Knobbe Martens

Petitioner Masimo Corporation's Demonstratives For Oral Hearing

August 12, 2024

Masimo Corporation v. Apple Inc.

IPR2023-00745 (Patent No. 10,076,257)

Grounds

GROUND 1	Claims 1-4, 8, 10, 11 and 14 are unpatentable as anticipated by Mills
GROUND 2	Claims 1-4 and 8-22 are unpatentable as obvious over Markel in view of Mills

Claims Argued in the POR

- Ground 1 Anticipation
  - Independent Claim 1
  - Dependent Claims 3-4 and 10
- Ground 2 Obviousness
  - Independent Claims 1 and 15
  - Dependent Claims 2, 9, 10, 12-13, 19, 20

- Claims 8, 11, 14, 16-18, and 21-22 were not separately argued in the POR
- Claims 5-7 were not challenged

Claim 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.

Embedded Constructions

Masimo's IPR Construction – "embedded"

Petition at 9:

A POSITA would understand at the time of the '257 patent disclosure based on its usage in the specification, the claim term "embedded" means "*an integral part of*" such as, by "*being placed in the thickness of a surrounding material including forming an outer and/or inner surface*" or "*placed underneath an exterior surface and against an inner surface*." EX1003, ¶46; EX1001, 9:34-48.

Apple does not dispute Mills's "embedded" pads under Masimo's construction of "embedded."

Mills:

[57] **ABSTRACT**

A compact, lightweight wrist-worn cardiac data and event monitor having dry skin electrodes integral with the monitor's housing is disclosed. Preferably, the skin

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,

Apple's IPR Construction – "embedded in"

POR at 5:

> **"embedded in"** (claims 1, 15) – The term "embedded in" should be given its plain and ordinary meaning, which does not necessarily require an explicit construction. APPLE-2003, ¶¶30-31. 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." APPLE-2003, ¶31,

Reply at 1:

> a material." *Id.* Apple does not specify a threshold for "partially," so its construction covers pads ***minimally*** set in ***or*** surrounded by an enclosure. Apple asserts its

Apple's Construction of "Embedded In" is Broad

Apple's Expert:

Q. Okay. So, to be at least partially set in the material, the pad doesn't need to directly contact the material of the enclosure. Correct?

A. I think that is right. There can be intervening layers. I am thinking practically and not, I mean, the example of a levitated pad, you know, in a -- I guess we could discuss that.

A. So, it is levitating?

Q. Yes, the book is levitating in the drawer of the desk.

Is that book embedded in the desk?

A. So I think the understanding of embedded in is at least partially set in or partially surrounded by the material of the desk in this case.

I think if the book is in the drawer surrounded by paper or by space, somehow floating within, I would still think the important relationship is that the book is in a position where the material of the desk partially surrounds the book within that structure.

So, yes.

EX1052, 55:5-22, 74:7-14; Reply, 9-10; EX1065, ¶¶229-230

Apple's Construction of "Embedded In" is Broad

Apple's expert:

Q. How much curvature does the surface of the enclosure need to have in order for the pad to be embedded in that material?

A. I think it has to be sufficient for a person of ordinary skill in the art to look at it and see that there is a departure from a flat surface that is sort of visible to the eye.

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I think one of ordinary skill in the art knows when they see curvature that leads to a thing being partly surrounded by material. It could be millimeters. It could be more. Somewhere below what they can see and it seems to be functionally relevant would probably not matter.

Q. And in that context, what about 1 degree of curvature, would that be sufficient to the embedded in?

A. It would depend on the radius as well as the radius of the curvature.

Again, you are trying to get me into a space where I am going to define things based on some amount of distance. And I think, frankly, a person of ordinary skill is going to look at it and they are going to see the drawing.

Would they see Figure 4B? Yeah. That is a lead embedded in a bezel.

If you take them through a progression of things that are sort of flatter and flatter all of the way to flat, they will probably get uncomfortable somewhere along the way, and at the end say no, it is not embedded.

EX1052, 112:6-113:9, 114:6-22; Reply, 9-10; EX1065, ¶¶229-230

Apple's Construction of "Embedded In" is Broad

Apple's expert:

But, it is -- if they have to get out, you know, instruments to determine whether something is flat or not, you know, in this weird hypothetical of a table in a room, whether it is flat or not, you know, again it is a little bit like with many definitions. You know, you sort of know it when you see it.

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And it is just, I think one of ordinary skill in the art is going to base their determination of whether something is embedded in something else based on what they see.

District Court Constructions – "embedded in"

C. Construction of the Apple Utility Patents

1. "embedded in" ('257 Patent, Claim 1)[14]

a) Apple's Opening Position

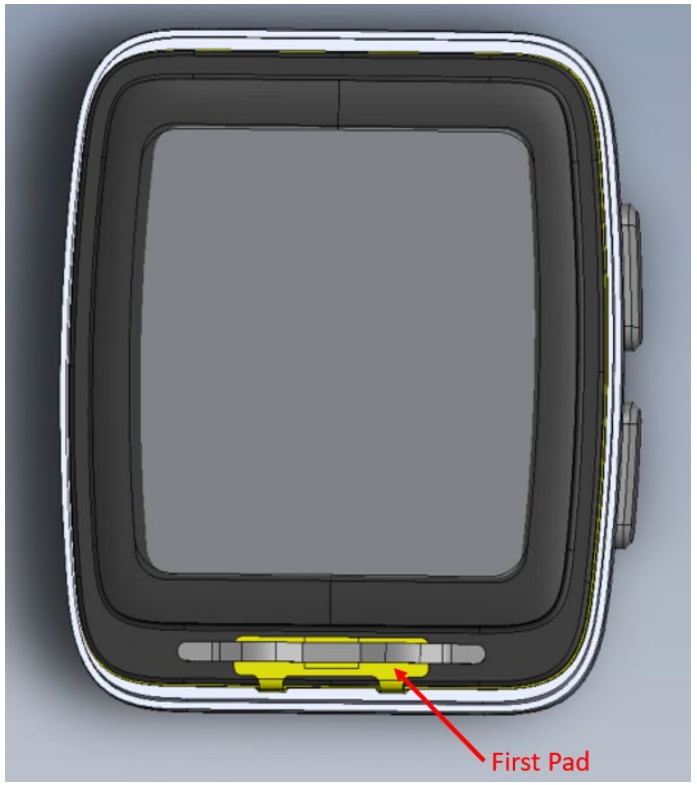
Apple's Proposed Construction	Masimo's Proposed Construction
plain and ordinary meaning	set firmly into and surrounded by material

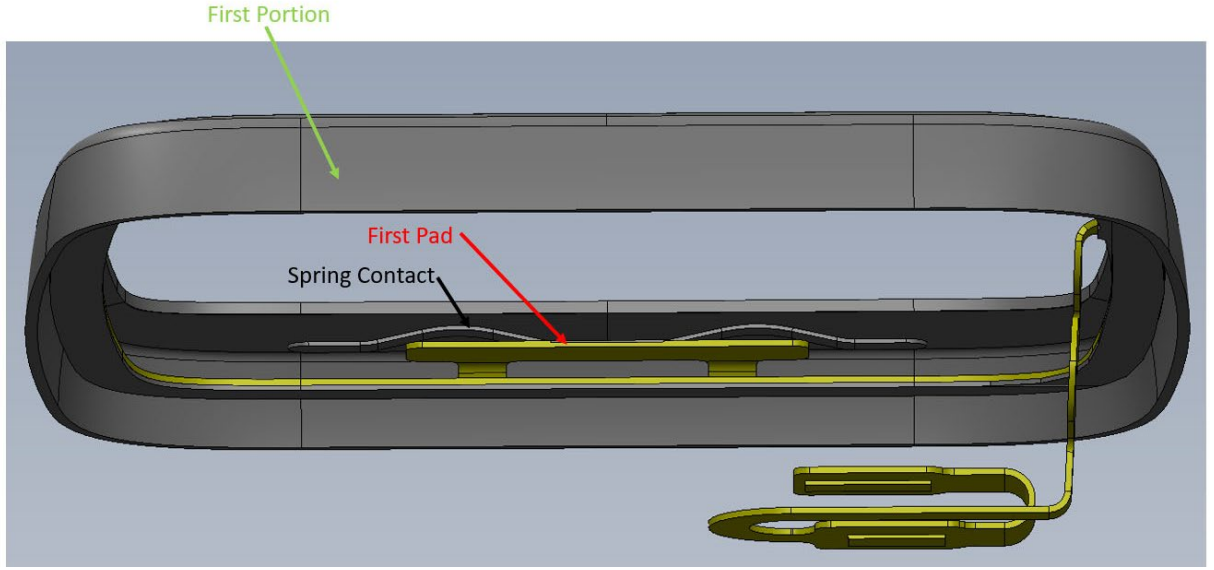
Apple Disputes Masimo's IPR and District Court Constructions

POR at 12:

> To be clear, just as the construction for "embedded" advanced by Masimo in the Petition is overly broad, the construction advanced by Masimo in the district court proceeding is improperly narrow. APPLE-2003, ¶45. For example, the

Apple's Infringement Contentions Undermine its IPR Arguments





The Exposed Copper Region on the ECG Flex Circuit that the Spring Contact is Soldered to, Which is Embedded in the Bezel is "A First Lead Comprising a First Pad that is Embedded in a First Portion of the Enclosure" Under Apple's Construction

Curvature

POR at 5:

"embedded in" (claims 1, 15) – The term "embedded in" should be given its plain and ordinary meaning, which does not necessarily require an explicit construction. APPLE-2003, ¶¶30-31. 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." APPLE-2003, ¶31,

P.O. Sur-Reply at 25:

electrode region 410b would have "an inner wall." Pet., 48. There is therefore no evidence on the record of an inner portion of the electrode region 410b having a groove, indent, or other physical configuration for receiving the top of Mills' leaf spring 62 such that the top of the leaf spring 62 would be "embedded in" the electrode region 410b as required by the claims. APPLE-2003, ¶161 (Dr. Kenny

Apple's Expert:

34. In a first arrangement described with respect to Figure 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. As shown in the figure, the lead 472 and the back surface of bezel 460 are both curved, with the lead 472 embedded in the bezel 460 because of the position of the lead 472 on the inside curved surface of the bezel 460. This is consistent with the understanding of a POSITA as

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with a flat surface of another component. The lead 472 is embedded in the bezel 460 because it is positioned on the inside curved surface of the bezel, which is clearly distinct from the examples discussed in Mr. Oslan's deposition of a book being placed in contact with the flat lower surface of a table.

Constructions

	IPR		District Court	
	Apple	Masimo	Apple	Masimo
"embedded"		an integral part of, such as, by being placed in the thickness of a surrounding material including forming an outer and/or inner surface or placed underneath an exterior surface and against an inner surface		
"embedded in"	at least partially set in or partially surrounded by a material		*plain and ordinary meaning*	set firmly into and surrounded by material

“Enclosure” Construction

"Enclosure" Construction

Opp. to PO's RMTA at 1:

> A POSITA would have understood that "enclosure" is a broad, generic term for "something that encloses." Indeed, "enclosure" is an autological or self-referential noun that defines itself by its ***function***—to enclose—not by any specific structure. Thus, the term encompasses ***any*** structure that encloses. EX1069, ¶321.

Pazandeh v. Yamaha Corp. of Am., 718 F. App'x 975, 979 (Fed. Cir. 2018):

> Finally, we owe deference to the district court's fact-findings, all of which are based on dictionary definitions, (1) that the plain meaning of "enclosure" is "something that encloses (as a barrier)"; (2) that the plain meaning of

EX1071:

enclosure

[en-**kloh**-zher] ◉ Phonetic (Standard) ○ IPA

noun

1 something that encloses, as a fence or wall.

EX1072:

enclosure noun

en·clo·sure in-ˈklō-zhər en-

variants *or less commonly* **inclosure** in-ˈklō-zhər

Synonyms of *enclosure* ›

1 : the act or action of enclosing : the quality or state of being enclosed

2 : something that encloses

EX1073:

en·clo·sure (ĕn-klō□zhər)

n.
1.
a. The act of enclosing.
b. The state of being enclosed.
2. Something enclosed: *a business letter with a supplemental enclosure.*
3. Something that encloses.

"Enclosure" Construction

Intrinsic evidence in '257 patent:

> As another example, an entire portion of the electronic device enclosure (e.g., a portion of a bezel or housing) can serve as a lead for the heart sensor.

Cases relating to a single component satisfying two limitations if consistent with the intrinsic evidence:

- *Powell v. Home Depot U.S.A., Inc.*, 663 F.3d 1221, 1231-32 (Fed. Cir. 2011)
- *Google LLC v. EcoFactor, Inc.*, 92 F.4th 1049, 1058 (Fed. Cir. 2024)
- *Apple Inc. v. Kilbourne*, IPR2019-00233, Paper 40 at 38, 57 (PTAB Mar. 25, 2020)
- *Retractable Techs., Inc. v. Becton, Dickinson & Co.*, 653 F.3d 1296, 1303 (Fed. Cir. 2011)
- *SharkNinja Operating LLC v. Bissell Inc.*, IPR2022-01175, Paper 40 (PTAB Jan. 11, 2024)

"Enclosure" Construction

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

Apple did not provide a construction for the term "enclosure"

Apple's enclosure:

- must be "separate" from the pad
- must "stand alone" in the absence of other components
- cannot be too thin
- cannot be an outermost coating layer

Kenny on Enclosure

Q. So it's your opinion that the ordinary meaning of "enclosure" being something that encloses is incorrect?

A. To me it's insufficient and not helpful to say something is what it is. That's what that definition says.

Q. Okay. So there is no requirement that the enclosure be physically separate from the pad; correct?

A. I think that's correct.

Enclosure Flow Chart

	Enclosure Construction	Additional Arguments
Apple		- must be “separate” from the pad - must “stand alone” in the absence of other components - cannot be too thin
Masimo	“something that encloses”	

Mills

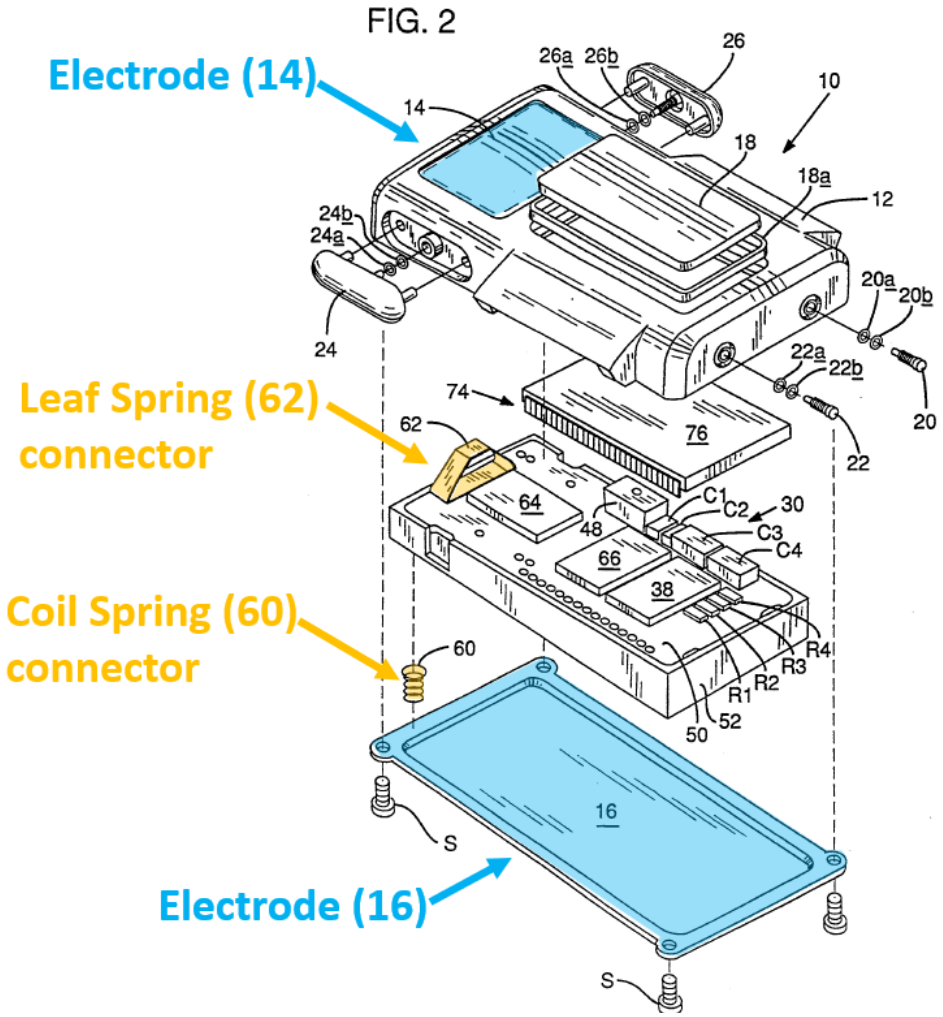


FIG. 2
Electrode (14)
Leaf Spring (62)
connector
Coil Spring (60)
connector
Electrode (16)
14
26a
26b
26
10
18
18a
12
24b
24a
24
20a
20b
20
22a
22b
22
74
62
76
64
48
C1
C2
30
C3
C4
66
38
60
R4
R3
R2
R1
50
52
16
S
S

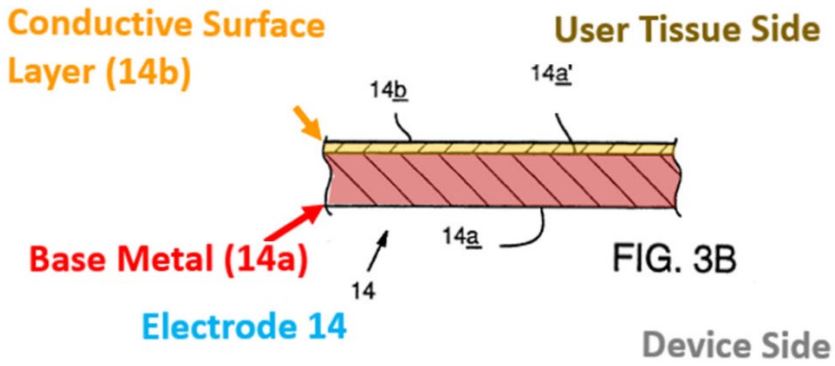

Conductive Surface
Layer (14b)
User Tissue Side
14b
14a'
14a
Base Metal (14a)
14
Electrode 14
Device Side

FIG. 3B

Markel

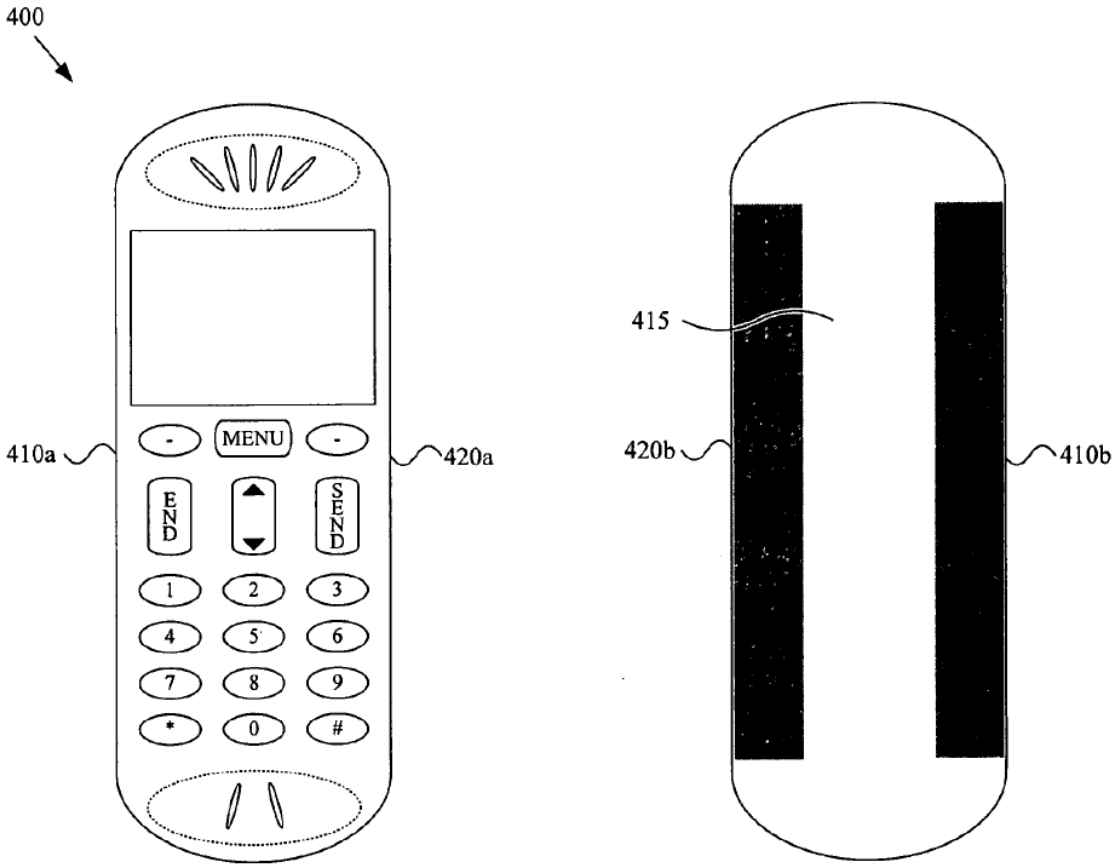


Figure 4

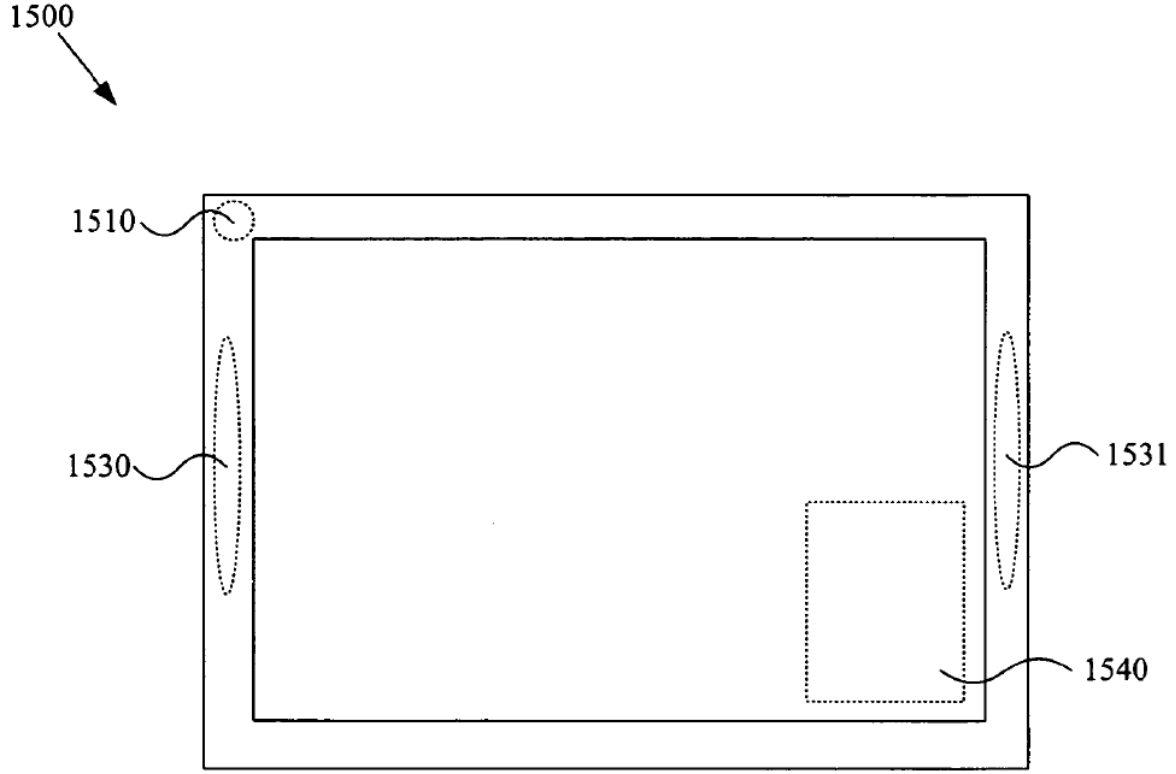


Figure 15

Ground 1 – Mills Anticipates Claims 1-4, 8, 10, 11, and 14

Ground 1, Claim 1 – Undisputed limitations taught by Mills

1) An electronic device for detecting a user's cardiac signal;

