” (Ex-1005, [0039]). *Markel* further explains that “an electrode (or all electrodes) or other sensor may be substantially concealed (or hidden) from a user” when, for example, it “comprise[s] molded conductive plastic with little or no visible indication of the electrode presence” (Ex-1005, [0040], [0037]). In these disclosed embodiments, “an electrode may be formed from conductive plastic (or another material) that may be integrated into various molded components of the [electronic device]. For example, various conductive plastics (e.g., graphite-impregnated plastic or the like) may provide sufficient conductivity for an electrode to perform adequately” (Ex-1005, [0037]).

EX1003, ¶83; Pet., 6-7.

Markel's Electrodes Are Visually Concealed, Not Positioned Under The Exterior Surface

Dr. Berger
(Petitioner's Expert):

Q. Would you agree that the electrode is concealed because the electrically conductive plastic is visually similar to other portions of the enclosure?

A. Yes, I believe so.

Apple-2013, 109:5-9; POR, 30

Markel's Electrodes Are Visually Concealed, Not Positioned Under The Exterior Surface

Dr. Kenny
(Patent Owner's Expert):

83. Indeed, there is no disclosure in Markel to suggest any other form of concealing the electrode beyond making the electrode from conductive plastics so that there is little or no visible indication of the electrode; and certainly, nothing in

Markel describes positioning the electrode underneath another layer to hide the electrode. A POSITA reading the disclosure of Markel in full context, would have understood that the concealment is achieved by the use of electrodes made from “molded conductive plastic with little or no visible indication.” EX1005, [0040]. A POSITA would have found nothing in cited portions of Markel to inform or encourage placement of an electrode underneath an exterior layer of a device. Simply, the electrodes in Markel are hidden in plain sight.

APPLE-2004, ¶83; POR, 31

Markel Does Not Disclose a Multi-Layered Electrode

Dr. Berger
(Petitioner's Expert):

A. Well, it says that 220 may be metallic or may be molded from conductive plastic. In the latter, I think it would be necessary to have something more conductive that makes contact with that molded plastic. So I think, then, it becomes a question of which part of it is the, quote, electrode and which part of it is a material that makes contact with that electrode.

No support in the record for this assertion

Markel's Electrodes Are Formed From Electrically Conductive Plastic, Not Positioned Under Electrically Conductive Plastic

Markel:

[0037] Electrodes may generally comprise conductive material. For example, an electrode may comprise a metallic surface exposed for user contact. Also for example, an electrode may be formed from conductive plastic (or another material) that may be integrated into various molded components of the mobile communication device. For example, various conductive plastics (e.g., graphite-impregnated plastic or the like) may provide sufficient conductivity for an electrode to perform adequately. It should be recognized that the scope of various aspects of the present invention should not be limited by characteristics of particular electrodes or electrode placements.

EX1005, [0037]; POR, 30

A first electrode may, for example, be placed on the left side portion 410 (e.g., placed on or molded into region 410*b*), and a second electrode may, for example, be placed on the right side portion 420 (e.g., placed on or molded into region 420*b*). In various exemplary configurations (e.g., where regions 410*b* and 420*b* include conductive plastic), an insulating region 415 may separate regions 410*b* and 420*b*.

EX1005, [0045]; POR, 30

5: Markel Does Not Disclose or Suggest a Lower Pad Embedded in a Conductive Exterior Portion of the Enclosure

Claim 1 of the '257 Patent

1. An electronic device for detecting a user's cardiac signal, comprising:

an enclosure;

a heart sensor configured to detect the user's cardiac signal, the heart sensor comprising:

a first lead comprising 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, and wherein 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; and

a second lead comprising a second pad that is embedded in a second portion of the enclosure, wherein the second pad is configured to detect a second electrical signal of the user's cardiac signal via the user's skin's contact with at least one of the second pad and the second portion of the enclosure; and

a processor coupled to the heart sensor and configured to receive and process the detected cardiac signal, wherein the first lead further comprises a first connector coupled to the first pad and configured to provide the first electrical signal detected by the first pad to the processor, and wherein the second lead further comprises a second connector coupled to the second pad and configured to provide the second electrical signal detected by the second pad to the processor.

a first lead comprising 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, and wherein 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; and

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EX1001 ('257 Patent), Claim 1.