2) an enclosure;

3) a heart sensor configured to detect the user's cardiac signal;

4) a second lead comprising a second pad that is embedded in a second portion of the enclosure …;

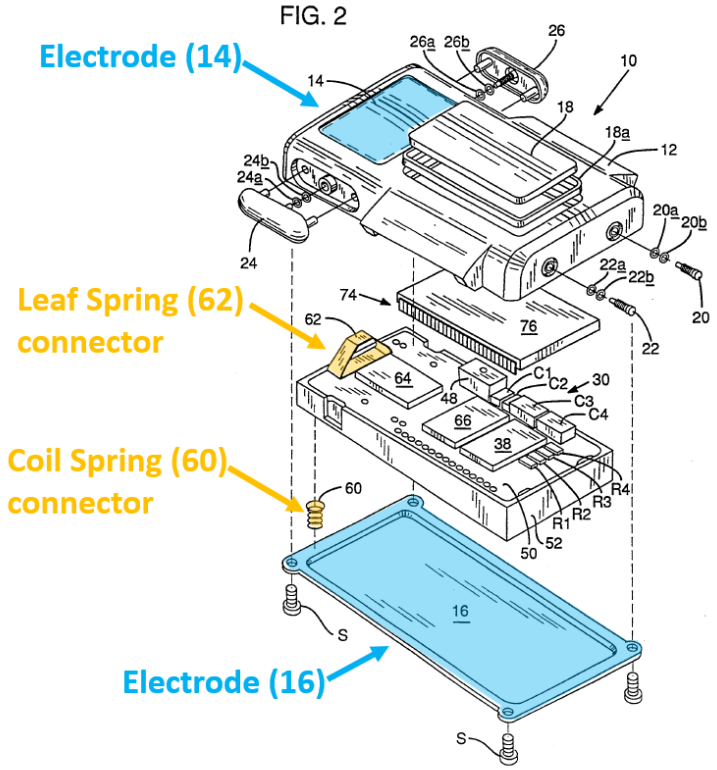
5) a processor coupled to the heart sensor …;

6) …a second connector coupled to the second pad and configured to provide the second electrical signal detected by the second pad to the processor.

[57] **ABSTRACT**

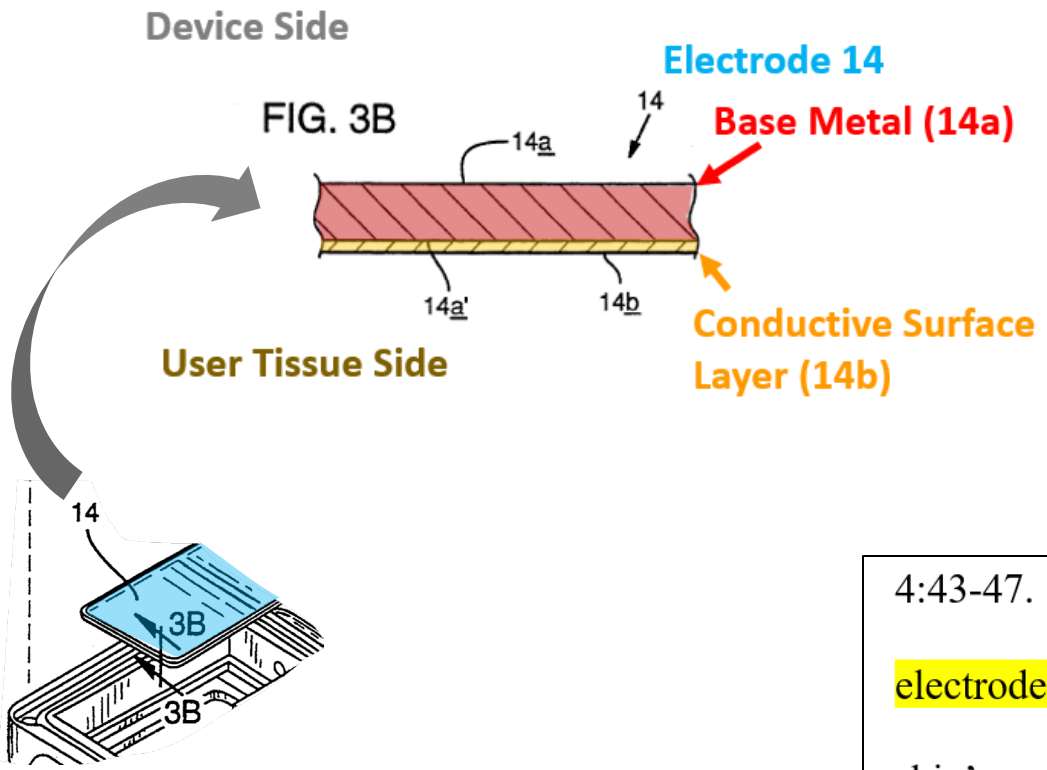
A compact, lightweight wrist-worn cardiac data and event monitor having dry skin electrodes integral with the monitor's housing is disclosed.

FIG. 2



Ground 1, Limitation 1[b(i)] – "a first lead comprising a first pad"

1st Theory – 14a is the first pad



Petition:

> 4:43-47. Thus, Mills teaches and a POSITA would understand that this first pad, electrode 14a, is configured to detect an electrical cardiac signal via the user's skin's contact with the exterior surface 14b of the first portion of the enclosure. EX1003, ¶59.

Ground 1, Limitation 1[b(i)] – "a first lead comprising a first pad"

1st Theory – 14a is the first pad

Petition at 21:

surface **14a**." EX1006, 4:4-5. Thus, the pad (base metal 14a) is positioned underneath the exterior of the first portion (conductive surface coating 14b) and is therefore also embedded under the exterior of the first portion. This two-layer

Petition at 22:

4:43-47. Thus, Mills teaches and a POSITA would understand that this first pad, electrode 14a, is configured to detect an electrical cardiac signal via the user's skin's contact with the exterior surface 14b of the first portion of the enclosure.

Petition at 24:

ii. Limitation 1[b(iv)]: "the first pad is positioned underneath the exterior surface of the first portion"

As discussed above with regard to Fig. 3B of Mills, embedded lead 14a is underneath or covered by the exterior surface 14b. Mills at Fig. 3B, EX1006, 4:43-47; EX1003, ¶60.

Petition at 29:

Thus, as illustrated in Fig. 3B (below with annotations), electrode 16 includes a base metal portion 14a, which is a pad embedded under conductive surface layer 14b. EX1006, Fig. 3B; EX1003, ¶63.

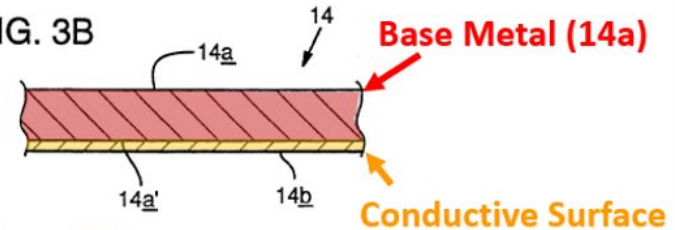
Ground 1, Limitation 1[b(ii)] – "embedded in a first portion of the enclosure"

1st Theory – 14a is embedded in a first portion

Mills

Device Side

FIG. 3B



Electrode 14

Base Metal (14a)

Conductive Surface Layer (14b)

User Tissue Side

'257 Patent

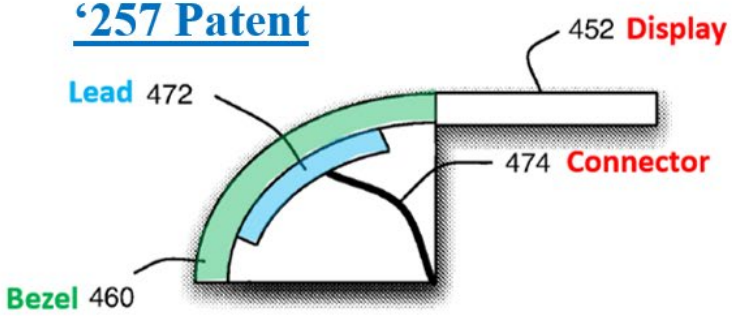
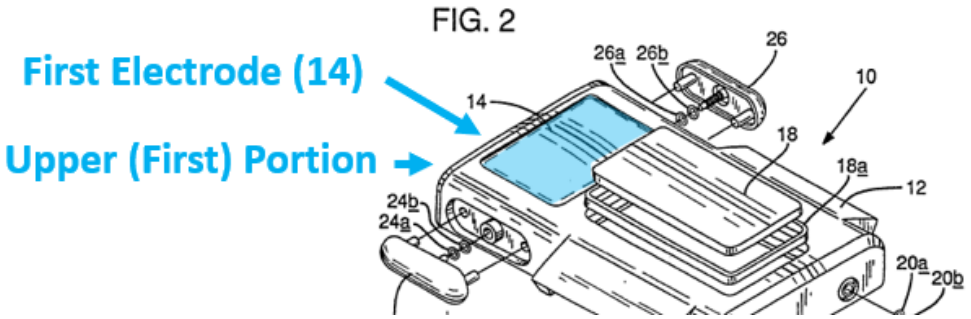


FIG. 4B

"[A]another ... bezel with an embedded heart sensor lead" Ex. 1001 at 9:37-38.

Ground 1, Limitation 1[b(ii)] – "embedded in a first portion of the enclosure"

1st Theory – 14a is embedded in a first portion



Petition at 21:

> Not only is each of electrodes 14 and 16 embedded into the housing 12 by being "integrally molded" into housing 12, each electrode 14 and 16 also has a base material embedded underneath an outer surface coating. Fig. 3B of Mills

Pet., 20-23; Reply, 3-4; EX1006, Fig. 2; EX1052, 186:18-187:6.

Ground 1, Limitation 1[b(ii)] – "embedded in a first portion of the enclosure"

1st Theory – 14a is embedded in a first portion

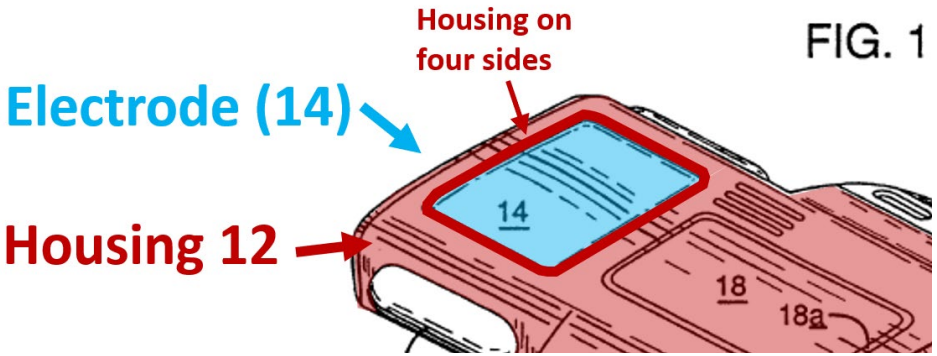
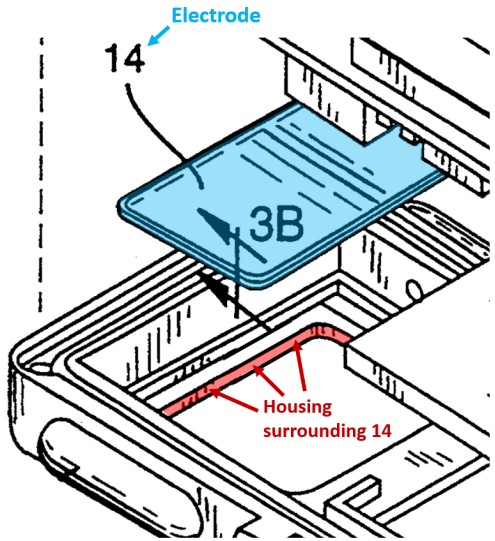


FIG. 1



Kenny Testimony:

18	Q. So, electrode 14 is at least
19	partially surrounded by the housing 12, correct?
20	A. I think so, yes.
21	Q. And the electrode 14 is set in that
22	portion of the housing 12 as well. Right?
1	A. I -- yeah, I suppose. This is
2	definitely surrounded by the housing 12.
3	Q. So, electrode 14 is embedded in the
4	housing 12 as shown in Figure 1 and Figure 2,
5	correct?
6	A. That is correct.

EX1052, 186:18-187:6; Pet., 21-23, 45; Reply, 7-9; EX1006, Fig. 2, 3A (detail, "3B" removed);

Ground 1, Limitation 1[b(ii)] – "in a first portion of the enclosure"

1st Theory – 14a is embedded in a first portion

Petition:

c. Limitation 1[b(ii)]: "embedded in a first portion of the enclosure"

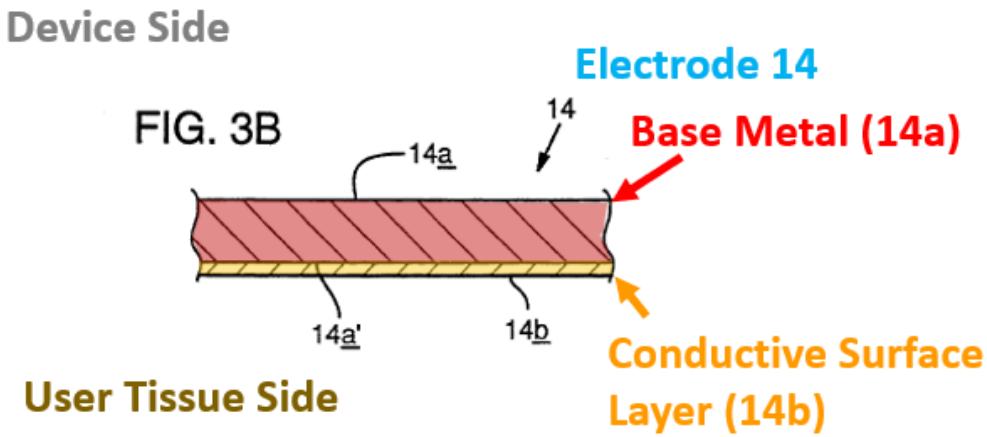
Fig. 1 of Mills discloses its electrode 14 (first pad) is "integrally molded" (*i.e.*, embedded) into the housing. EX1006, Fig. 1; 3:8-9; EX1003, ¶59.

***

Not only is each of electrodes 14 and 16 embedded into the housing 12 by being "integrally molded" into housing 12, each electrode 14 and 16 also has a base material embedded underneath an outer surface coating. Fig. 3B of Mills

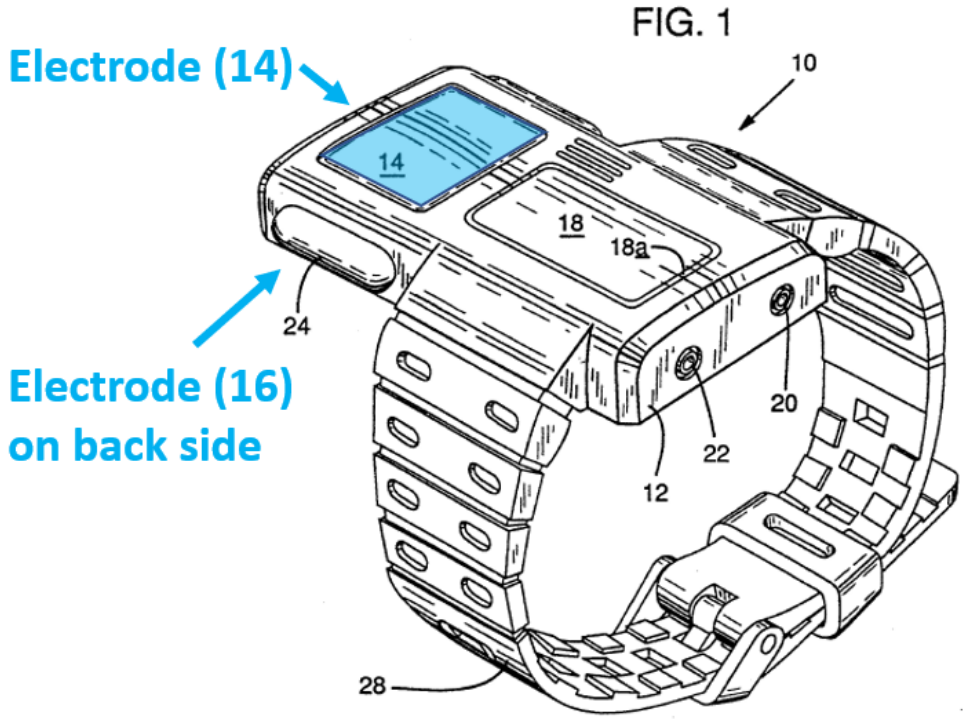
Ground 1, Limitation 1[b(ii)] – "in a first portion of the enclosure"

1st Theory – 14a is embedded in a first portion



Such plating of base metal expanse **14** *a* has been found to protect, and thus to greatly extend the life, of a dry skin electrode such as electrode **14** by producing an extremely hard, exterior, skin-contactable surface. Such plating also has been found to provide high conductivity and thus to produce a high quality electrical interface between an electrode such as electrode **14** and the patient's skin surface, which may be very dry

Ground 1, Limitation 1[b(ii)] – "in a first portion of the enclosure"



of electrodes **14**, **16**, which it may be seen from FIG. **1** form an integral, unitary part of housing **12**.

Mills consistently describes electrodes 14 and 16 as an integral part of housing 12:

[57] **ABSTRACT**

A compact, lightweight wrist-worn cardiac data and event monitor having dry skin electrodes integral with the monitor's housing is disclosed.

...

The monitor's housing includes dual, integral dry skin electrodes located on a wrist-contacting, inner or

...

exploded isometric view. Wrist-worn ECG, or cardiac data, monitoring apparatus **10** comprises a housing **12** including first and second dry skin electrodes **14**, **16** unitarily connected therewith and forming an integral part thereof for making conductive contact with a car-

...

or is that contained within and including housing **12** (of which electrodes **14**, **16** form an integral part: electrode **14** integrally molded therein and electrode **16** by the use

EX1006, Fig. 1, Abst., 2:13-14, 3:7-11, 3:47-49, 6:55-56; Pet., 16-18; Reply, 11.

Petition Identified Plating 14b as Part of First Portion

Petition at 21:

surface **14a**." EX1006, 4:4-5. Thus, the pad (base metal 14a) is positioned underneath the exterior of the first portion (conductive surface coating 14b) and is therefore also embedded under the exterior of the first portion. This two-layer

Petition at 22:

4:43-47. Thus, Mills teaches and a POSITA would understand that this first pad, electrode 14a, is configured to detect an electrical cardiac signal via the user's skin's contact with the exterior surface 14b of the first portion of the enclosure.