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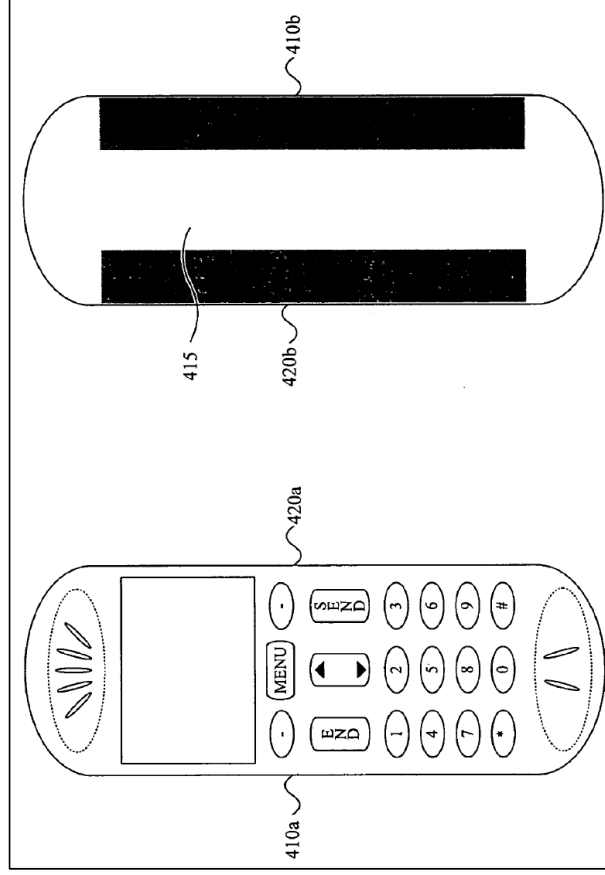
DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

“embedded in”

27. “embedded in” (claims 1, 15) – In my opinion, the term “embedded in” should be given its plain and ordinary meaning, which does not require an explicit construction. A POSITA would have known what it means for a first material, structure, or component to be “embedded in” a second material, structure, or component based on both the plain and ordinary meaning of this term and the way in which this term is used in the ’257 patent specification, which conforms with the plain and ordinary meaning. However, should it be necessary to define the parameters of the plain and ordinary meaning for this term, an express construction of the term “embedded in” that a POSITA would have recognized as consistent with the plain and ordinary meaning of this term is “at least partially set in or partially surrounded by a material.” This construction is both consistent with the plain and ordinary meaning of the term “embedded in” and supported by the use of the term “embedded in” in the specification and claims of the ’257 patent.

Markel Provides No Details On The Inner Configuration of Its External Electrodes

Markel:



EX1005, FIG. 4; POR, 13, 27-28; Sur-Reply, 14

“embedded in”

Q. So in that example, though, the two flat pads would be in electrical contact, would you agree?

MR. FERNANDO: Object to form.

THE WITNESS: If you're saying two conductive pieces of metal that are touching each other, I believe they're, then, in electrical contact with each other.

• • •

THE WITNESS: I don't think I'd use the term "embedded" there.

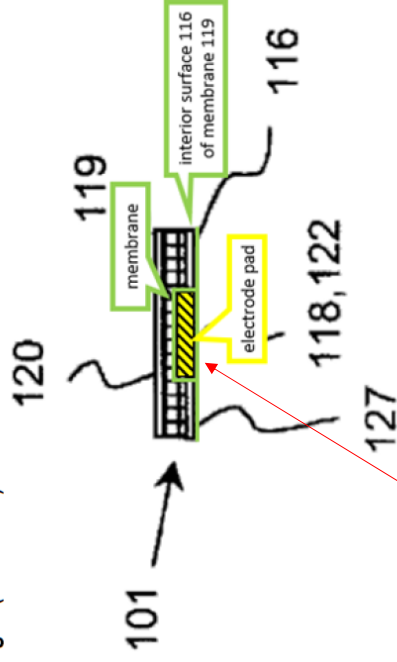
6: Nissilä's Electrode Is Exposed on the Exterior of the Device for Direct Contact with the User

AliveCor Misrepresents the Disclosures of Nissilä

AliveCor's Altered Fig. 5 of Nissilä:

Actual Fig. 5 of Nissilä:

Ex. 1006, Fig. 5 (annotated)

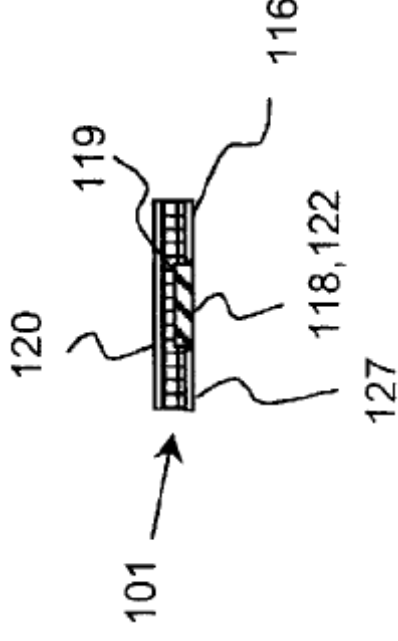


Pet. 72; POR, 41

No support for a separate membrane that encloses the electrode

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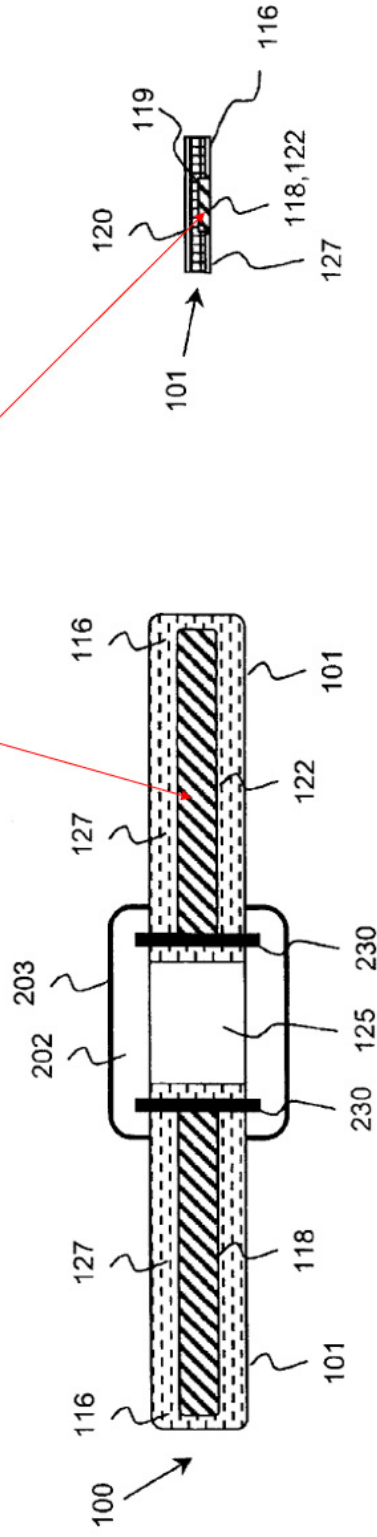
EX1006, FIG. 5; POR, 48



Nissilä Discloses an Exterior Electrode for Direct User Contact

Actual Disclosure of Nissilä:

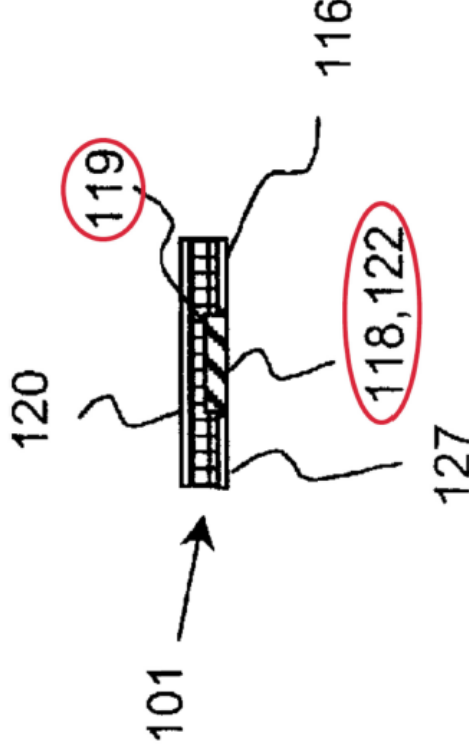
Electrode forming a portion of the exterior surface of the device with no intervening layer between the electrode and the user's skin



Nissilä Discloses an Exterior Electrode for Direct User Contact

Actual 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. The electrodes 118, 122 at both ends of the electrode structure 100 can be equal or narrower in width to the band-like component 101. The 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. The adhesive 127 is preferably a conductive glue, such as conductive Solgel or a conductive silicone glue. If the electrode 118, 122 is narrower than the band-like component 101, it is possible to use a non-conductive adhesive 127 on outer edges of the band 101, on the inner surfaces thereof, outside the electrodes 118, 122.



Nissilä Discloses an Exterior Electrode for Direct User Contact

Nissilä's other embodiment:

According to a preferred embodiment, the inner surface of the electrode structure is an adhesive surface for attaching the electrode structure on the skin of the person's chest. An advantageous manner to implement the adhesive surface and the electrodes is the embodiment, in which the electrodes located at the ends of the band-like component of the electrode structure are made of electrically conductive adhesive. Hence, the adhesive attaches the electrode structure on the skin of the person's chest. In a second embodiment 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.