Petition at 24:

ii. Limitation 1[b(iv)]: "the first pad is positioned underneath the exterior surface of the first portion"

As discussed above with regard to Fig. 3B of Mills, embedded lead 14a is underneath or covered by the exterior surface 14b. Mills at Fig. 3B, EX1006,

Petition at 37:

metal pad portion 14a. EX1006, Fig. 3B. Housing 12 and outer surface portion 14b of electrode 14 form a pocket into which the inner base metal pad portion 14a underneath the exterior surface 14b of the enclosure. EX1006 at Figs. 1, 3B. The

Petition identified the upper part of the housing as part of first portion

Petition at 21:

> Not only is each of electrodes 14 and 16 embedded into the housing 12 by being "integrally molded" into housing 12, each electrode 14 and 16 also has a base material embedded underneath an outer surface coating. Fig. 3B of Mills

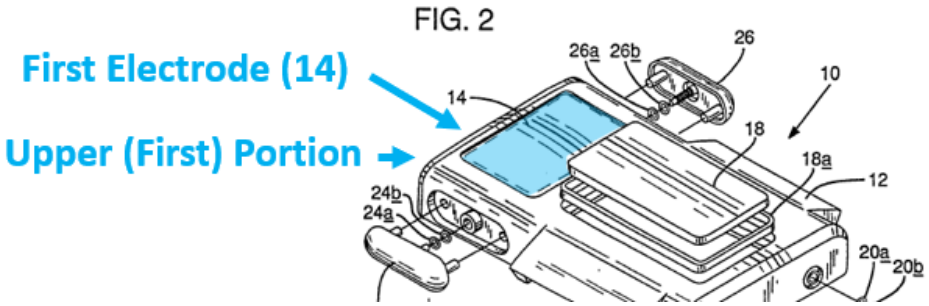
Petition at 34:

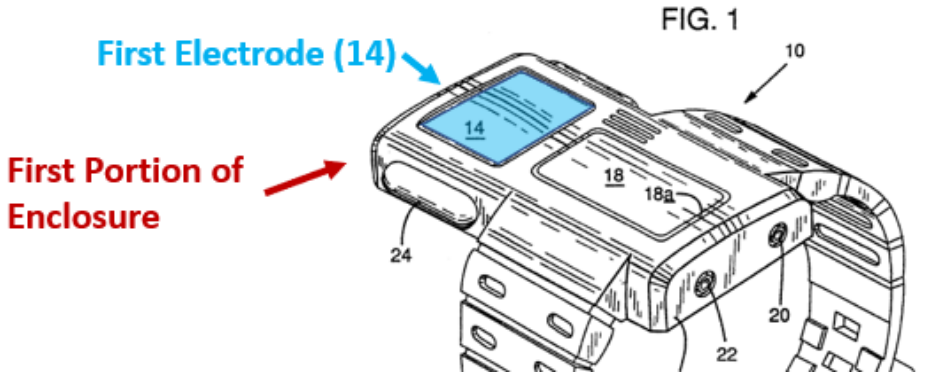
> portions of the enclosure. The upper or first portion of housing 12 has integrated electrode 14 on one side (top side) of the cardiac data apparatus 10 and the lower or second portion of the housing 12 has integrated electrode 16 on another side (bottom side) that is opposite of the side having the first portion. EX1006, Fig. 2,

Petition at 39:

> As shown in the diagram below (annotated Figs. 1 and 3B of Mills), first portion of housing 12 (enclosure) contains electrode 14. Electrode 14 consists of

Petition at 23, 25, 45:





Ground 1, Limitation 1[b(i)] – "a first lead comprising a first pad"

2nd Theory – top of leaf spring 62 is a first pad

Petition at 22-23:

> In addition to the above described ways in which Mills meets the limitation of this Claim 1, Mills further discloses electrode 14 is physically and electrically connected to processing circuitry by a leaf spring 62 as shown in Fig. 2 (reproduced below with annotations). *Id.* at 4:67 – 5:3; *See also Id.* at 4:1-3; EX1003, ¶60.

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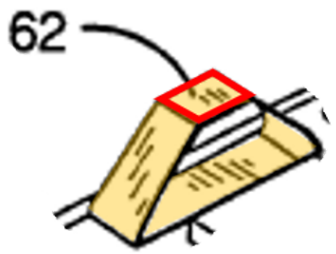
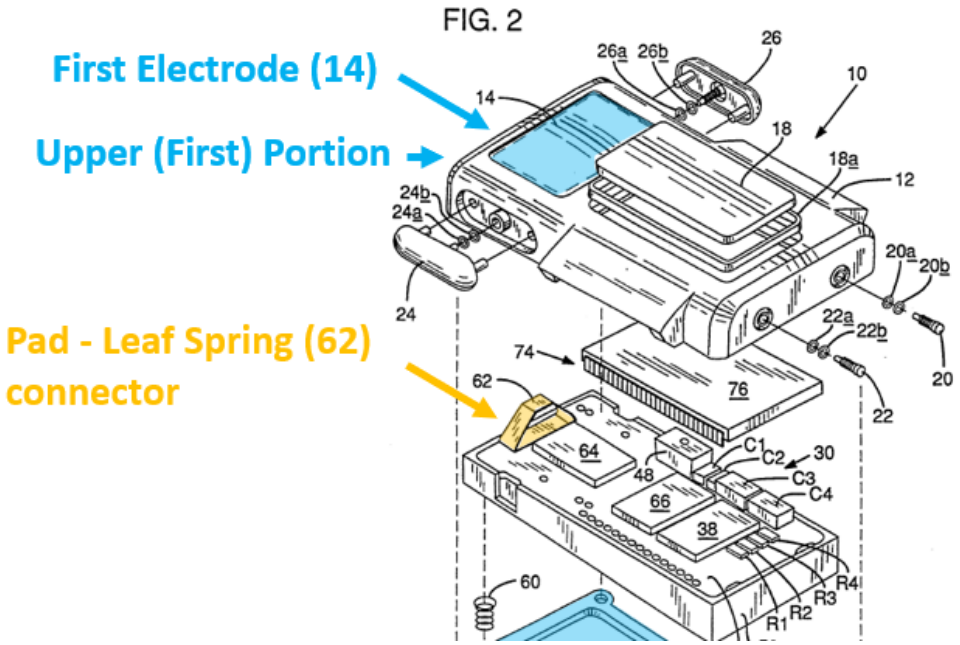
EX1006, 4:67 – 5:3. The top of the trapezoid-shaped leaf spring 62 is a pad.

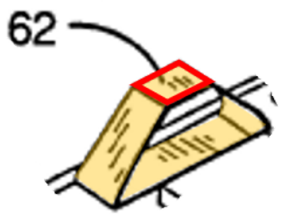


Ground 1, Limitation 1[b(ii)] – "embedded in a first portion of the enclosure"

2nd Theory – top of leaf spring 62 is embedded



Petition at 23:



The pad is pressed against the inner wall of electrode 14 in Mills and surrounded by the housing 12 of Mills and is therefore embedded in the device of Mills.

2nd Theory – Embedded

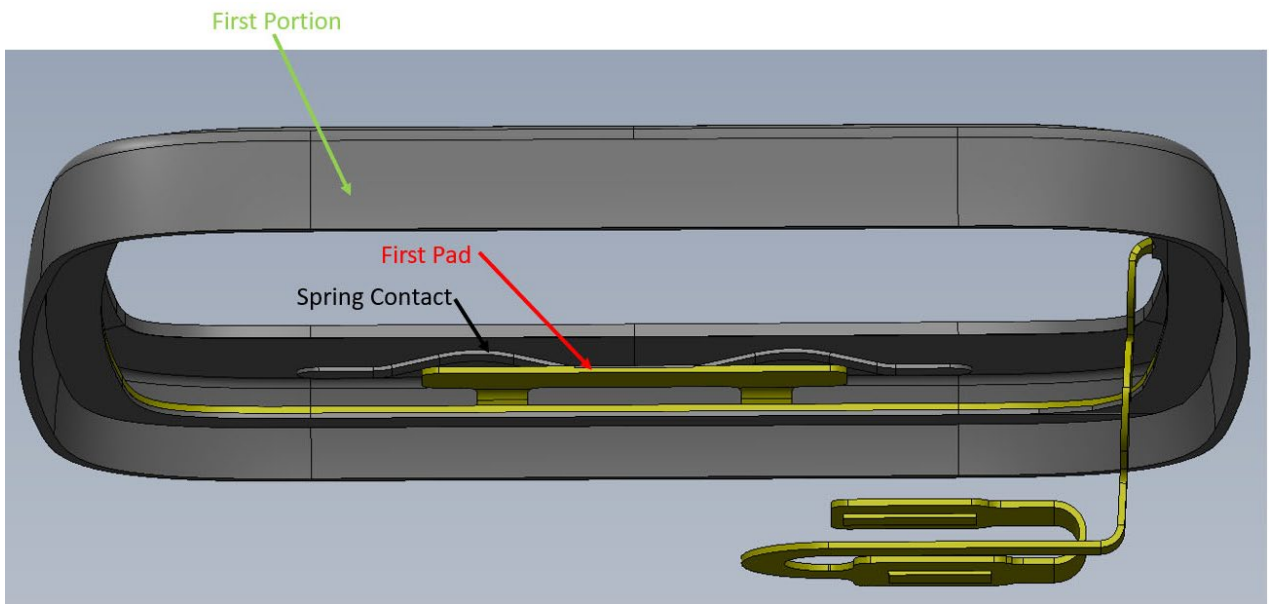
POR at 42:

> Second, even if the electrode 14 is considered part of the housing of Mills' device, the top portion of the leaf spring 62 is not "embedded in" the electrode 14 but rather positioned behind and parallel/adjacent to the electrode 14 so as to contact the electrode 14. APPLE-2003, ¶¶120-128. Elements 1[b(i)]-1[b(ii)]

. . .

> 23-24 ("electrode 14 (first portion)"). Masimo further alleges that "[t]he pad ***is pressed against*** the inner wall of electrode 14 in Mills."[6] Pet., 23. However, it is not sufficient for the first pad to be simply "pressed against" and parallel to the first portion of the enclosure, the claims require that the first pad be "***embedded in***" the first portion of the enclosure. APPLE-2003, ¶¶122-124. Masimo's expert

Apple's infringement allegations:



2nd Theory – Embedded

Kenny confirmed that the pad does not have to *contact* the first portion of the enclosure to be embedded.

Q. So, in the '257 patent claims, the pad or the lead does not need to contact the enclosure in order to be embedded in the enclosure. Correct?

A. I think if the pad is partially set in or partially surrounded by the material of the enclosure, then it would be regarded as embedded in that enclosure.

Q. Even if the pad doesn't contact the inside of the enclosure, correct?

A. I think that is correct. That, if the pad is at least partially set in or partially surrounded by a material, it would meet -- a person of ordinary skill would understand that to be embedded in the enclosure.

And that would be true if there were intervening layers, yes.

POR Acknowledged Mapping of Housing as Part of First Portion

POR at 23:

> Masimo later maps "the exterior surface 14b" of electrode 14 to "the first portion of the enclosure," thereby appearing to map both the housing 12 and outer-platting 14b of electrode 14 to the claimed housing. Pet., 22. As discussed above, Masimo does not identify this mapping as an alternative to the first mapping but rather conflates the two throughout the petition. APPLE-2003, ¶86.

PO Sur-Reply at 7:

> Masimo's third mapping in the Petition,[3] Masimo modifies this mapping by now identifying, for the first time, a combination of "an upper part of housing 12 and electrode 14 as the claimed 'first portion.'" Pet. Rep., 5-6, 18 (newly asserting that an unspecified "upper part of housing 12 and the electrode" together provide the claimed "first portion."

Ground 1, Limitation 1[b(v)] – "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"

Petition at 26:

EX1006, 6:63–7:1. Mills further discloses "Dry skin electrodes 14, 16 are designed for use with equipment capable of producing or monitoring changing electrical conditions (indicative of changing cardiographic conditions) at the surface of a patient's skin, and are particularly suitable in cardiac monitoring, e.g. by apparatus 10" – a wrist-worn cardiac data monitor. EX1006, 3:62-67. A POSITA would

***

Further, the leaf spring 62 carries the electrical signal from the electrode 14 through the leaf spring 62 via the leaf spring's top pad to a printed circuit board (PCB), PCB 50 of Mills and ultimately to microcontroller chip 42 of Mills.

Entire First Portion Does Not Need to Be Conductive

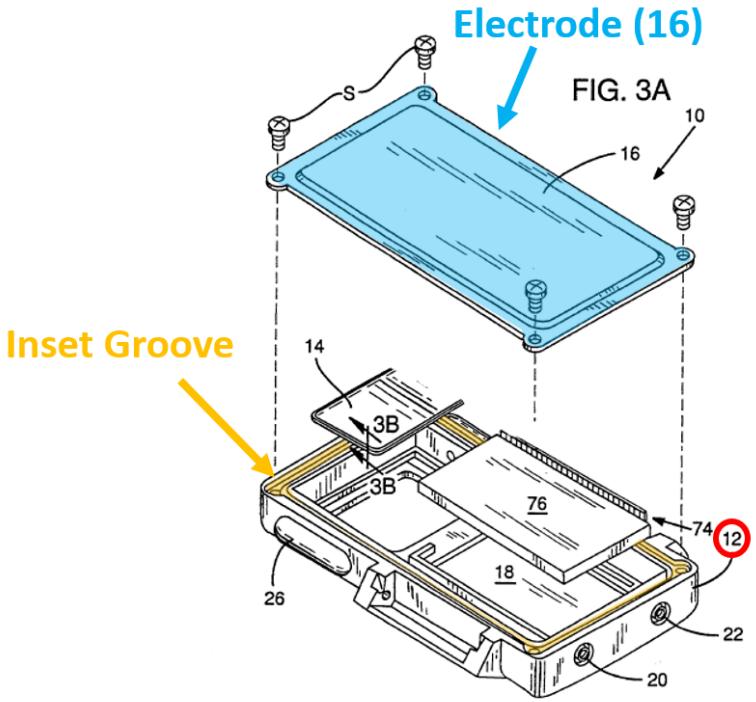
Claim 1

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

Ground 1, Limitation 1[b(vi/vii)] – "a second lead comprising a second pad that is embedded in a second portion of the enclosure"

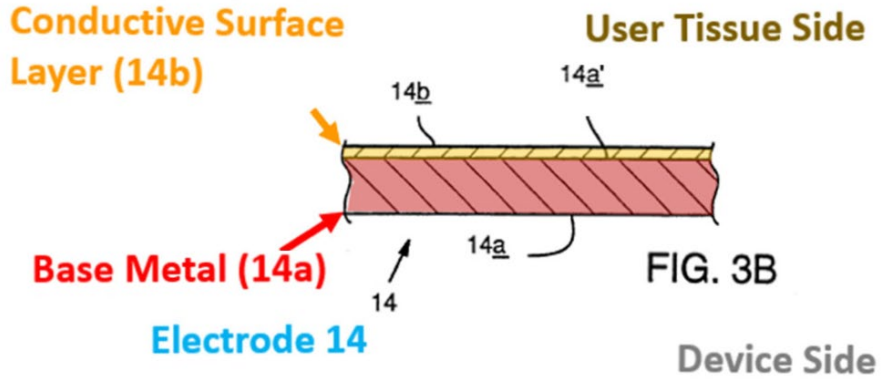
1st Theory

Electrode 16 is a second pad embedded in the inset groove of the housing.



2nd Theory

Electrode 16 has an "identical material content and cross-sectional structure as electrode 14" (4:11-13). Thus, 16a (equivalent of 14a) is a second pad embedded under 16b (equivalent of 14b).



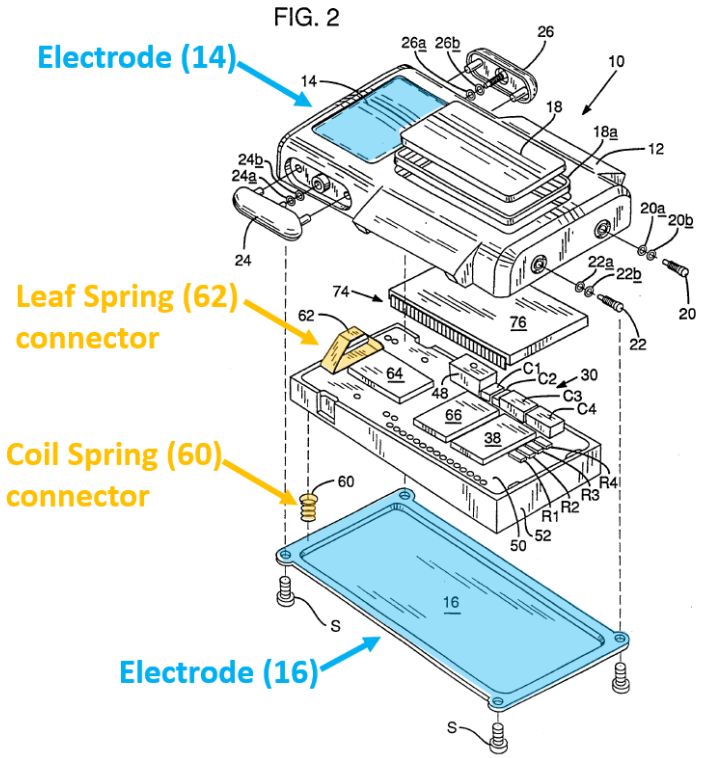
(rotated)

Ground 1, Limitation 1[b(vi/vii)] – “a second lead comprising a second pad that is embedded in a second portion of the enclosure”

Apple’s Expert Testimony:

> Q. And so electrode 16 would be embedded in the housing 12, correct?
>
> A. I again think that is more likely than not.

Ground 1, Limitation 1[c(i)] – "wherein the first lead comprises a first connector coupled to the first pad and provides the first electrical signal detected by the first pad to the processor"



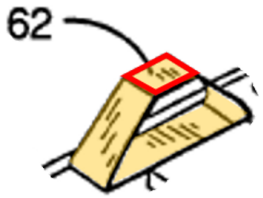
Petition at 31:

Fig. 2 of Mills (reproduced below with annotations) illustrates electrode 14 connected to the leaf spring 62, which connects electrode 14 to the VLSI processor. EX1006 at 4:67 – 5:3; *see also* 4:1-3. Accordingly, leaf spring 62 is a

Ground 1, Limitation 1[c(i)] – "wherein the first lead comprises a first connector coupled to the first pad and provides the first electrical signal detected by the first pad to the processor"

Leaf Spring Pad

EX1006, 4:67 – 5:3. The top of the trapezoid-shaped leaf spring 62 is a pad.



Leaf Spring Connector

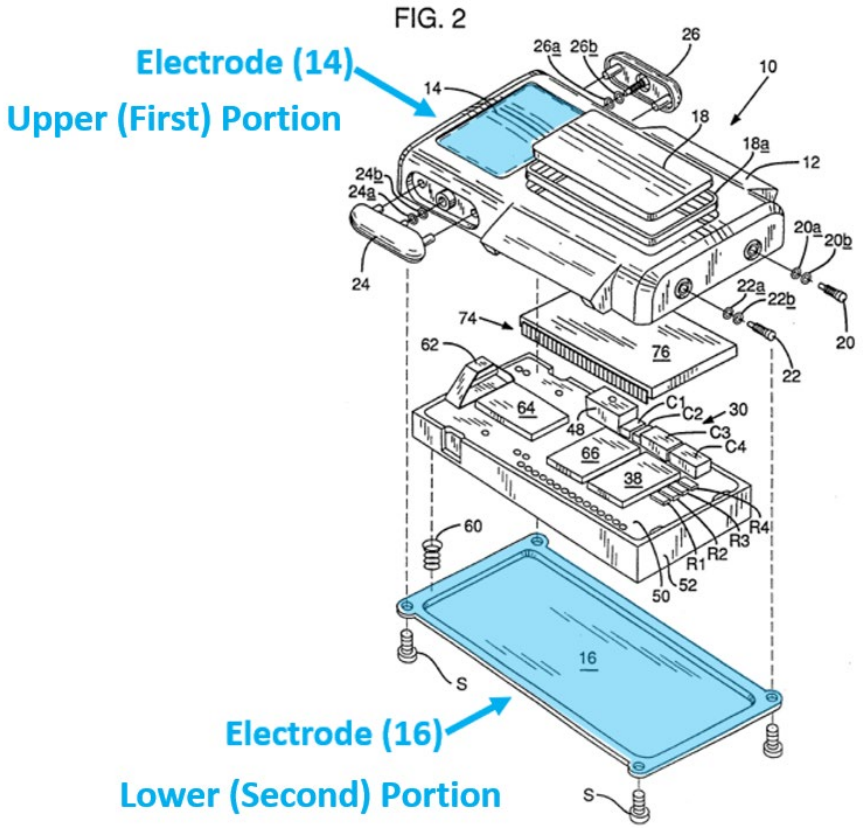
Fig. 2 of Mills (reproduced below with annotations) illustrates electrode 14 connected to the leaf spring 62, which connects electrode 14 to the VLSI processor. EX1006 at 4:67 – 5:3; *see also* 4:1-3. Accordingly, leaf spring 62 is a

. . .

springs are well known electrical connectors commonly used in the art. Leaf springs are commonly employed as electrical connectors because they provide good electromechanical contact between two components. Leaf springs are often placed between two components as an electrical connector (or bridge) and

The claim language and specification do not require the first pad and first connector to be physically separate parts. *See Google LLC v. EcoFactor, Inc.*, 92 F.4th 1049, 1058 (Fed. Cir. 2024); *Powell v. Home Depot U.S.A., Inc.*, 663 F.3d 1221, 1231-32 (Fed. Cir. 2011).

Ground 1, Claim 2 – "wherein the first portion and the second portion are located on opposite sides of the electronic device"



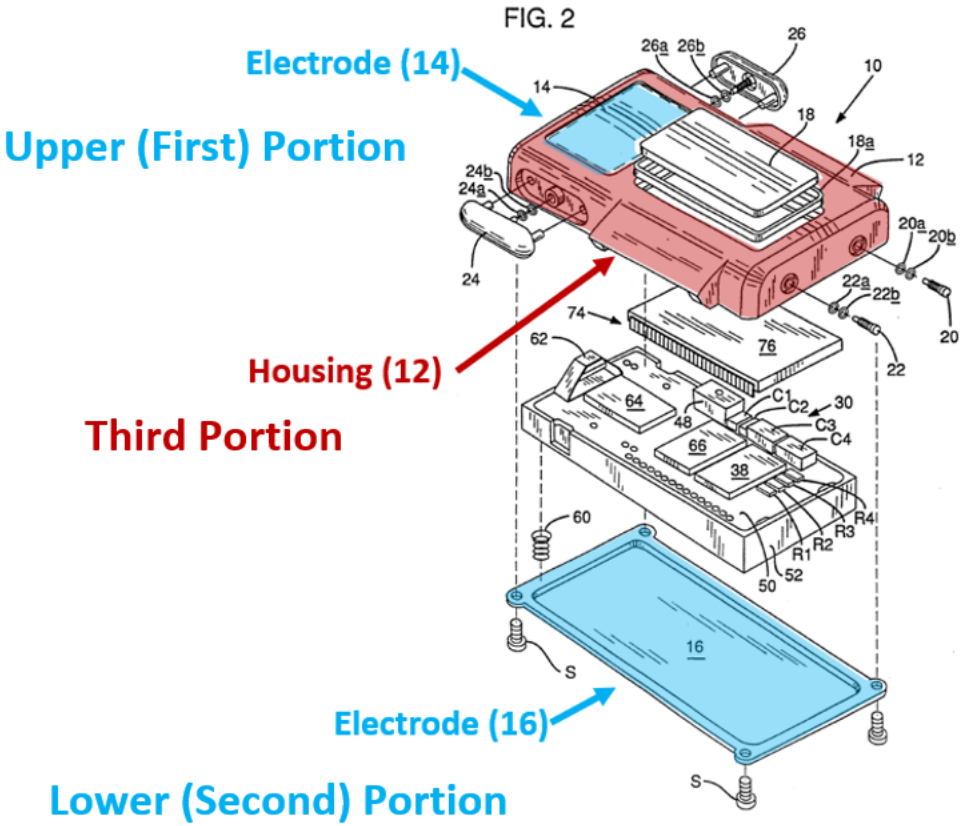
Petition:

> The upper or first portion of housing 12 has integrated electrode 14 on one side (top side) of the cardiac data apparatus 10 and the lower or second portion of the housing 12 has integrated electrode 16 on another side (bottom side) that is opposite of the side having the first portion. EX1006, Fig. 2, EX1003, ¶67.

Ground 1, Claim 3 – "wherein the first portion is electrically isolated from the second portion"

Petition at 34:

> Mills discloses a housing 12 which separates its two electrodes 14, 15. EX1005, Fig. 2. Mills discloses its housing 12 may be molded plastic, such as acrylonitrile-butadiene-styrene (ABS). EX1006 at 6:40-43. Plastics, in general, are

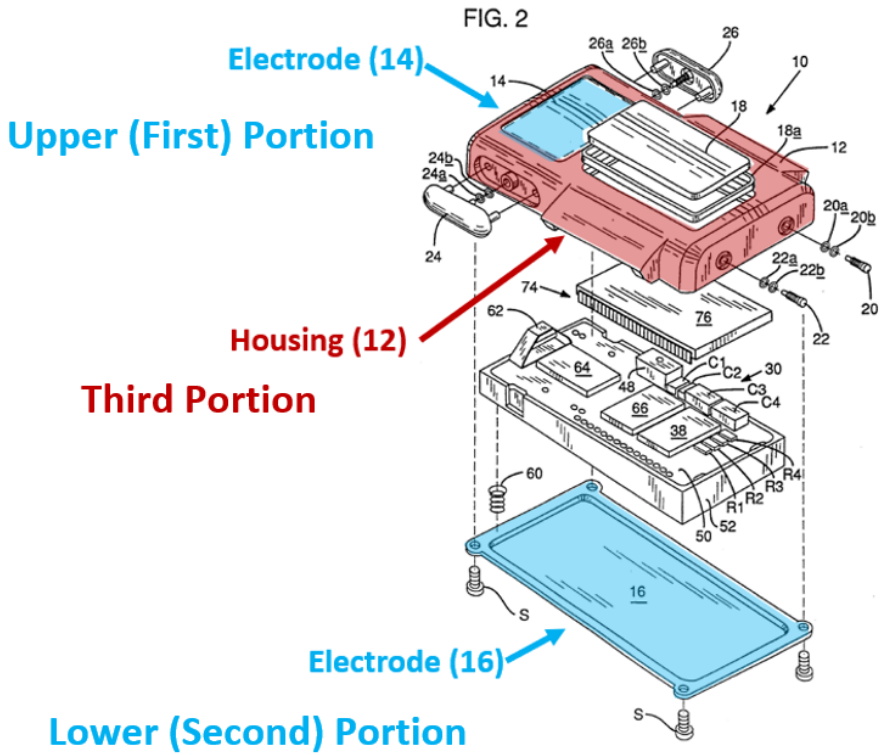


Ground 1, Claim 4

Claim 4:
wherein: the first portion is separated from the second portion by a third portion of the enclosure;

at least the third portion is constructed from a material having a first conductivity; and

the first conductivity is insufficient to transmit the first electrical signal from the first pad to the second pad via the third portion.



Ground 1, Claim 10 – "the second lead is configured to detect the second electrical signal of the user's cardiac signal via the user's contact with the second portion of the enclosure"

16a (equivalent of 14a) is a second pad embedded under 16b (equivalent of 14b):

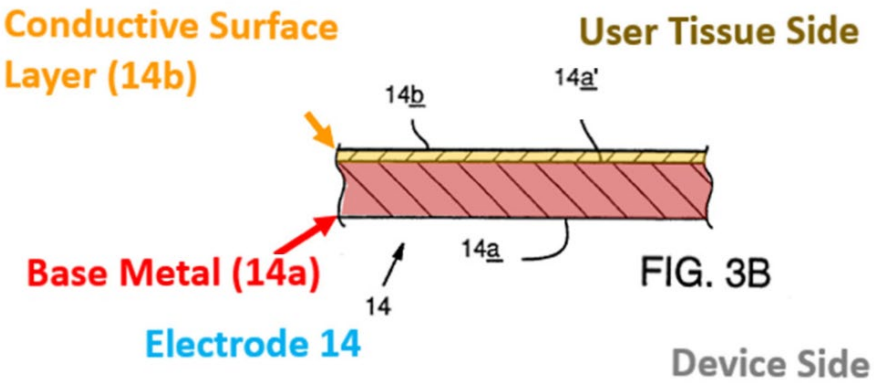


FIG. 3B

Mills

It will be understood that electrode **16** of apparatus **10** is of identical material content and cross-sectional structure as electrode **14**, but is of much greater surface area.

Petitioner's Reply

> Apple incorrectly argues Masimo identified electrode 16 as a unitary structure that is both the "second pad" and the "second portion." POR, 49. Masimo identified electrode 16's pad as the "second pad" and its plating as part of the "second portion." Pet., 29.

Pet., 39; EX1006, 4:10-13; Reply, 20-21; *See* EX1006, Fig. 3B

Ground 2, Claims 1-4 and 8-22 are obvious over Markel in view of Mills

Claim 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.

Ground 2, Claim 1 – Undisputed limitations taught by Markel

1) An electronic device for detecting a user's cardiac signal;

2) an enclosure;

3) a heart sensor …;

4) a second lead comprising a second pad that is embedded in a second portion of the enclosure…;

5) a processor coupled to the heart sensor and configured to receive and process the detected cardiac signal …;

6) …a second connector coupled to the second pad and configured to provide the second electrical signal detected by the second pad to the processor.

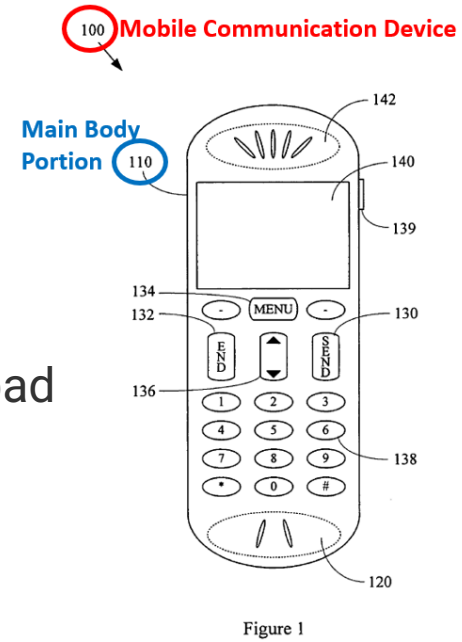


Figure 1

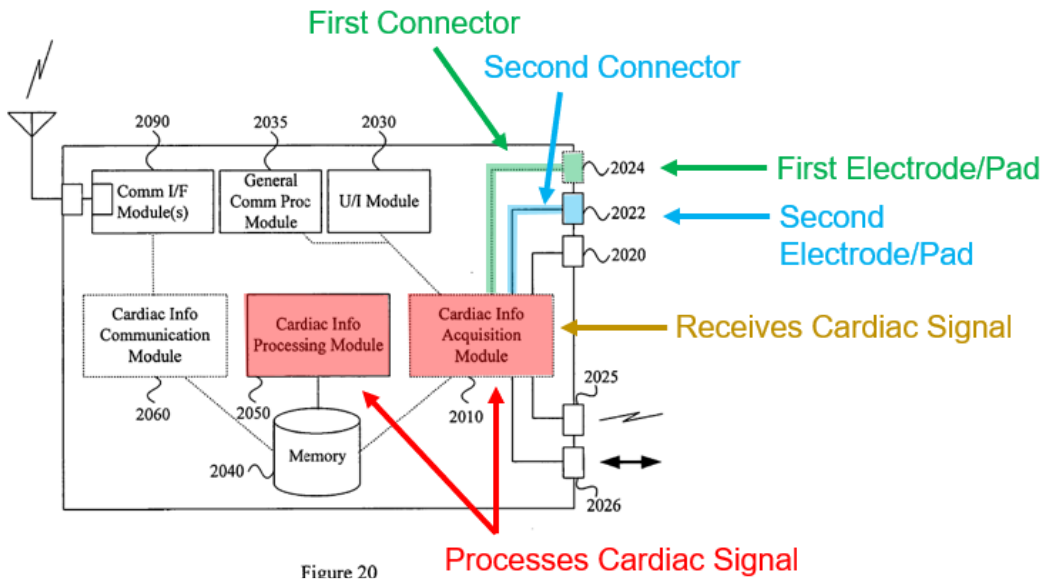


Figure 20

[5] Markel Fig. 20 is a block diagram applicable to any of Markel's Figs. 1-19. EX1005, [0108].

Pet., 40-54; POR, 50-60; P.O. Sur-Reply, 20-29; EX1005, Fig. 4, 10.

Ground 2, Limitation 1[b](i) – "a first lead comprising a first pad that is embedded in a first portion of the enclosure"

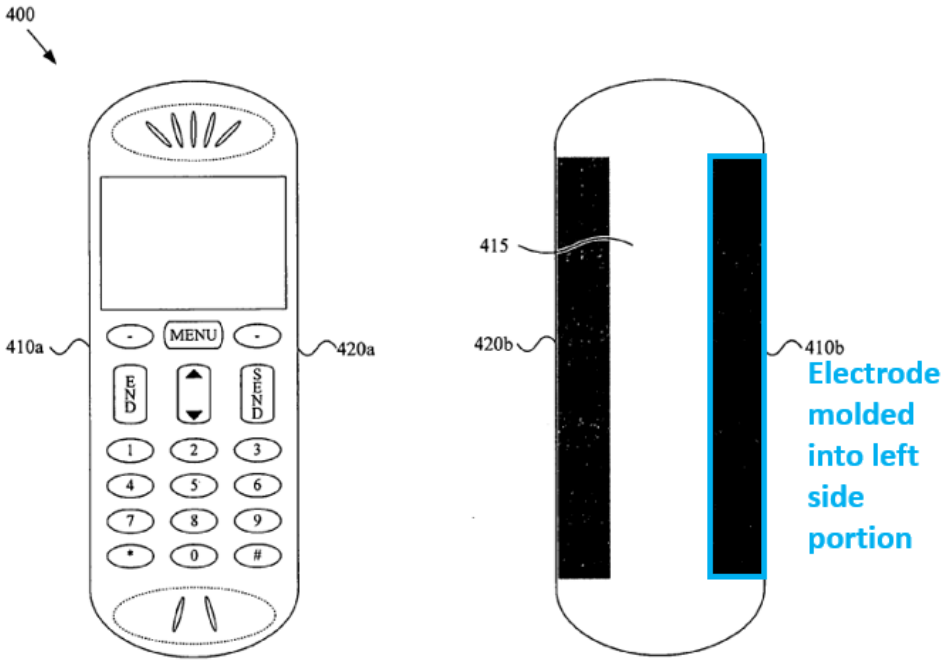


Figure 4

Petition at 42:

i. Limitation 1[b(i)]: "a first lead comprising a first pad that is embedded in a first portion of the enclosure"

Markel discloses electrodes for detecting the cardiac signals "may be disposed in any of a variety of locations" on its device including being "generally … [or] substantially concealed (or hidden) from a user. EX1005, [0045], [0039]-[0040]. Such electrodes may be "exposed for user contact" or "may be integrated into various molded components." *Id.*, [0037]; EX1003, ¶81.

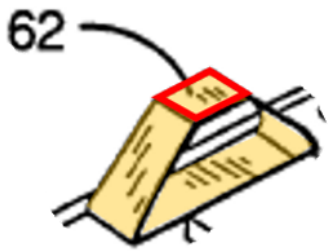
Markel discloses an example of device 400 in Fig. 4. EX1005, [0045]. A first electrode is "placed on or molded into the region 410b." *Id.* A POSITA would understand that Markel describes a first pad formed of conductive plastic embedded in a first portion of the enclosure. *Id.*; EX1003, ¶82.

Pet., 42, 67; *See* EX1005, (Fig. 4), [0039]-[0040], [0045]

Ground 2, Limitation 1[b](i) – "a first lead comprising a first pad that is embedded in a first portion of the enclosure" (cont'd)

Petition at 46:

EX1006, 4:67-5:3. The top of the trapezoid-shaped leaf spring 62 is a pad.



Petition at 47:

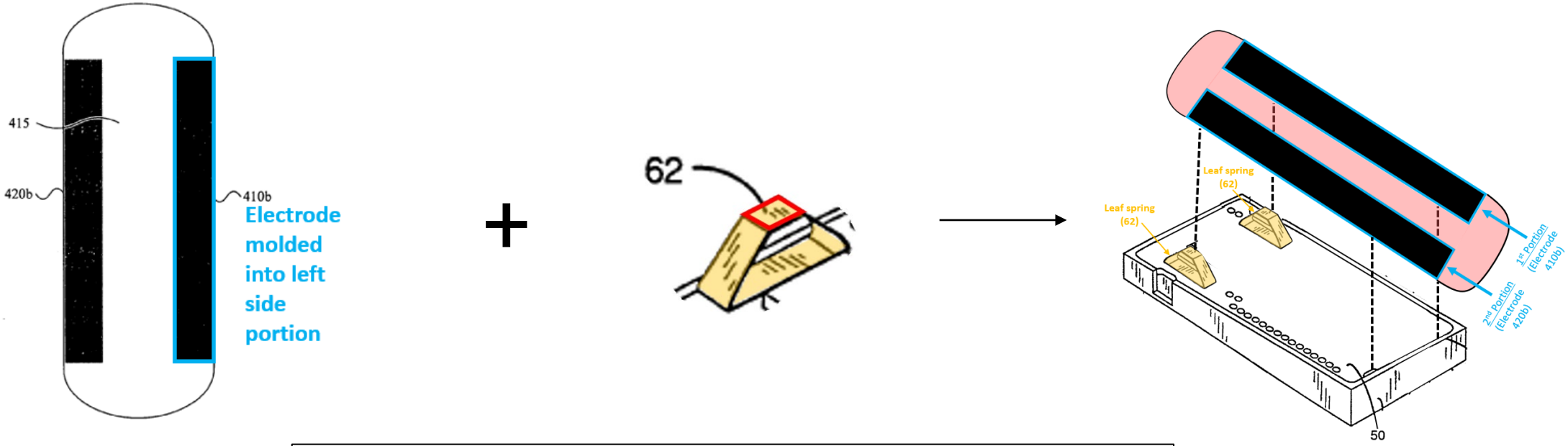
It would have been obvious to incorporate the pad (leaf spring 62) teachings of Mills into the device of Markel because Mills provides details of internal physical connections on which Markel is silent. Markel teaches that "electrodes

Petition at 49:

The combined device of Markel and Mills as discussed above would include the pad of leaf spring 62 positioned underneath the electrodes/first portion 410b exterior surface of Markel. Accordingly, this limitation would have been obvious

Ground 2, Limitation 1[b](i) – "a first lead comprising a first pad that is embedded in a first portion of the enclosure" (cont'd)

In the combination Mills's leaf spring pad is "embedded in":



Petition at 48:

> Once incorporated into the internal components of Markel, the leaf spring 62 of Mills would be embedded in the housing of Markel because its top pad portion is placed underneath an exterior surface material and against an inner wall of the exterior surface material. A POSITA would have an expectation of success in the

Ground 2, Limitation 1[b](i) – Response to Arguments

Apple argues leaf spring pad is not embedded:

material." Pet., 48. However, it is not sufficient that the top of Mills leaf spring 62 be merely "placed…against" the first portion of the enclosure but rather Element 1[b(i)] requires that the "first pad…***is embedded in*** a first portion of the enclosure." APPLE-2003, ¶¶157-159.

As discussed in Section IV, *supra*, the proper scope of the plain and ordinary meaning of the term "embedded in" is "at least partially set in or partially surrounded by a material." Therefore, even under Masimo's framing of the

Reply at 1:

a material." *Id.* Apple does not specify a threshold for "partially," so its construction covers pads ***minimally*** set in ***or*** surrounded by an enclosure. Apple asserts its

Reply at 23:

The proposed combination of Mills's leaf spring 62 with Markel would also result in Mills's leaf-spring pads being pressed firmly against Markel's electrodes 410, 420 and surrounded by Markel's housing 110. Therefore, the leaf-spring pad would be embedded in the enclosure in the combination just like it is in Mills's device, under either Apple's construction or Masimo's District court construction. EX1065, ¶¶277-278.

Ground 2, Limitation 1[b](i) – Response to Arguments

Apple argues the leaf spring pad is "slidably yielding" and not embedded:

> Furthermore, Mills describes the leaf spring 62 as being "slidably yielding" which would have further indicated to a POSITA that the top of the leaf spring would not have been "embedded in" the electrode 410b in the proposed combination to allow for relative, sliding motion between the two components. EX1006, 4:67-5:3; APPLE-2003, ¶164.

Oslan

261. Apple characterizes Masimo's "third mapping" as identifying electrode 14 ***alone*** as the first portion. POR, 41. Apple then argues the leaf spring pad is merely "positioned behind" or "pressed against" this electrode. *Id.* at 42. But Masimo's second mapping (which corresponds to Apple's "third mapping") identified an upper part of housing 12 and the electrode as the "first portion." Pet. at 22-24. Under this mapping, the leaf spring pad is not just pressed against the electrode but surrounded by the housing, and, thus, embedded in the first portion, even under Apple's construction. *Supra* VII.A.2. Dr. Kenny's embedded-in testimony supports that conclusion. Specifically, he said a book within a desk drawer is embedded in the desk even if it does not touch the drawer or desk. EX1052, 56:2-8. Further, Apple's dictionary citation (from Wiley) defines "embedded" as "that which has been included within a larger entity." EX2005, 3.

262. Apple argues the pad is not "firmly set into" the first portion under Masimo's district court construction because the leaf spring is "slidably yielding." POR, 43. But in a fully assembled device, the leaf spring 62 would be compressed tightly between electrode 14 and PCB 50, and thus would be fixed. *See* EX1006 at Fig. 2.

Ground 2, Limitation 1[b](i) – Response to Sur-Reply Arguments re Embedded

Apple's Sur-Reply:

electrode region 410b would have "an inner wall." Pet., 48. There is therefore no evidence on the record of an inner portion of the electrode region 410b having a groove, indent, or other physical configuration for receiving the top of Mills' leaf spring 62 such that the top of the leaf spring 62 would be "embedded in" the electrode region 410b as required by the claims. APPLE-2003, ¶161 (Dr. Kenny

Masimo's Reply at 1:

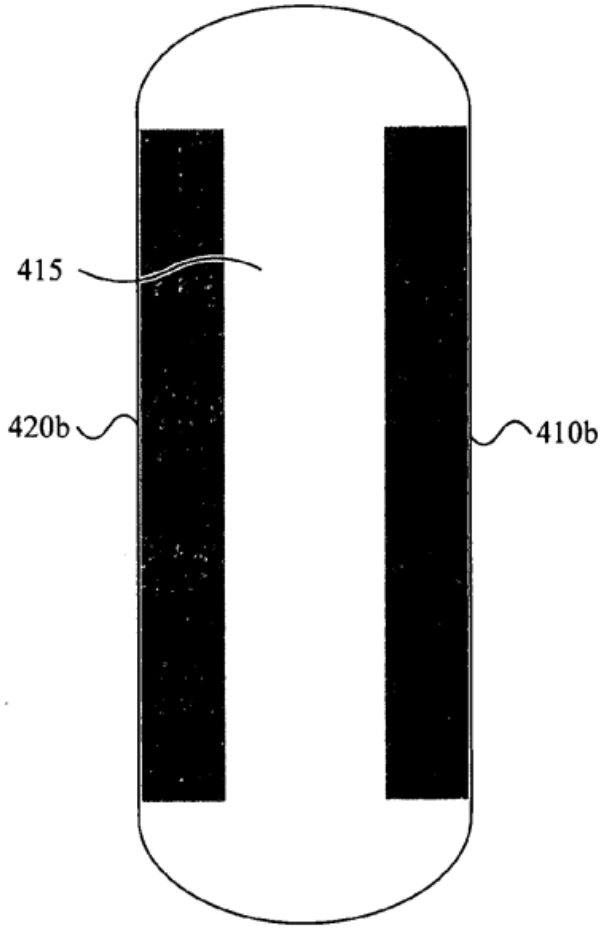
a material." *Id.* Apple does not specify a threshold for "partially," so its construction covers pads ***minimally*** set in ***or*** surrounded by an enclosure. Apple asserts its

Ground 2, Limitation 1[b](i) – Response to Sur-Reply Arguments

Apple's Sur-Reply:

> Furthermore, such a new mapping would still fail to satisfy claim 1 because, as discussed with respect to claim 1 above (*supra*, pp. 11-15), a non-conductive plastic portion of the enclosure cannot properly serve as a part of the claimed first portion of the enclosure. Specifically, as Masimo describes in the Petition, "Markel further discloses an insulating region 415 that electrically isolates the region 410b from the region 420b." Pet., 46; EX1005, [0045].