Nissilä Discloses an Exterior Electrode for Direct User Contact

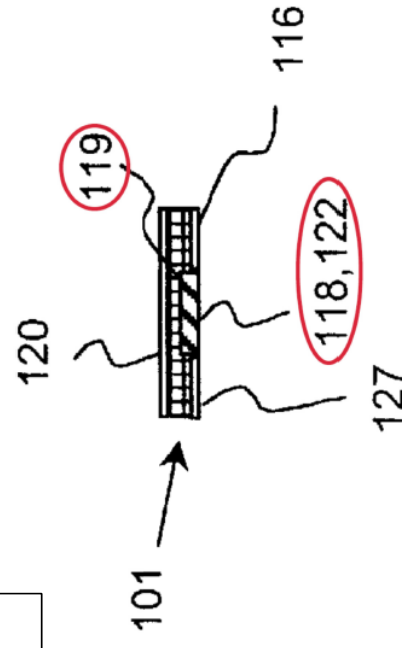
Actual Disclosure of Nissilä:

In a second embodiment 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. On the inner surface of the membrane, which is placed against the person's skin there is an electrically conductive adhesive. The adhesive is preferably an electrically conductive glue. Further, a third manner to implement the electrodes and the adhesive surface is an embodiment, in which 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. Around the electrodes, on the outer edges of the band, on the inner surface thereof, there is an adhesive, with which the electrode structure is attached to the person's skin. In this case, the adhesive need not be electrically conductive. Because the inner surface of the electrode structure is that portion of the electrode structure which is against the person's skin, the electrodes are preferably located on the inner surface of the band.

Nissilä Discloses an Exterior Electrode for Direct User Contact

Actual Disclosure of Nissilä:

Because 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.



Nissilä Does Not Disclose a Separate Membrane that Encloses or Contains the Electrode

Dr. Berger
(Petitioner's Expert):

Nissilä further discloses an electrode comprising a “membrane 119” that “is made of metal, electrically conductive plastic or a similar conductive material” (Ex-1006, 5:32–37). The electrode pad is embedded in and enclosed by “membrane 119.” Thus, the electrode pad is *underneath* the “membrane 119,” which includes an “exterior surface of the enclosure” and “exterior surface of the first portion” as recited in claim element [1.c.ii]. This is illustrated in at least *Nissilä*'s Figure 5 (annotated below) which shows a cross section of the disclosed electrode structure.

Nissilä Discloses an Exterior Electrode for Direct User Contact

Dr. Kenny
(Patent Owner's Expert):

A POSITA would have recognized that

these disclosures in Nissilä mean exactly what they say, the electrodes 118, 122 positioned on either end of Nissilä device “*consist of*” or are made of an electrically conductive membrane.

There is no discussion in Nissilä that

contradicts this clear disclosure of electrodes made from the electrically conductive membrane or otherwise describe the membrane as a separate component distinct from the electrodes themselves. Dr. Berger does not address this “consist of”

language in Nissilä nor discuss how these limited disclosures of Nissilä, which clearly state that the electrodes 118 and 122 “consist of” the membrane 119 could somehow be interpreted such that the membrane is actually distinct from the electrodes 118 and 122. Instead of addressing the clear “consist of” language used in Nissilä’s specification, Dr. Berger uses terms such as “embedded in” and “enclosed by” that appear nowhere in Nissilä and are not supported by the actual disclosures of Nissilä. EX1003, ¶358.

FISH 

APPLE-2004, ¶113; POR 43-46

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DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

Nissilä Does Not Disclose a Separate Membrane that Encloses or Contains the Electrode

Dr. Kenny
(Patent Owner's Expert):

there is no teaching in Nissilä of an additional conductive “membrane” layer positioned between the electrode and the exterior surface of the device. Rather, what Nissilä *actually* discloses is that in the embodiment of Figure 5, the electrode pads are formed *from* a conductive membrane 119. EX1006, 33-49. Nissilä is clear that the electrodes 118, 122 *are* the membrane 119, the electrodes are never described as being “embedded in” or “enclosed by” a separate membrane as Dr. Berger asserts. *Id.*; EX1003, ¶358. In fact, the words “embedded” and “enclosed” appear nowhere in Nissilä.

APPLE-2004, ¶105; POR 40, 50

Nissilä Does Not Disclose a Separate Membrane that Encloses or Contains the Electrode

Dr. Berger
(Petitioner's Expert):

A. I don't find the word "enclose" in

Nissila.

Q. Does Nissila ever use the term "embed" or "embedded" to describe the relationship between the components 119 and 122 and the membrane 119?

(Witness reviews document.)