Markel Figure 4:



P.O. Sur-Reply, 26-27; Petition, 47-48; EX1005, [0043]; EX1005, Fig. 4

Ground 2, Limitation 1[b(iv)] – "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; "

Petition at 50:

touching the electrodes)." *Id.*, [0035], [0068]. Using the leaf spring of Mills as discussed above, the electrical signal is then carried from the electrode 410b through the leaf spring via the leaf spring's top pad to a printed circuit board (PCB), such as PCB 50 of Mills and ultimately to a microcontroller chip, such as microcontroller chip 42 of Mills or the equivalent processing arrangement disclosed by Markel. EX1006, 4:55-60, 4:68-5:3; EX1005, [0178]-[0179].

Ground 2, Limitation 1[b(v)/(vi)] – "a second lead comprises 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"

The arrangement below illustrates the locations for the first pad and second pad:

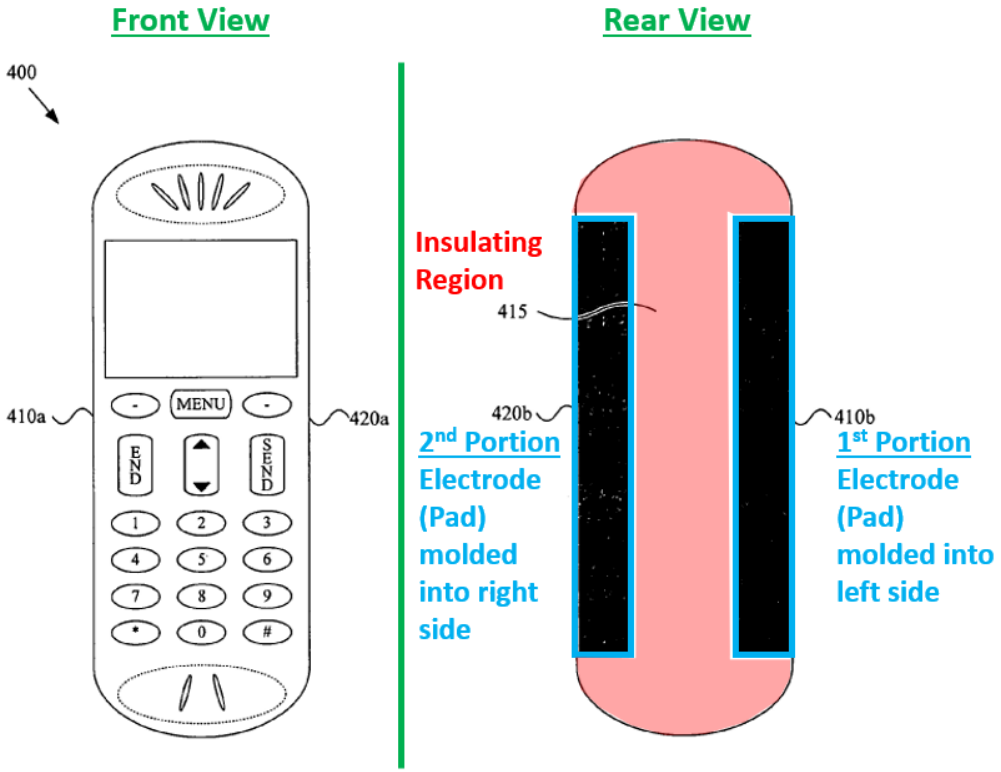


Figure 4

Ground 2, Limitation 1[c]

Limitation 1[c]:
a processor coupled to the heart sensor 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.

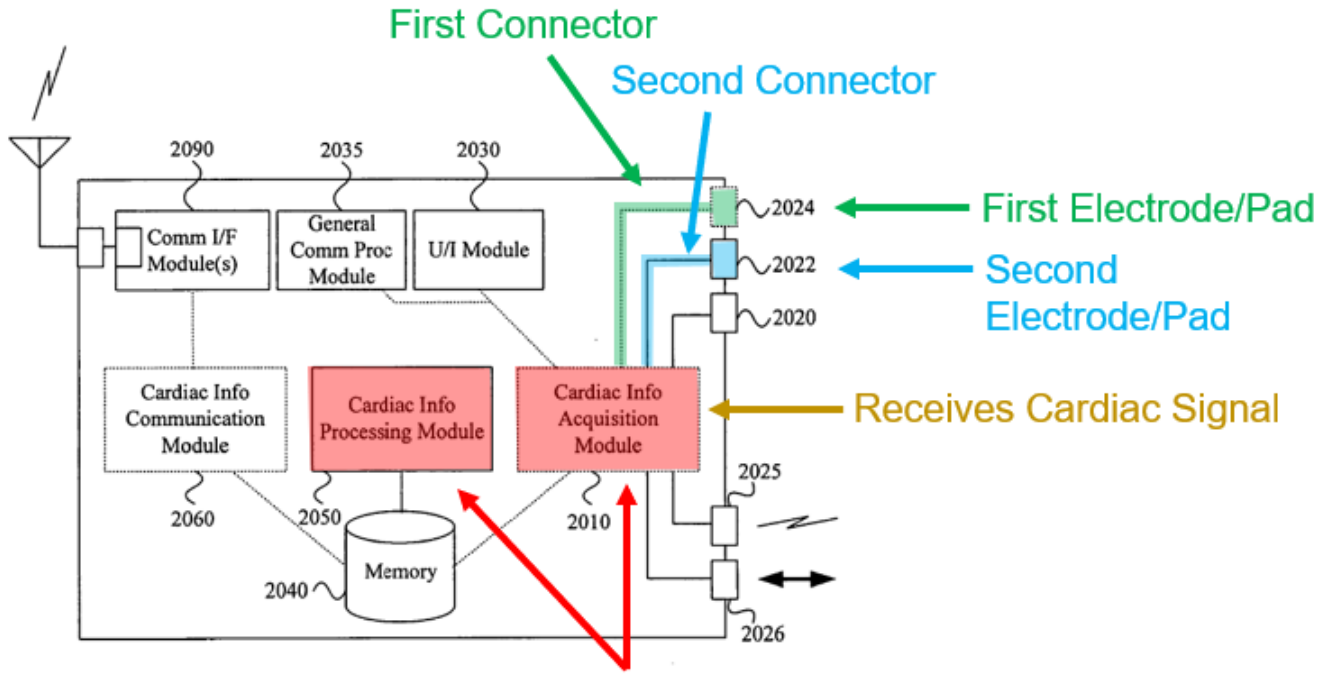


Figure 20

[5] Markel Fig. 20 is a block diagram applicable to any of Markel's Figs. 1-19. EX1005, [0108].

Ground 2, Limitation 1[c] Response to Arguments

Limitation 1[c]:
a processor . . . 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 . . .

Oslan testimony:

would include using a pad underneath the exterior surface. EX1005, [0035]. Leaf springs are well known electrical connectors commonly used in the art. Leaf springs are commonly employed as electrical connectors because they provide good electromechanical contact between two components. Leaf springs are often placed between two components as an electrical connector (or bridge) and mechanical

Reply at 24:

processor. Pet., 52-53. Masimo included Figure 20 to conceptually show a first and second pad (which are part of first and second electrodes) would couple to a processor through a connector. EX1065, ¶¶280-282.

EX1003, ¶86; Pet., 47, 51-54; Reply, 24-25; POR, 58-60.

Ground 2 – Motivation to Combine

Oslan:

86. It would have been obvious to incorporate the pad (leaf spring 62) teachings of Mills into the device of Markel because Mills provides details of internal physical connections on which Markel is silent. Markel teaches that "electrodes may be incorporated into the MCD 100 in a variety of manners," which would include using a pad underneath the exterior surface. EX1005, [0035]. Leaf

***

87. Once incorporated into the internal components of Markel, the leaf spring 62 of Mills would be embedded in the housing of Markel because its top pad portion is placed underneath an exterior surface material and against an inner wall of the exterior surface material. A POSITA would have an expectation of success in the combination as it is a mere rearrangement of known mechanical components in a complementary device. A POSITA would be led to the claimed invention based on the teachings of Markel and Mills.

Markel

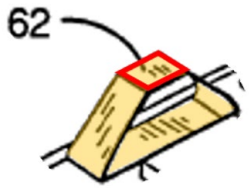
[0037] Electrodes may generally comprise conductive material. For example, an electrode may comprise a metallic surface exposed for user contact. Also for example, an electrode may be formed from conductive plastic (or another material) that may be integrated into various molded components of the mobile communication device. For example,

Mills

performed. Those skilled in the art will appreciate that the illustrated circuit structure, by the preferred embodiment of the invention, is contained entirely within housing **12** of apparatus **10**, with the exception of course of electrodes **14**, **16**, which it may be seen from FIG. **1** form an integral, unitary part of housing **12**.

Ground 2 – Motivation to Combine (cont'd)

Leaf Springs:



- ensure continuous, reliable, low-resistance connections;
- avoid soldering, allowing easier device assembly, disassembly, and maintenance;
- reduce movement and mating cycles without significantly reducing performance;
- are resilient under harsh conditions and rapid temperature changes;
- are compact and ideal for small consumer devices;
- provide constant contact via spring-induced pressure, such as with Mills's "slideably yielding" leaf spring;
- have a "self-adjusting nature" to "compensate for any minor misalignments" to reduce connection-failure risk.

These benefits stand unrebutted by Apple.

Ground 2 – Motivation to Combine (cont'd)

Kenny

19	Q. Okay. So, it is your opinion that
20	the moveable leaf spring would have been
21	interchangeable with the cable connections that
22	you have described?

***

21	But yeah, I think in 1994, someone
22	trying to build something like Mills without the
1	benefit of 14 years of improvements in flexible
2	cables and timing connectors, at that time maybe
3	a leaf spring was a reasonable choice.

Leaf spring need only be a "suitable" alternative, not optimal, to make the combination obvious. *Intel Corp. v. Qualcomm Inc.*, 21 F4th 784, 800 (Fed. Cir. 2021); *In re Mouttet*, 686 F.3d 1322, 1334 (Fed. Cir. 2012).

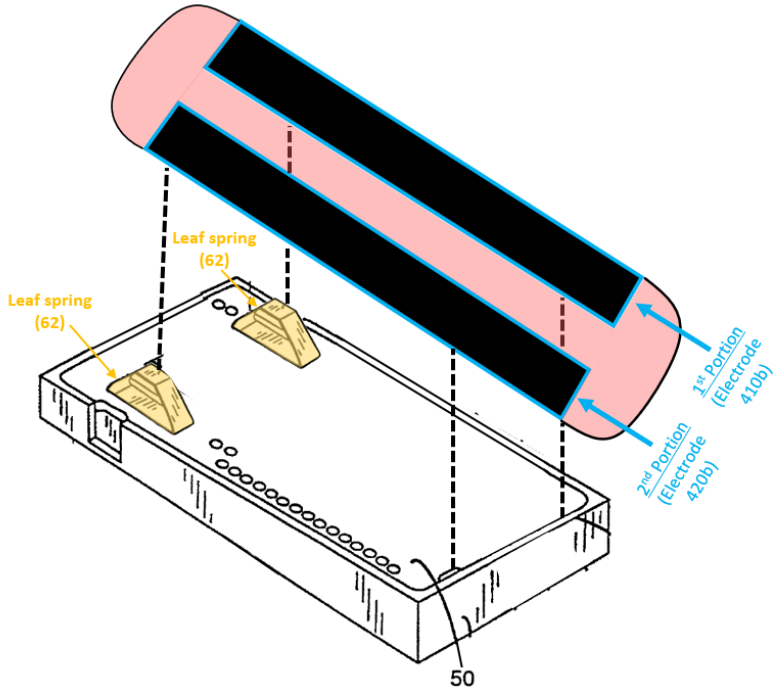
Ground 2 – POSITA Would Know How to Combine Markel/Mills

Oslan:

creativity, not an automaton."). Changing from a front-back to a left-right orientation is a mere rearrangement of known mechanical components in known ways. Leaf springs would couple components to both front-back-oriented and left-right-oriented electrodes in essentially the same way. For example with reference to Figure 4 of Markel, a POSITA having ordinary creativity would have been able to align and rearrange Mills's leaf spring as illustrated below:

***

293. Apple has not shown why such a configuration would not have been feasible. Many other configurations are also possible and within the purview of a POSITA. Further, it is unclear how Apple's expert is qualified to comment on the



(sample positioning from EX1065)

Ground 2, Claim 2 – "the first portion and the second portion are located on opposite sides of the electronic device"

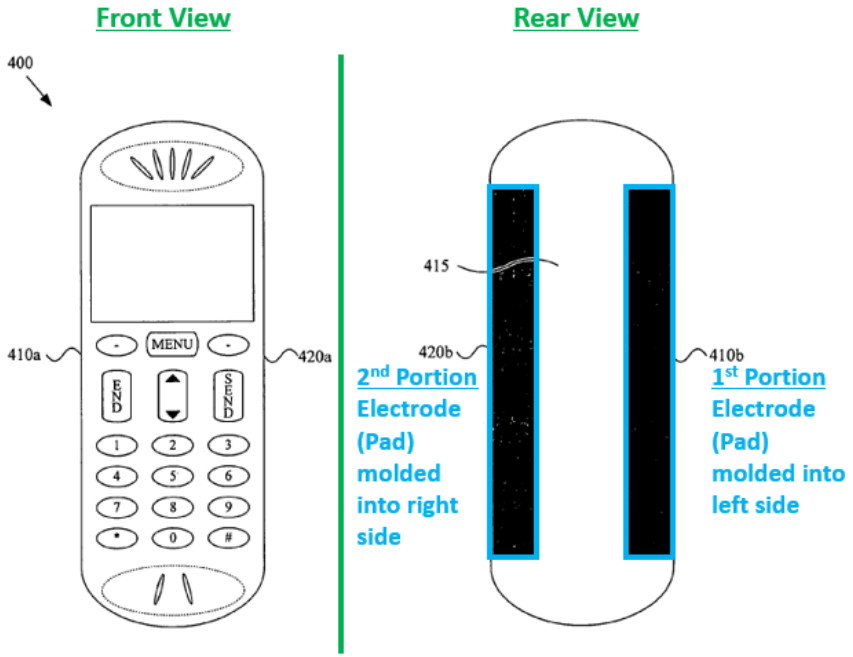


Figure 4

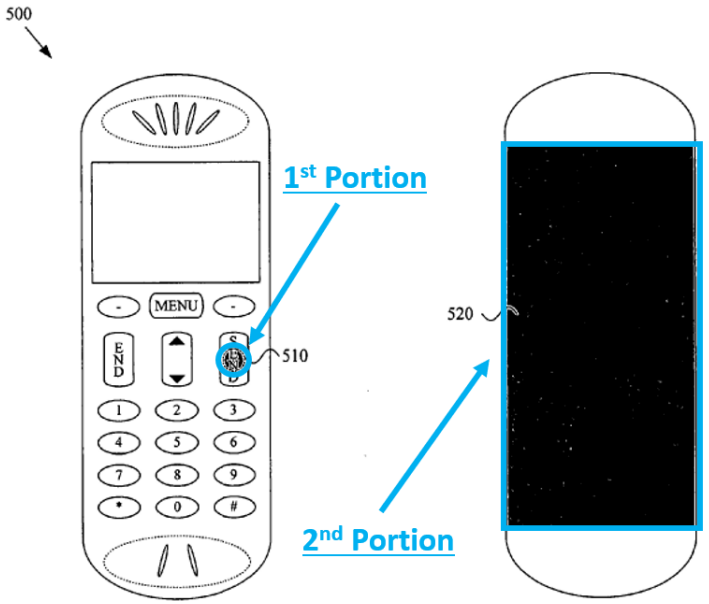


Figure 5

Ground 2, Claim 3 – "wherein the first portion is electrically isolated from the second portion"

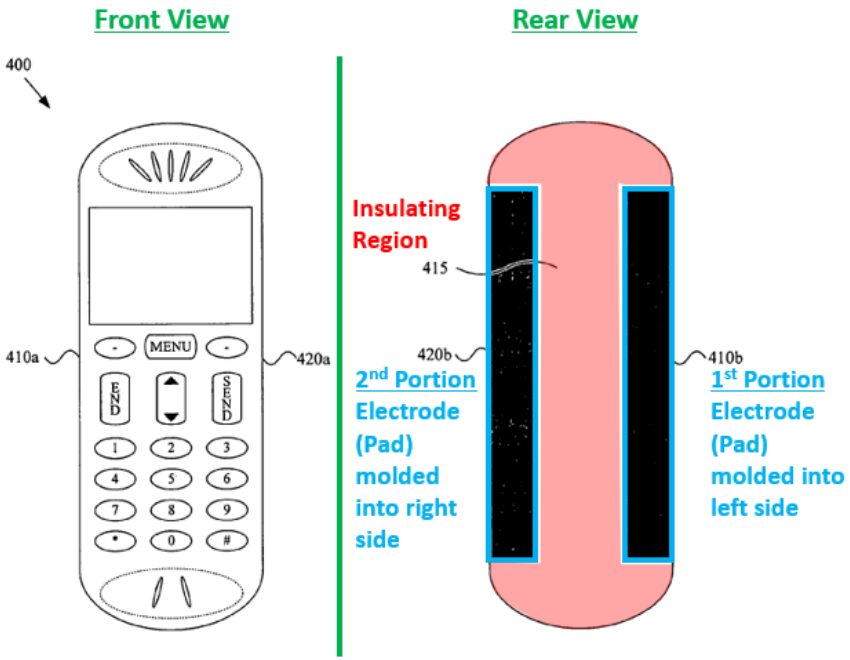


Figure 4

Markel discloses region 410b (*first portion*) and the region 420b (*second portion*) may include conductive plastic. EX1005, [0045]. Markel further discloses an insulating region 415 that electrically isolates the region 410b from the region 420b, as shown in Fig. 4 below. *Id.*; EX1003, ¶96.

Ground 2, Claim 4

Claim 4:
wherein: the first portion is separated from the second portion by a third portion of the enclosure;

at least the third portion is constructed from a material having a first conductivity; and

the first conductivity is insufficient to transmit the first electrical signal from the first pad to the second pad via the third portion.

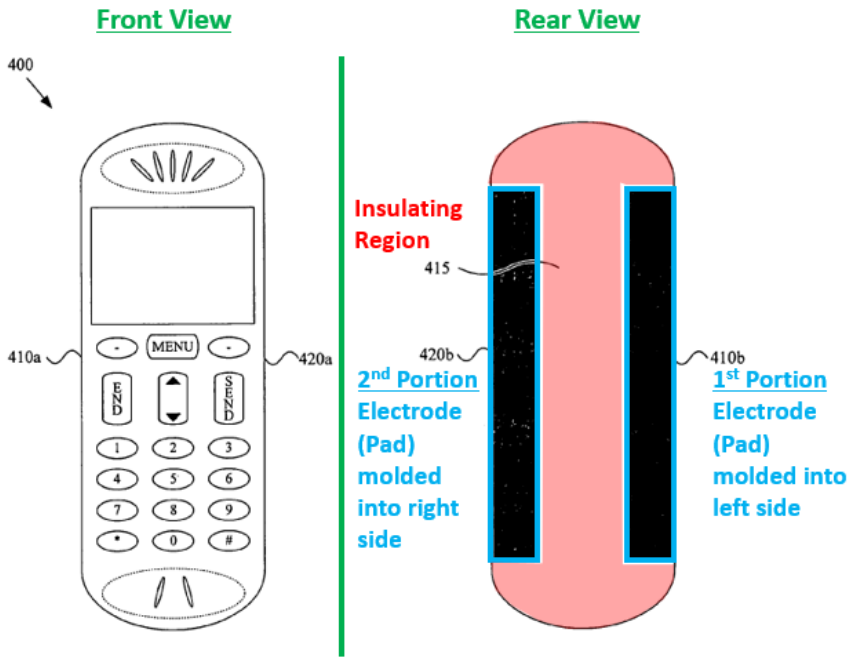


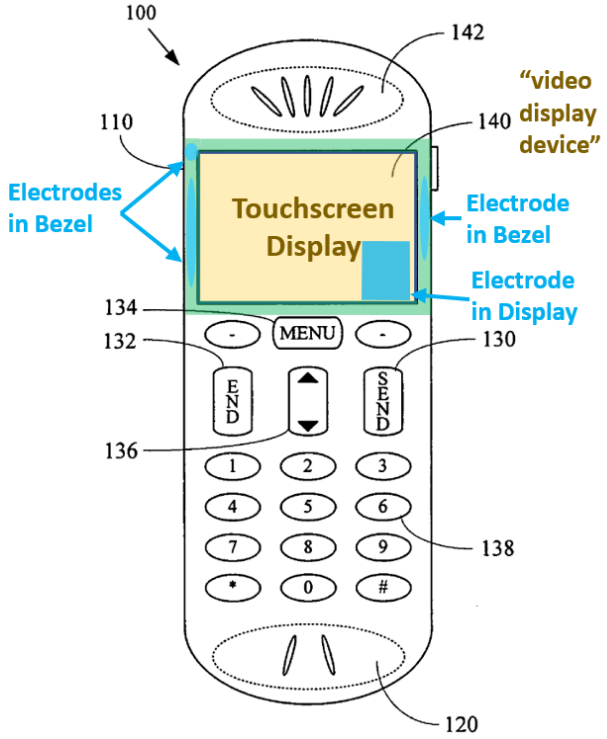
Figure 4

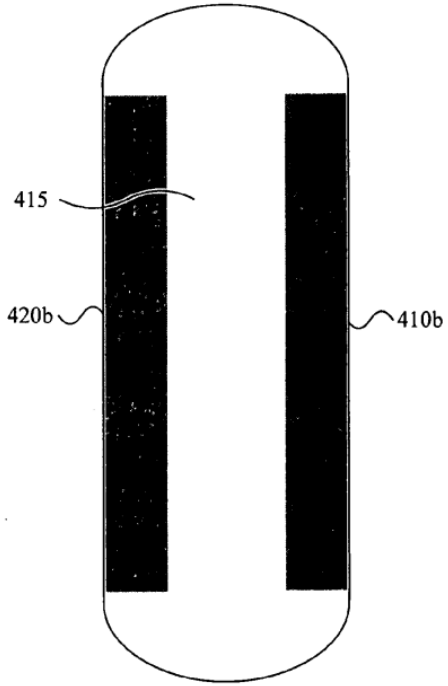
Markel discloses region 410b (*first portion*) and the region 420b (*second portion*) may include conductive plastic. EX1005, [0045]. Markel further discloses an insulating region 415 that electrically isolates the region 410b from the region 420b, as shown in Fig. 4 below. *Id.*; EX1003, ¶96.