A. I don't find that term.

APPLE-2013, 141:12-21; POR 42

Nissilä's Priority Document Confirms that the Electrodes 118, 122 are the Membrane/Film 119

Nissilä Priority Patent:

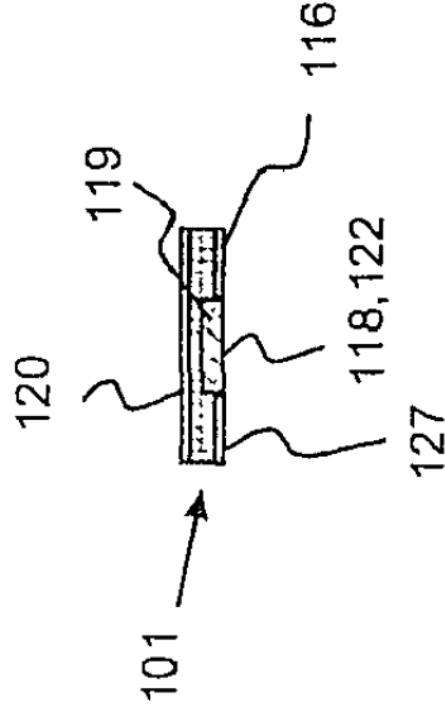


FIG.5

APPLE-2006, FIG. 5; POR 48-49

Nissilä's Priority Document Confirms that the Electrodes 118, 122 are the Membrane/Film 119

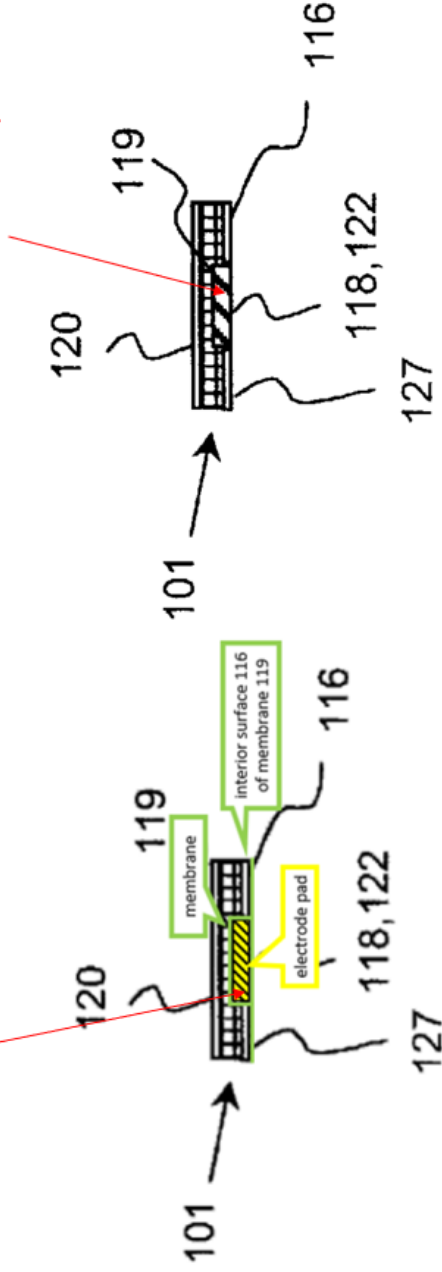
Nissilä Priority Patent:

According to another embodiment, as shown in Figs. 3 - 6, 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. In this case, the width of the electrode 118, 122 at each end of the electrode structure 100 may be as wide as the ribbon-like structural part 101, or narrower than the width thereof. The film 119 may in this case directly touch the surface 102 of the person's skin, or there may be electrically conductive gripping material 127 on an inner surface 116 of the film 119 that is placed against the surface of the person's skin. The gripping material 127 is advantageously electrically conductive glue, such as conductive Solgel or conductive silicone glue. If the width of the electrode 118, 122 is narrower than the width of the ribbon-like structural part 101, gripping material 127 may be used on an inner surface of the ribbon at outer edges of the ribbon 101, outside the electrodes 118, 122, and 127 need not be electrically conductive.

Nissilä's Membrane 119 is the Electrode

AliveCor's altered FIG. 5 (green layer completely fabricated by AliveCor)

Unaltered FIG. 5 of Nissilä (electrode 118, 122 on exterior of device with no intervening layer between the electrode and the user's skin)

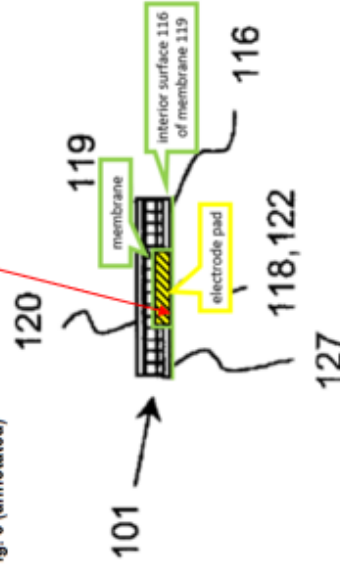


APPLE-2004, ¶¶121-122; POR 50-51

Nissilä's Membrane 119 is the Electrode

AliveCor's modified version of FIG. 5, showing an extra conductive layer positioned between the electrode 118, 122 that spans the entire surface of the device.