Ground 2, Claim 9

Claim 9:
a display, wherein the enclosure supports the display, and 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 and

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.





Markle has an enclosure supporting a display as shown in the figures. A POSITA would have understood the supporting enclosure has an exterior portion behind the display.

Pet., 58-59; Reply 25; *See* EX1005, Figs. 1, 4; EX1065, ¶295

Ground 2, Claim 10 – "wherein the second lead is configured to detect the second electrical signal of the user's cardiac signal via the user's contact with the second portion of the enclosure"

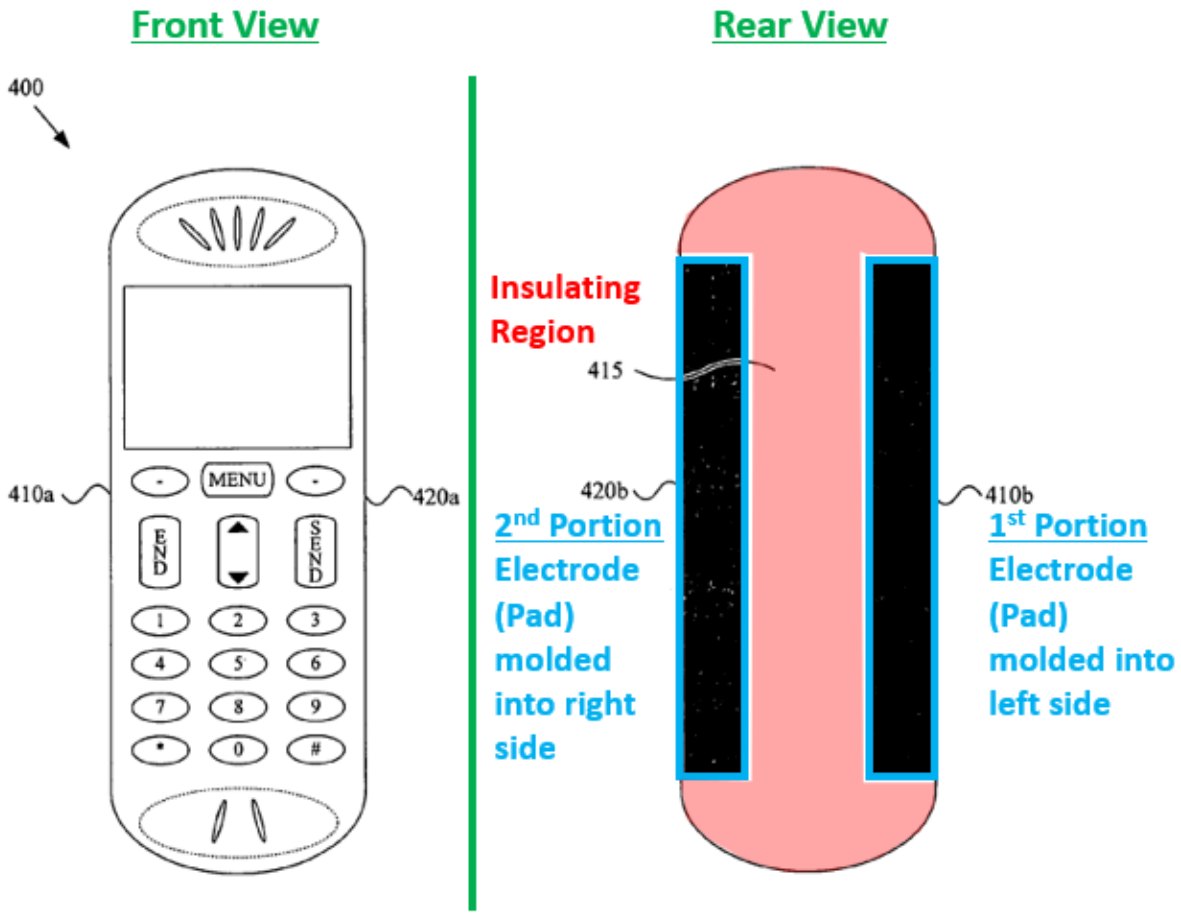
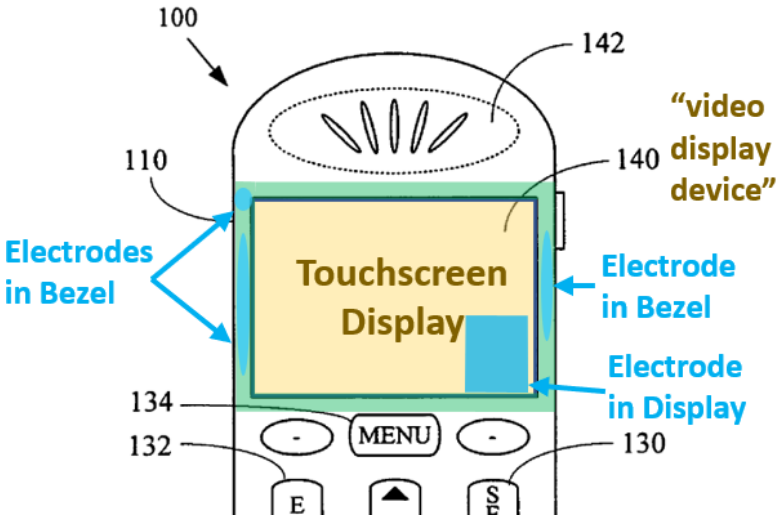
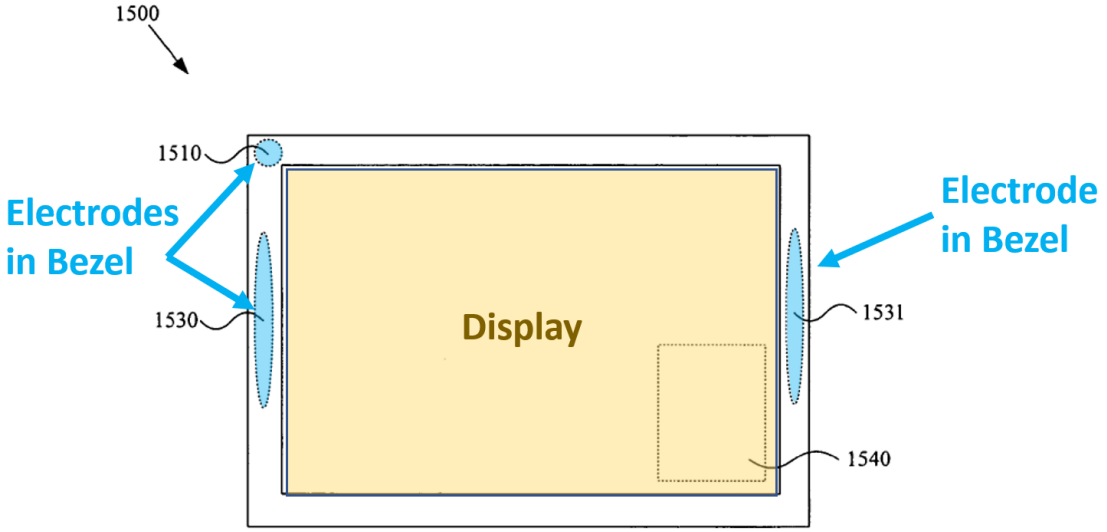


Figure 4

Ground 2, Claim 12 – "wherein the first portion of the enclosure is a bezel"



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).



[**0078**] FIG. **15** is a diagram illustrating an exemplary computer display device **1500**, in accordance with various aspects of the present invention. The display device **1500** may, for example, comprise an electrode **1510** on a border portion of the display device **1500**. Also for example, the display device **1500** may comprise an electrode **1530** on a first side of the display device **1500** and/or an electrode **1531** on a second side of the display device **1500**. Further for example, the display device **1500** may comprise one or more electrodes **1540** on a touch screen portion of the display device **1500**.

Ground 2, Claim 12 – "wherein the first portion of the enclosure is a bezel"

Figure 15 electrodes under bezel:

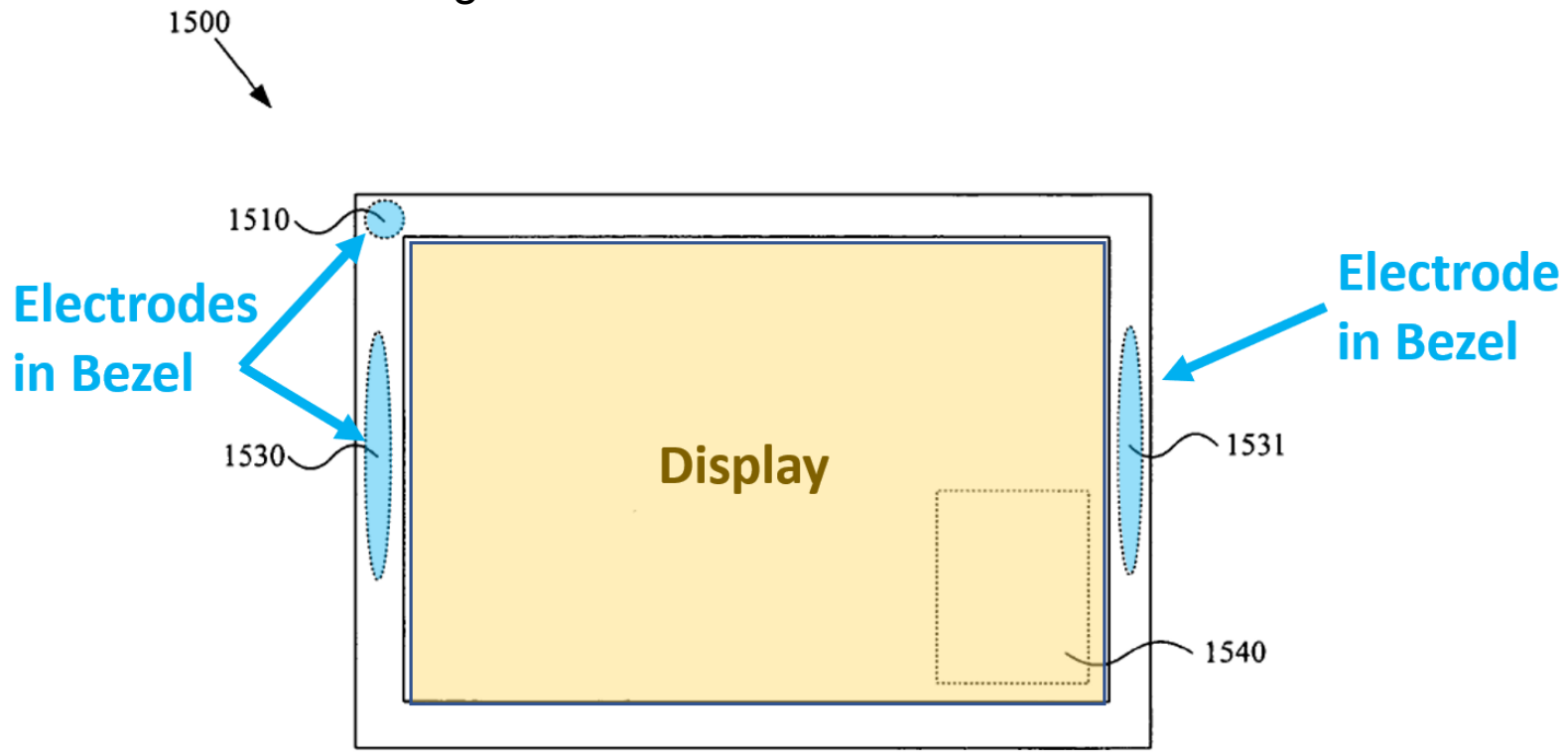
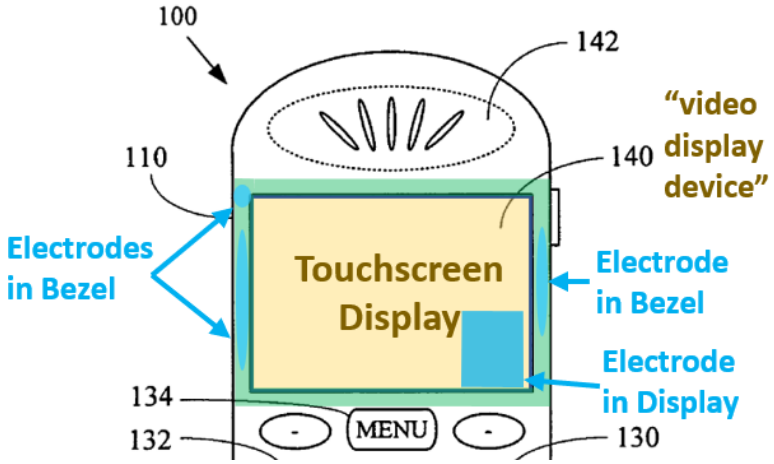


Figure 15

Ground 2, Claim 12 – "wherein the first portion of the enclosure is a bezel"

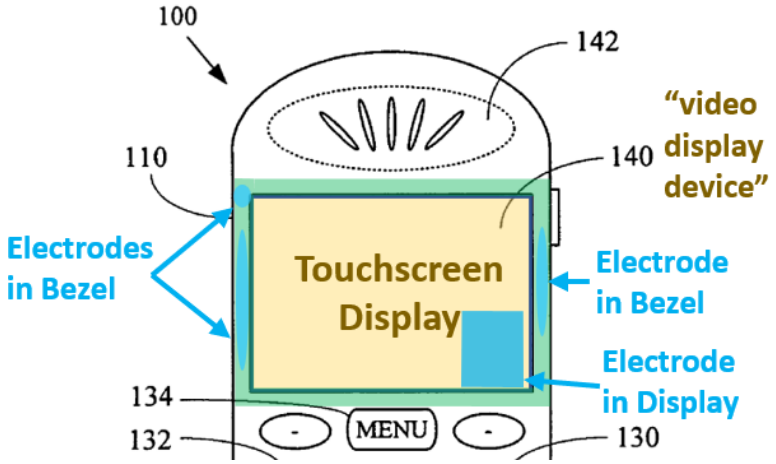


[0045] A plurality of electrodes (or other sensors) may be disposed in any of a variety of locations, non-limiting examples of dual-electrode placement will now be presented. For example, first and second electrodes may be disposed on a main body portion **110** of the MCD **100**. FIG. **4** provides a non-limiting example of such electrode placement. The mobile communication device **400** illustrated in

Petition at 62:

> EX1005, [0034]. Markel further goes on to state that an electrode may be disposed on a border of the display (*i.e.*, bezel). EX1005, [0044]. Markel provides an example of a display with electrodes on a border of the display in Fig. 15 (shown below with annotations). EX1005, [0078], Fig. 15. EX1003, ¶104.

Ground 2, Claim 13 – "wherein the second portion of the enclosure is a bezel"



[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**. FIG. **4** provides a non-limiting example of such electrode placement. The mobile communication device **400** illustrated in

Masimo Reply:

> Further, Markel discloses many devices and locations where electrodes may be placed. EX1005, 2-13 (pushbuttons, mobile devices, audio ports, auxiliary devices, keyboards, touchpads, desktop mouse, and bezels). Thus, Markel's teachings are not constrained to any particular form factor. It would have been obvious to add Mills's embedded pads (either pad 14a or leaf spring 62) under Markel's bezel. EX1065, ¶¶301-302.

Ground 2, Claim 15 – Response to Arguments

Claim 15: . . . a second lead embedded in the display screen of the electronic device . . .

> Further, Markel discloses that an electrode may be integrated or embedded into the touch screen of display 140. EX1005, [0044], [0074], [0078]. The electrodes of Markel are "cardiac sensor[s] (e.g., one or more electrodes) … adapted to detect cardiac activity of a user." *Id.*, [0035]. An electrode incorporated into the display is shown in Fig. 15. *Id.*, Fig. 15; EX1003, ¶121.

Pet., 40-54; POR, 50-60; P.O. Sur-Reply, 20-29; EX1005, Fig. 4, 10.

Ground 2, Claim 19 – "the first portion of the electronic device comprises a bezel of the enclosure; the electronic device further comprises a non-conductive component positioned between the bezel and the display screen for electrically isolating the first lead from the second lead"

Oslan at ¶129:

portion 243 (e.g., non-conductive plastic)." EX1005, [0047]. A POSITA would understand the need for electrical isolation between leads the first and second lead using non-conductive materials for proper measurement of ECG signals.

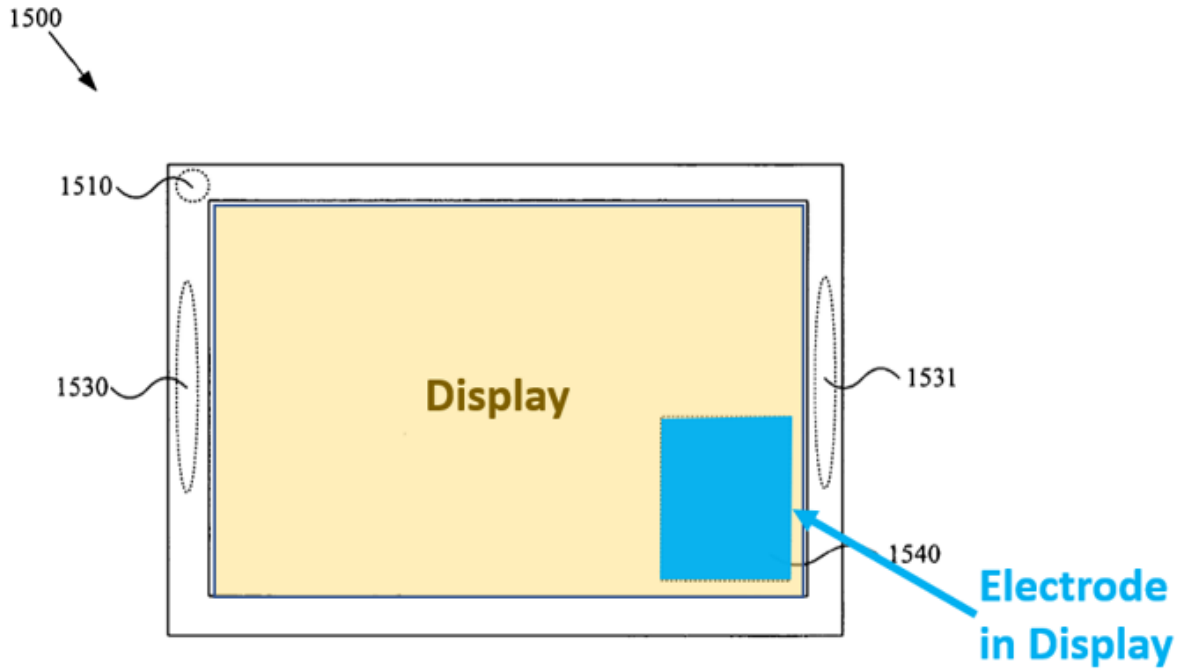


Figure 15

Ground 2, Claim 20 – "wherein the first lead is configured to detect the first electrical signal of the user's cardiac signal via the user's contact with the first portion of the enclosure"

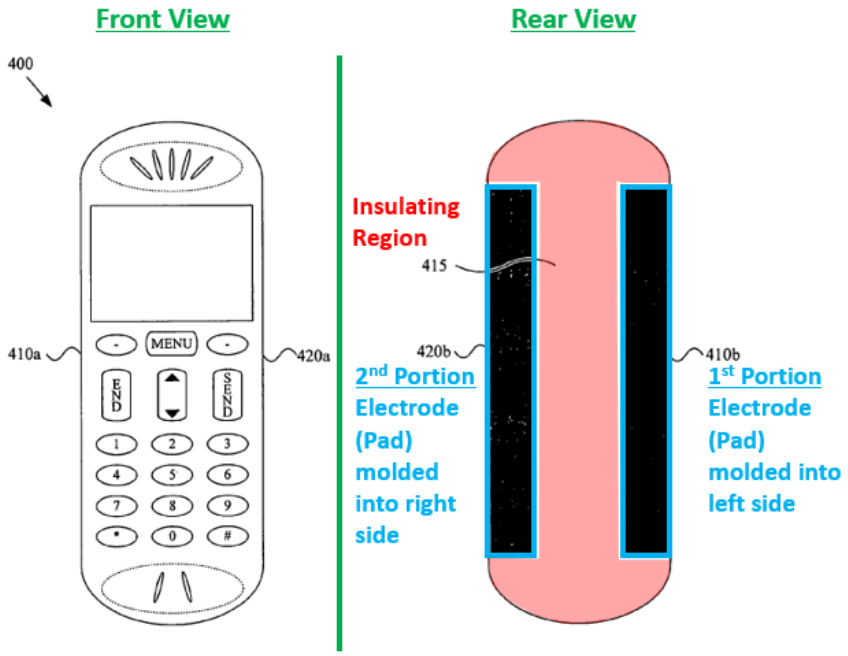


Figure 4

Markel's electrode 410b may be "placed on *or molded into* region 410b." Its electrodes can be "substantially concealed (or hidden) from a user."

Petition:

> EX1005, [0035], [0068]. Markel also discloses a first electrode "placed on or molded into region 410*b*," a first portion of the enclosure, as shown in annotated Fig. 4 below. *Id.*, [0045], Fig 4. Markel discloses, as discussed above in claim 16

Proposed Substitute Claims 23-27

Proposed Substitute Claim 23 – Anticipated by Markel or Obvious in view of Markel and Mills

Substitute for Original Claim 3

Proposed Claim 23, Limitation 1 – "The electronic device of claim 1, wherein the first portion is electrically isolated from the second portion by an electrically isolating component inserted between the first and second pads;"

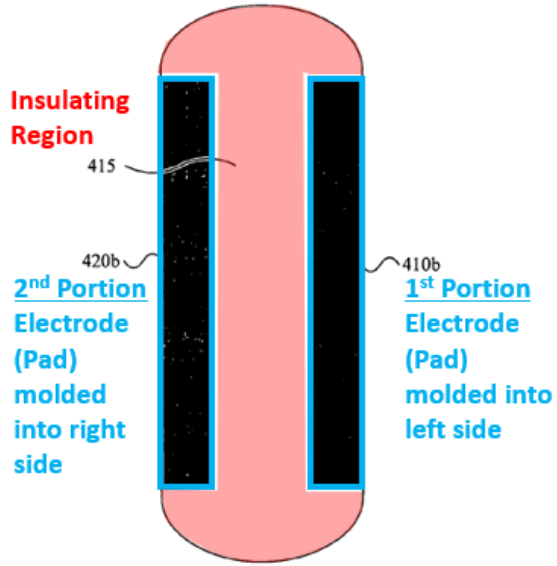
Anticipation

Mills teaches placing an electrically isolating component made of a well-known insulating plastic (ABS) between its electrodes.

Obviousness

Markel has an "insulating region 415" between electrodes 410b/420b.

Rear View

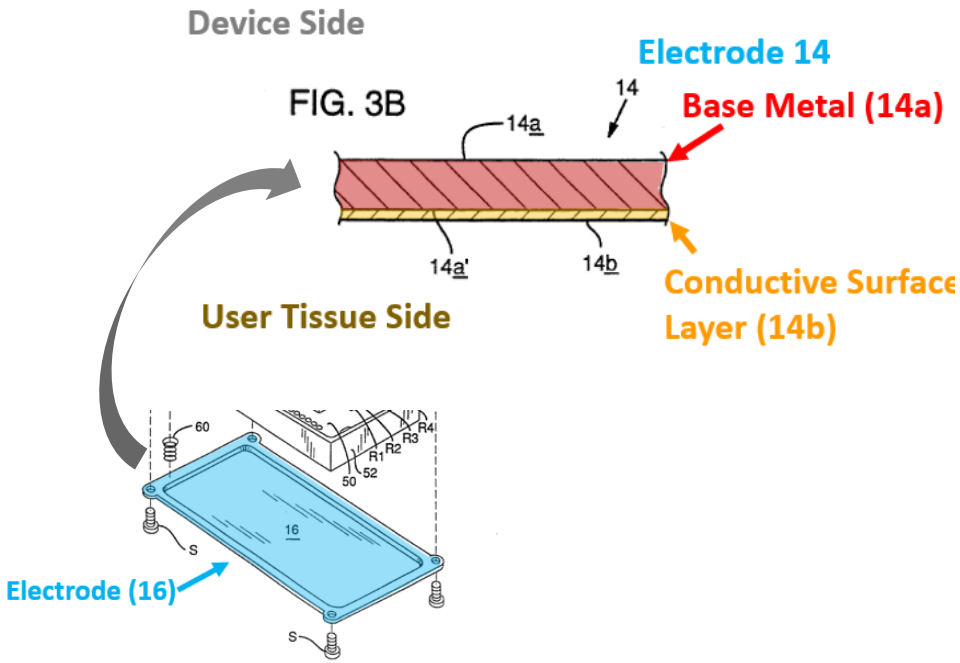


Opp. RMTA, 11; Pet., 34-35, 56-57; EX1005, Fig. 4; Sur-Reply RMTA, 5-9

Proposed Claim 23, Limitation 2 – "wherein the exterior surface of the enclosure comprises an exterior surface of the second portion, wherein the second pad is positioned underneath the exterior surface of the second portion of the enclosure; and"

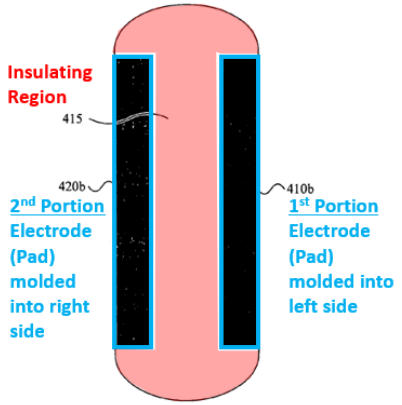
Anticipation

Electrode 16 has an "identical" cross section to electrode 14 and, thus, a second pad underneath an exterior surface of the second portion.



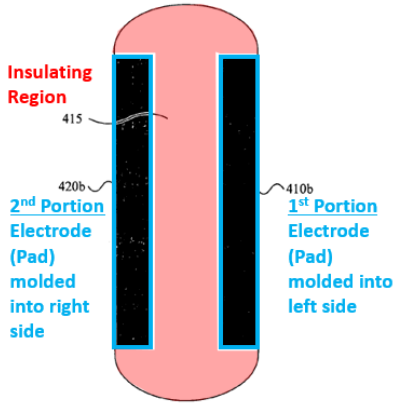
Obviousness

1)

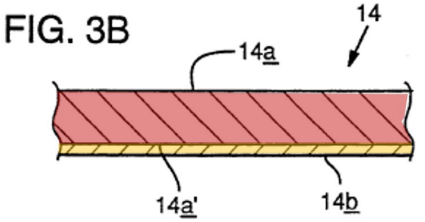


+

2)



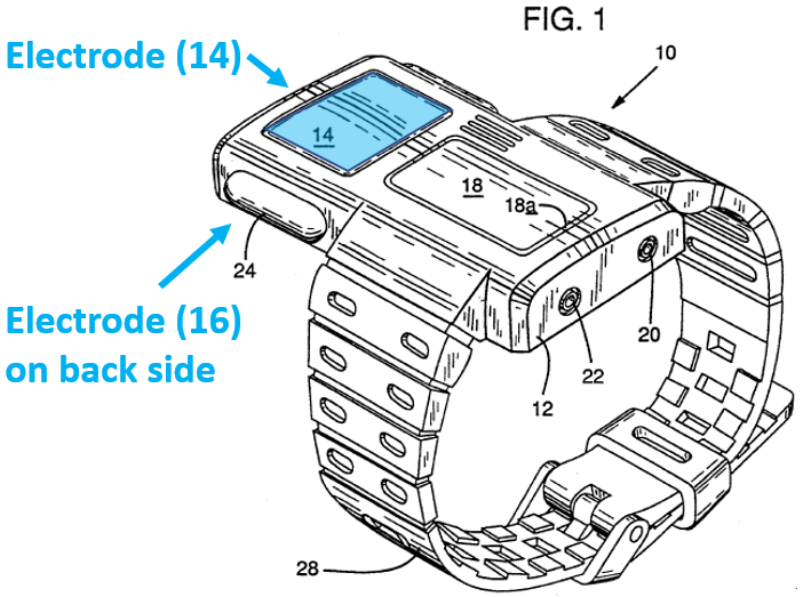
+



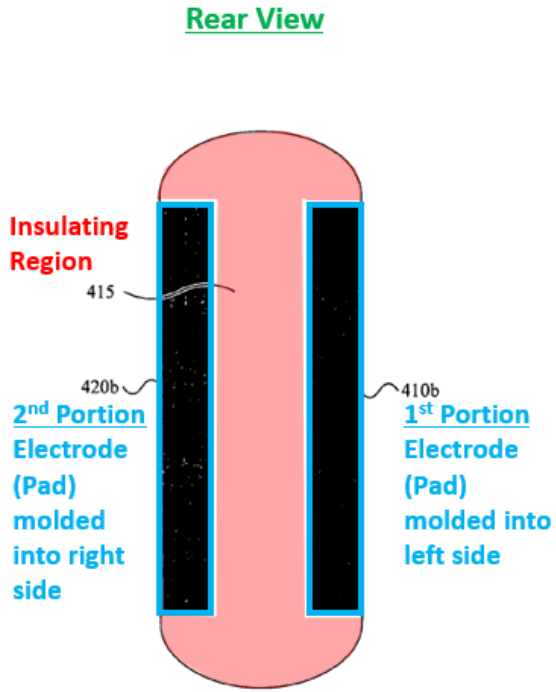
Opp. RMTA, 12-16; Pet., 34-35, 56-57; *See* EX1006, Fig. 2, 3B; EX1005, Fig. 4; Sur-Reply RMTA, 5-9

Proposed Claim 23, Limitation 3 – "wherein the first and second pads are adjacent pads."

Anticipation



Obviousness



Opp. RMTA, 16-17; Pet., 18; *See* EX1006, Fig. 1; EX1005, Fig. 4; EX1001, 9:53-57, 2:51-59; Sur-Reply RMTA, 5-9

Proposed Substitute Claim 24 – Obvious in view of Markel and Mills or Markel, Mills, and Lyons

Substitute for Original Claim 11

Proposed Claim 24, Limitation 1 – "The electronic device of claim 1, wherein the second lead is configured to detect the second electrical signal of the user's cardiac signal via the user's contact with the second lead;"

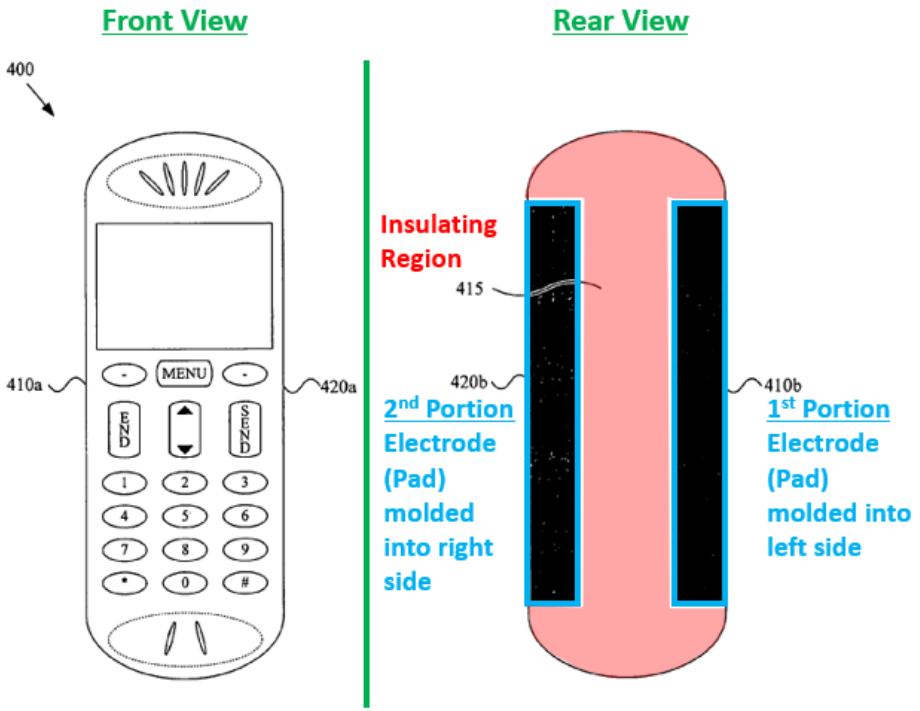


Figure 4

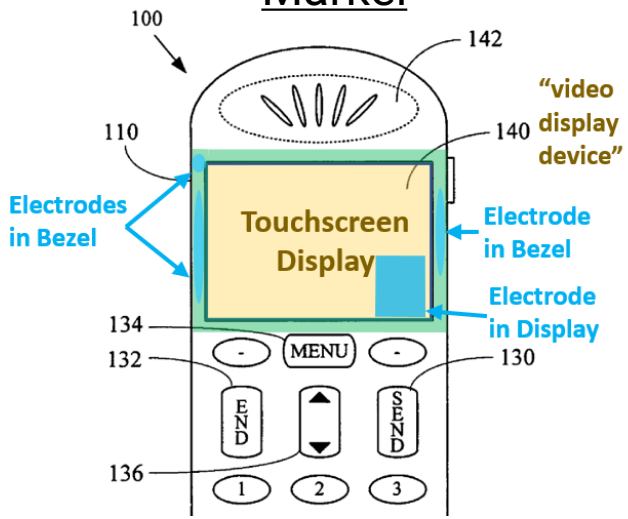
These limitations were recited in original Claim 11 and addressed in the Petition.

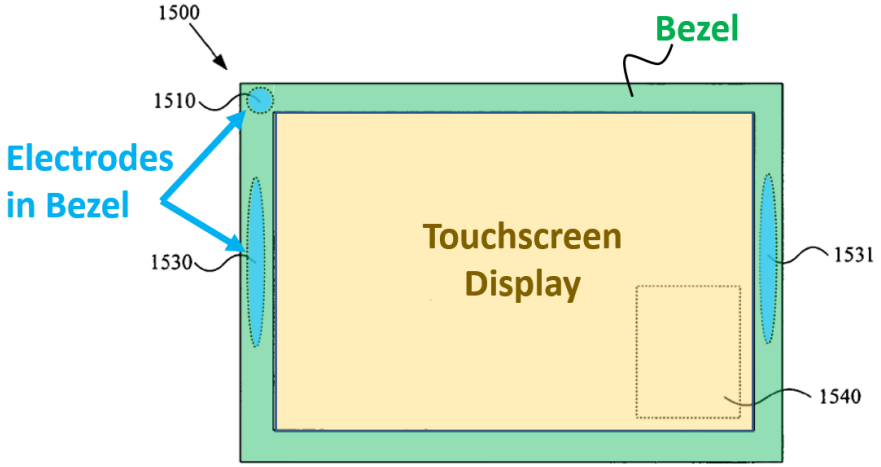
Markel teaches that electrode 420b may be "placed on or molded into region 420b." Markel also provides that an electrode may be "exposed for user contact."

Opp. RMTA,17-18; Pet., 61-62; EX1005, [0037], [0045], Fig. 4; Sur-Reply RMTA, 9-10

Proposed Claim 24, Limitation 2 – "wherein the first pad is embedded in an inner surface of an electrically conductive metal bezel that forms a portion of an exterior surface of the electronic device; and"

Markel





Lyons

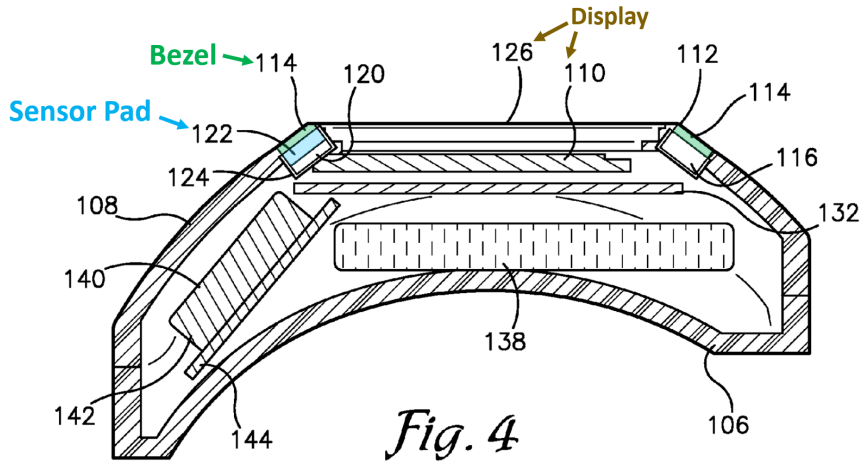
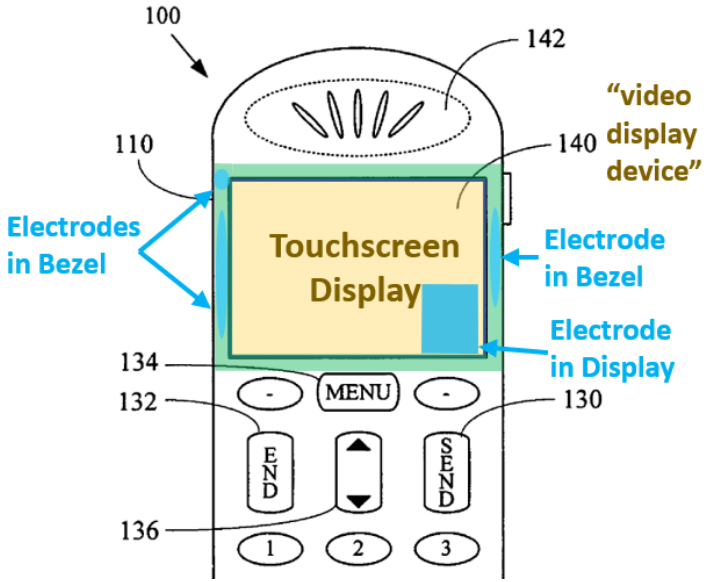


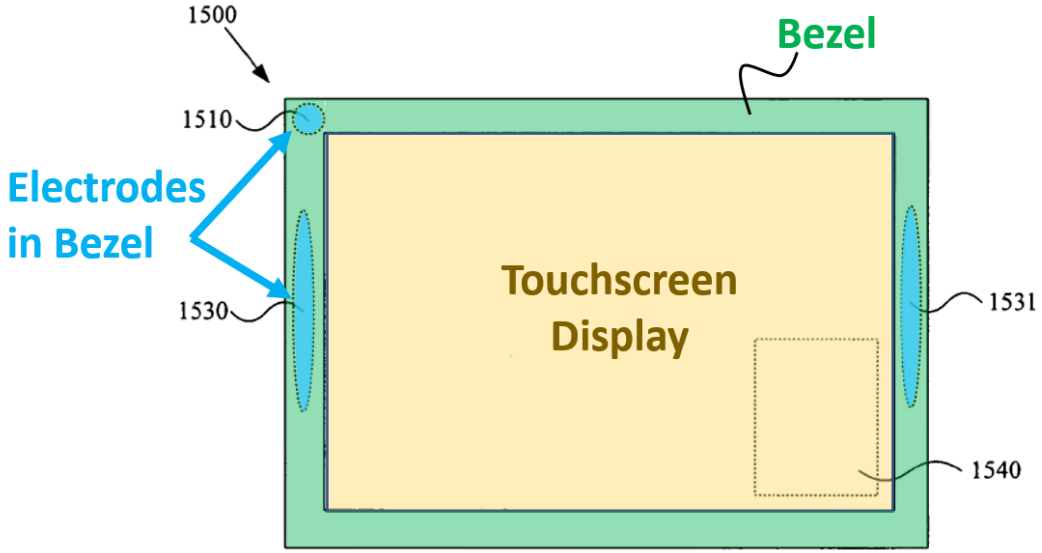
Fig. 4

Lyons at [0020]:

108 of the housing **102**. The bezel **114** may be formed of metal or plastic and, in specific implementation may be joined to the housing in a water-resistant or water-proof manner to prevent the intrusion of fluids into the housing.

Proposed Claim 24, Limitation 3 – "wherein the second pad is exposed on the exterior surface of the electronic device for direct contact from a user."