Ex. 1006, Fig. 5 (annotated)



Unmodified FIG. 4 of Nissilä showing the electrodes 118, 122 exposed on the exterior surface of the device and visually distinct from the surrounding portions of the band.

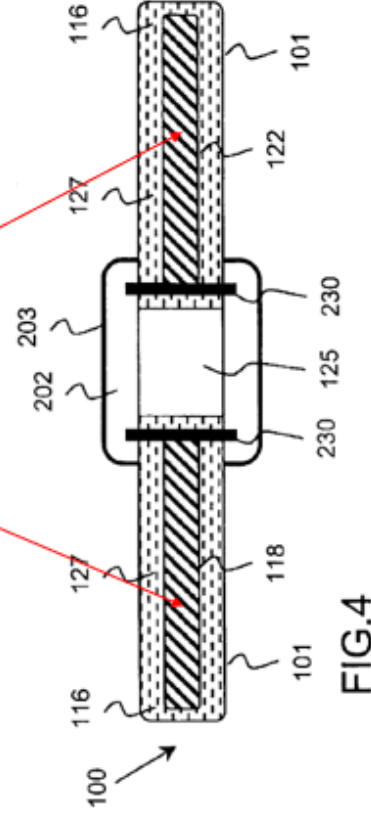


FIG.4

7: A POSITA Would Not Have Applied Nissilä to Markel in the Proposed Manner

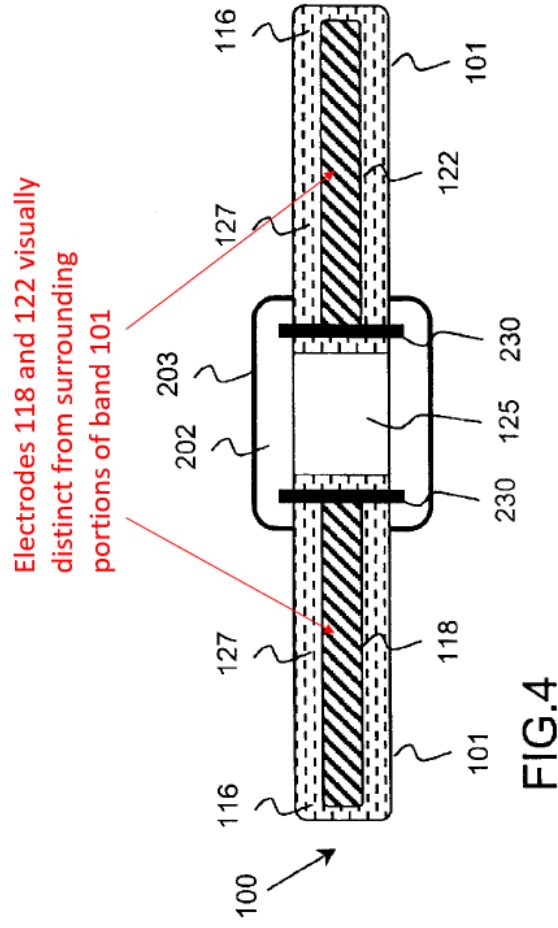
Alleged Motivation to Combine

AliveCor's Assertion:

A POSITA would be motivated to combine *Nissili*'s electrode structure with *Markel*'s electronic device in order to accomplish *Markel*'s stated goal of an electrode that is “*substantially concealed (or hidden) from a user . . . with little or no visible indication of the electrode presence*” (Ex. 1005, [0040]; Ex. 1003, ¶355). *Markel*'s hidden electrode is desirable because it increases aesthetics of the device while protecting the electrode from bumps or other damage (Ex. 1003, ¶354). Indeed, by concealing the electrode from the user, the user is able to obtain the benefits of having an ECG capability without a *visible indication* of the electrode presence that takes away from the device's appearance (Ex. 1003, ¶354).

Nissilä's Electrodes Are Visually Distinct From Surrounding Band

Nissilä:



EX1006, FIG. 4; POR 61

Nissilä's Electrodes Are Visually Distinct From Surrounding Band

Dr. Berger
(Petitioner's Expert):

Q. And this is showing those electrodes as being visually distinct from the surrounding portions of the band; is that correct?

A. I believe that's correct.

APPLE-2013, 126:13-16; POR 60-61

FISH 

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

Markel's Electrodes Are Already Visually Concealed

Dr. Berger
(Petitioner's Expert):

Q. Why would a POSITA need to add Nissila's membrane to its electrodes, to the electrodes of Markel, if Markel's electrodes are already concealed?

A. Honestly, I don't think one needs to.

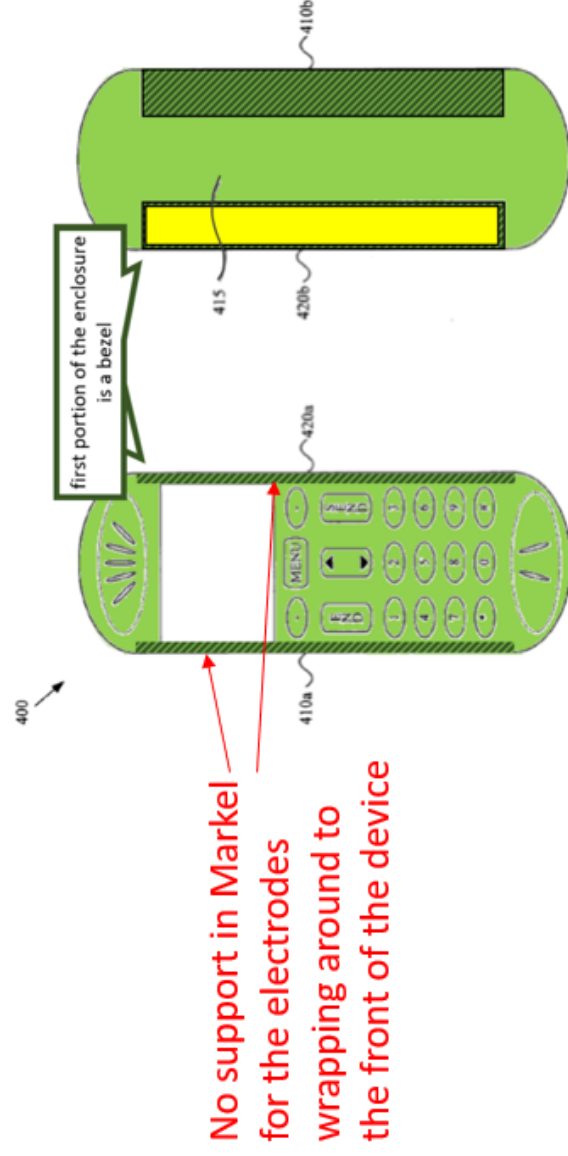
APPLE-2013, 170:9-171:3; POR 63

8: Markel's Electrodes 410b and 420b Do Not Wrap to the Front of the Device (Claims 12-13, 19)

AliveCor's Annotations of Markel's Figure 4 Have No Support

AliveCor's Assertion:

Ex. 1005, Fig. 4 (annotated)



Markel's Actual Disclosure

Markel:

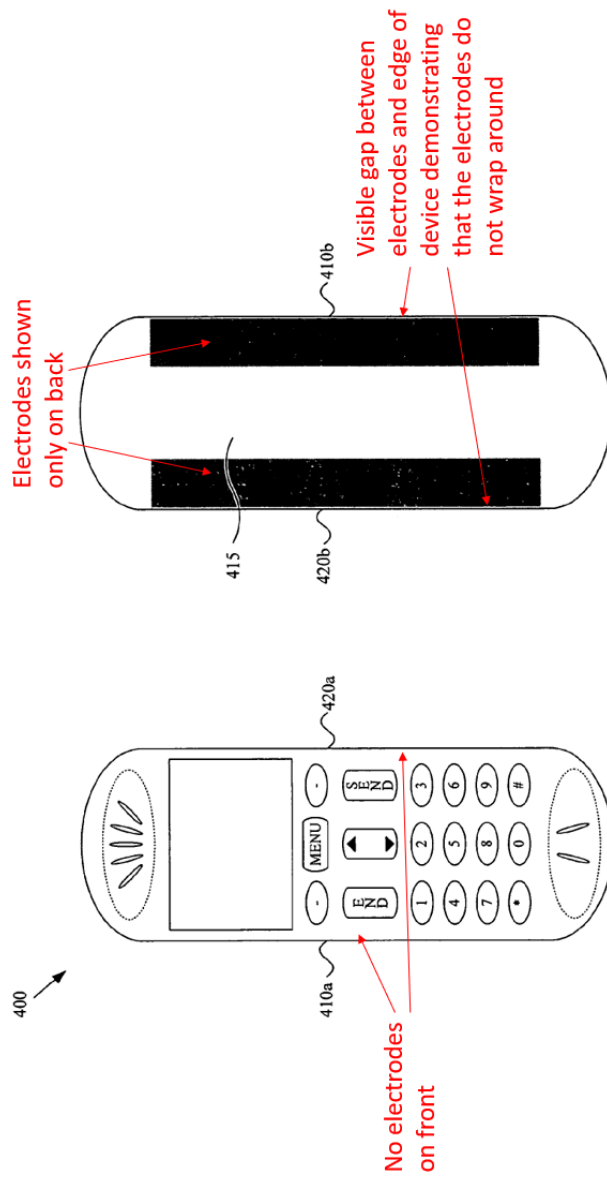


Figure 4

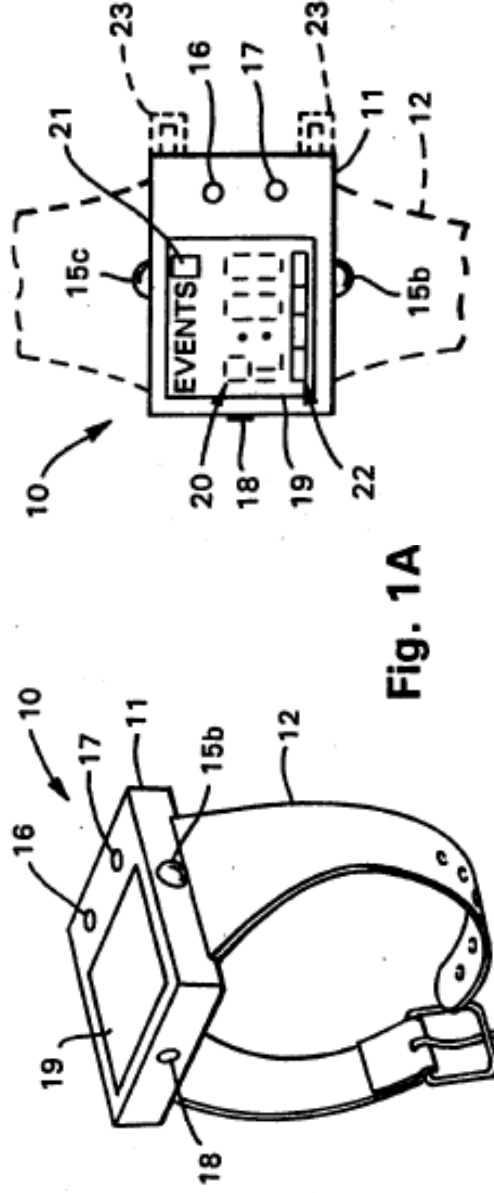
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EX1005, FIG. 4 (annotated); POR, 72-73.

9: Righter Fails to Disclose Electrodes Positioned in a Bezel (Claims 12-13, 19)

Righter's Electrodes Are on the Sides of the Device, Not in the Bezel

Righter:



10: Revised Contingent Motion to Amend

Markel Does Not Disclose User Authentication Based on Cardiac Signals

Markel:

[0093] The cardiac information acquisition module 1710 may, for example, be adapted to periodically attempt to acquire cardiac information from a user or may be adapted to continually attempt to acquire such information. The cardiac information acquisition module 1710 may also, for example, be adapted to acquire cardiac information from a user governed by acquisition constraints or directives included in a profile (e.g., stored in the memory 1740). Such a profile may, for example, include information-directing behavior of the cardiac information acquisition module 1710 (e.g., timing behavior, triggering behavior, sensor interface behavior, UI behavior, etc.).

EX1005, [0093]; Rep. to Opp. to Rev. Mot. to Amend, 11

[0097] The cardiac information acquisition module 1710 may also, for example, be adapted to identify the user of the MCD 1700. For example, such identification (or authentication) may be utilized in an exemplary scenario where a variety of users may be utilizing the MCD 1700. In such an exemplary scenario, the acquisition module 1710 may be adapted to acquire cardiac information for a plurality of different users and to segment such information according to user identity.

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EX1005, [0097]; Rep. to Opp. to Rev. Mot. to Amend, 11

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DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

Engstrom Uses a “Heart Beat Profile” for authentication

Engstrom:

[0049] Recall from earlier description, upon depression by a user, while phone 100 is in powered down or low power state, power switch 122 couples power to sensors 132 and other components 202-212 of phone 100. For the embodiment, on power on/reset, operating logic 230 causes sensors 132 to sense the heart beat pattern of the user, based on the user's fingers 250 in contact. Resultantly, after a predetermined elapsed amount of time, a heart beat profile of an authorized user who is aware of the authentication requirement, and have properly held the phone with his/her fingers in contact with sensors 132, would have a heart beat profile of the user taken or captured in real time, for authentication.

EX1020, [0049]; Rep. to Opp. to Rev. Mot. to Amend, 11

FISH

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

THANK YOU