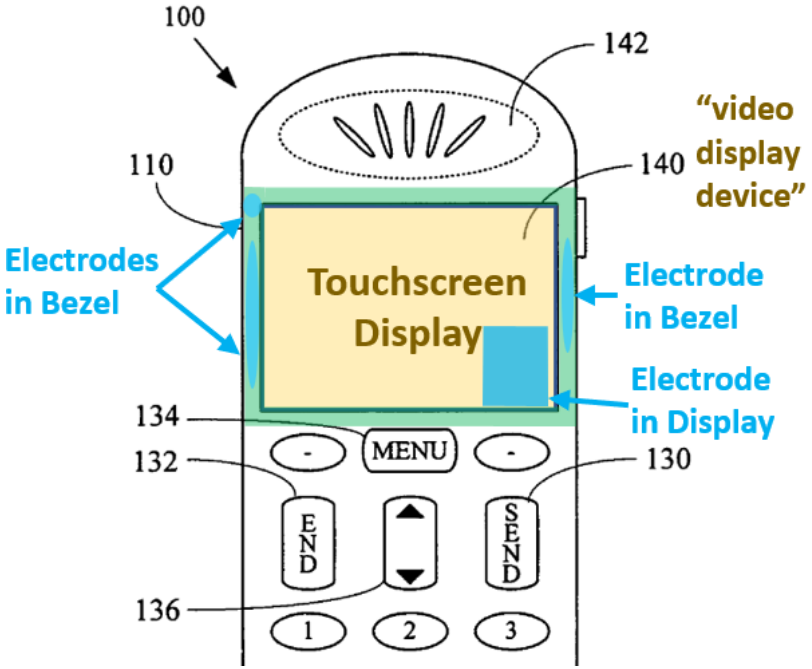
Oslan:

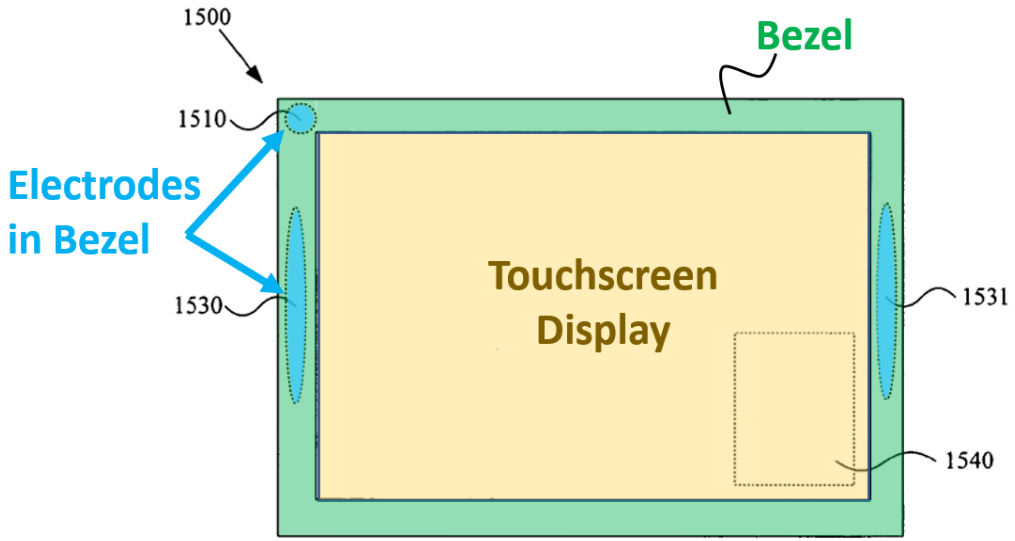
portion 243." EX1005, [0045], [0047]. *see also* Pet. at 56-57. Consistent with Markel's teachings, a POSITA would have known that if electrodes are provided in relative proximity, an insulating portion would be needed. *See* EX1052, 230:7-231:5

Proposed Substitute Claim 25 – Obvious in view of Markel and Mills or Markel, Mills, and Lyons

Substitute for Original Claim 12

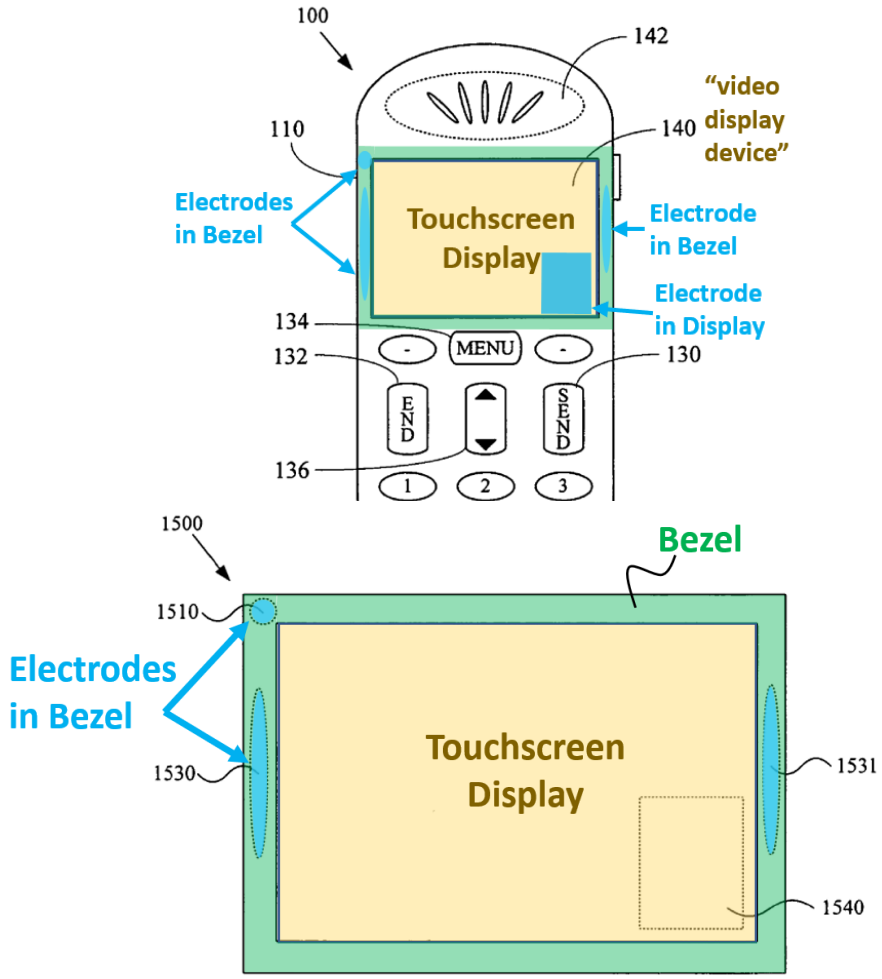
Proposed Claim 25, Limitation 1 – "further comprising a touch screen display, wherein the first portion of the enclosure is a bezel; wherein the bezel extends around the touch screen display;"





Proposed Claim 25, Limitation 2 – "wherein the first pad is embedded in an inner surface of the bezel."

Markel



Lyons

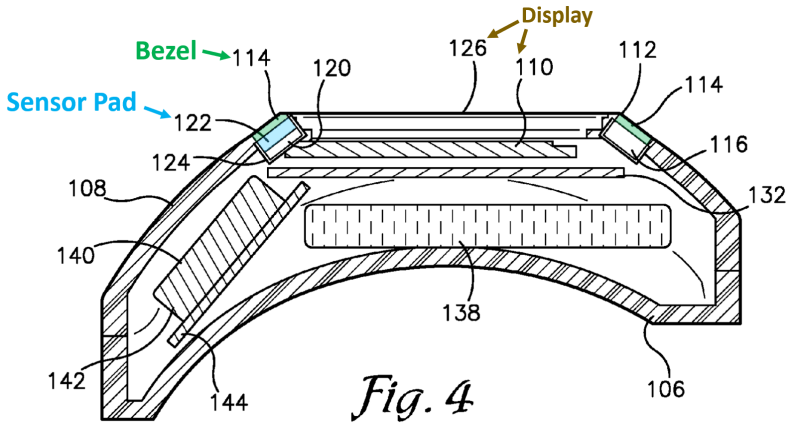


Fig. 4

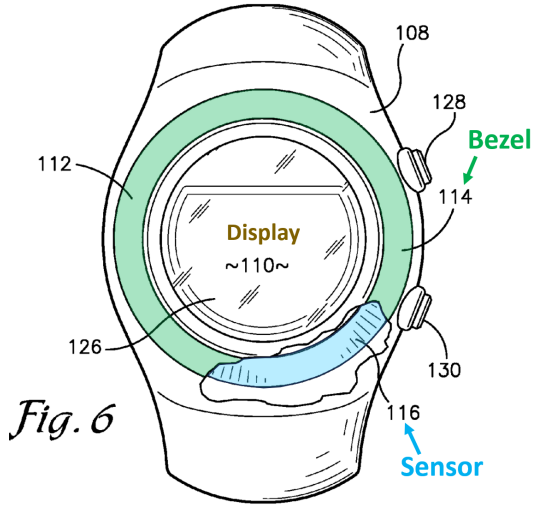


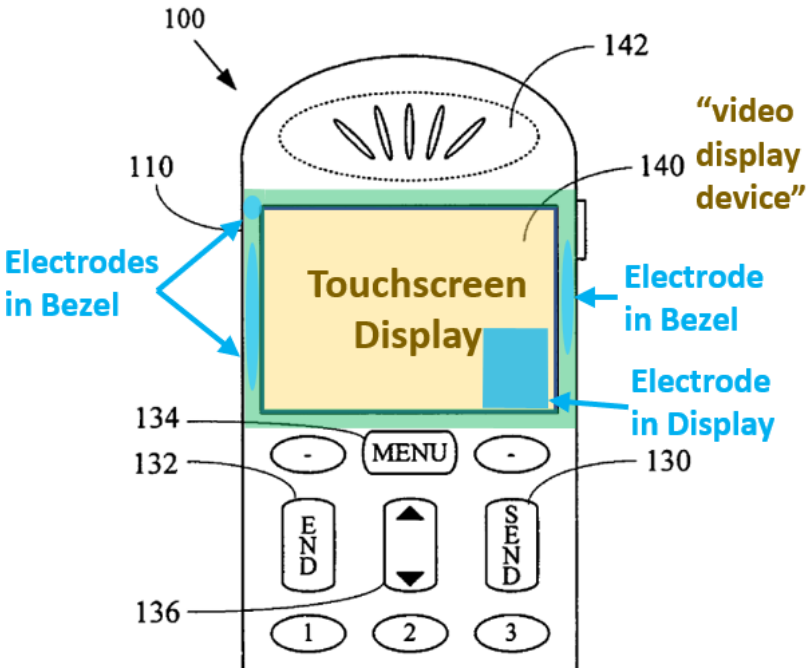
Fig. 6

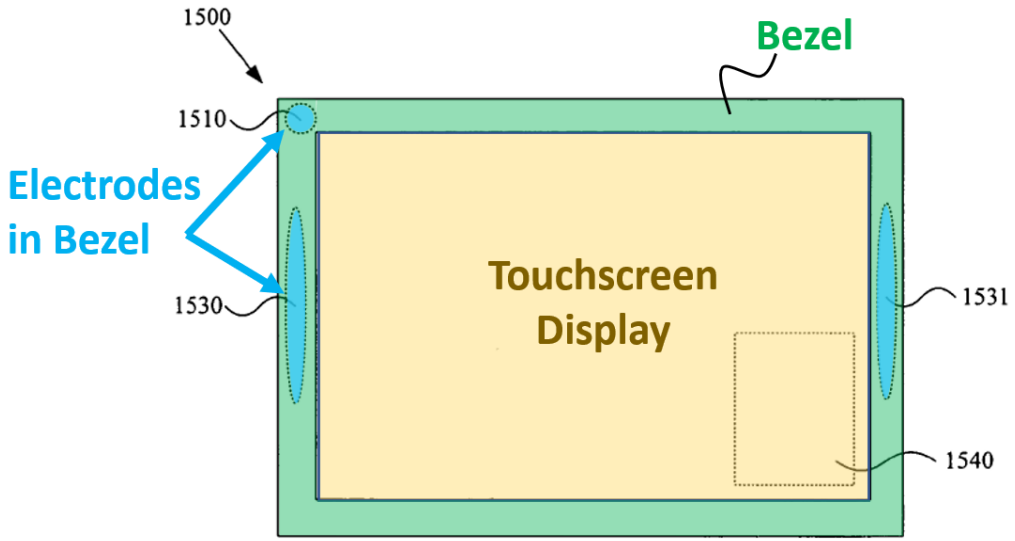
When a user touches the bezel **114** with his or her fingertip (or other conductive object) the electric field around one or more of the sensor pads **122** is changed. The integrated circuit **124**

Proposed Substitute Claim 26 – Obvious in view of Markel and Mills or Markel, Mills, and Lyons

Substitute for Original Claim 13

Proposed Claim 26, Limitation 1 – "wherein the ~~second~~ first portion of the enclosure is a bezel, the electronic device further comprising:"

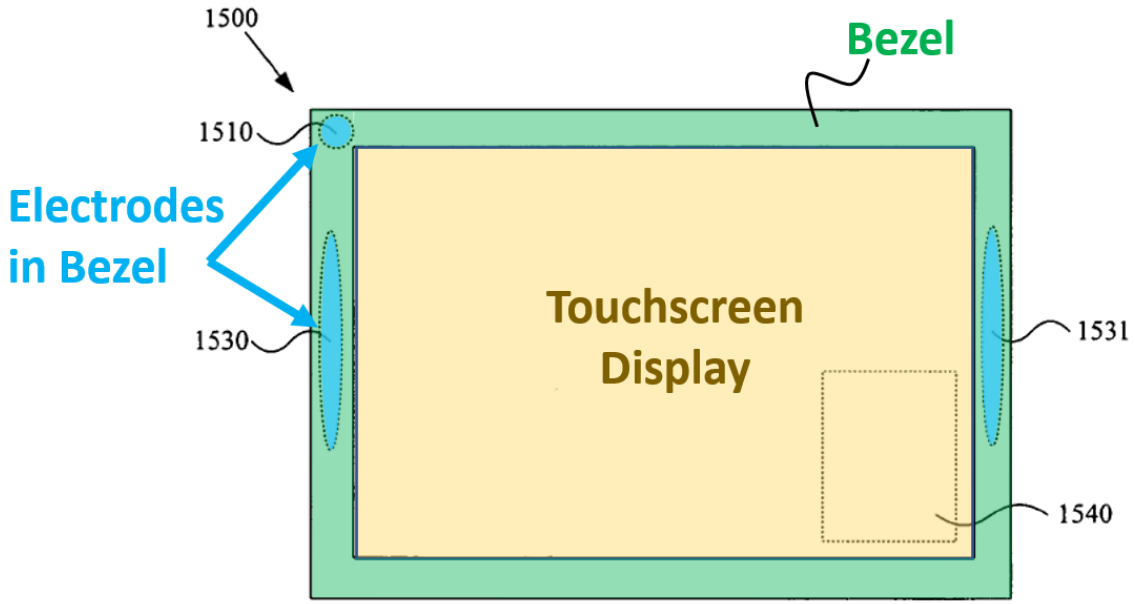


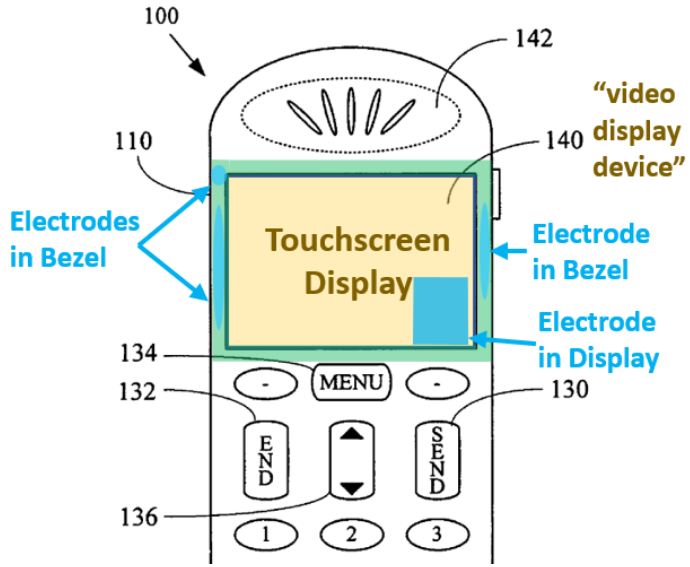


Opp. RMTA, 20-21; Reply, 27; Pet., 62; *See* EX1005, [0034], [0078]

Proposed Claim 26, Limitation 2 – "a third lead comprising a third pad that is embedded in the second portion of the enclosure, wherein the third pad is configured to detect a third electrical signal of the user's cardiac signal via the user's skin's contact with the third pad; and"

Markel states that "the MCD 100 may be adapted to detect cardiac activity of a user that is conductively coupled to at least two of a first, second and third (or N) electrodes."





Proposed Claim 26, Limitation 3 – "wherein the second pad is configured to detect the second electrical signal … via the user's skin's contact with the second pad; wherein the first pad detects signals through a first hand, and the second and third pads detect signals through a second hand."

Markel teaches that electrodes may have a "***placement*** . . . ***for convenient access*** for a user to contact both the first and second electrodes simultaneously (e.g., with different hands or different fingers)."

contact."); *Id.*, 7:33-34; EX1057, abstract. The figure below shows a user naturally would touch the three electrodes with two hands:

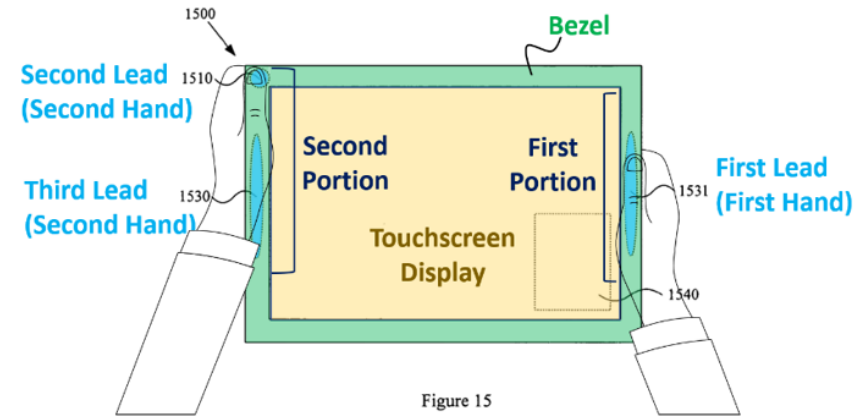


Figure 15

(annotated)

Broadening in Proposed Claim 26 - "wherein the ~~second~~ first portion of the enclosure is a bezel"

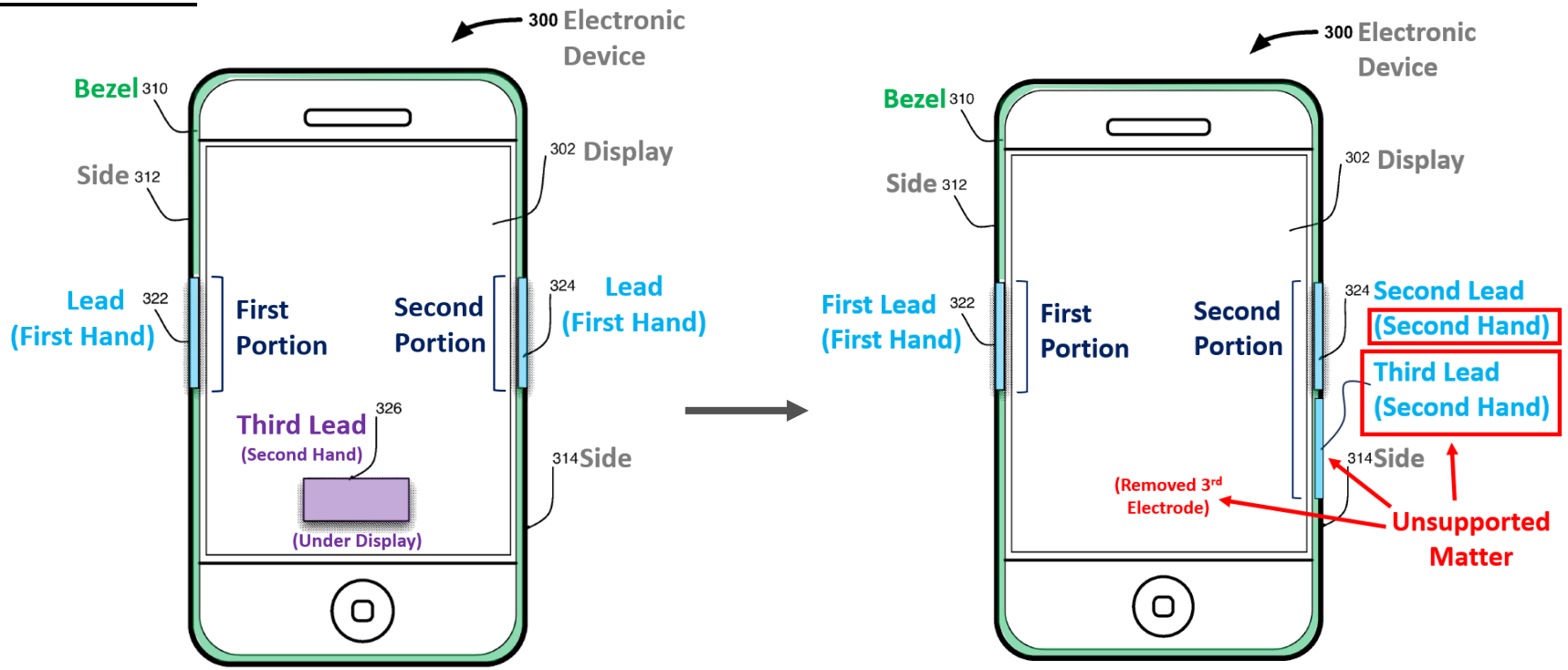
A claim "is broader in scope than the original claim[ ] if it contains within its scope any conceivable apparatus or process which would not have infringed the original patent." *Sisvel Int'l S.A. v. Sierra Wireless, Inc.*, 81 F.4th 1231, 1240 (Fed. Cir. 2023).

Could Infringe Substitute Claim 26		Does not Infringe Original Claim
(1) pad A is embedded in and underneath a bezel on the top face	≠	(1) pad A is the only pad in a bezel, and thus must be the "second pad" in a bezel
(2) pad B is embedded in the back of the device but exposed for user contact.		(2) pad B cannot be a "first pad" because it is exposed for user contact

Lack of Written Description Support – Proposed Claim 26

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

wherein the first pad detects signals through a first hand, and the second and third pads detect signals through a second hand."



Opp. RMTA, 9-10; *See* EX1001, Fig. 3; Sur-Reply RMTA, 11-12

Proposed Substitute Claim 27 – Obvious in view of Markel and Mills or Markel, Mills, and Kyoso

Substitute for Original Claim 14

Proposed Claim 27

Claim 27:
The electronic device of claim 1, wherein an interior surface of the enclosure comprises an interior surface of the first portion, wherein the first pad is positioned on the interior surface of the first portion;

wherein the processor is further configured to extract one or more characteristics of the detected cardiac signal and compare the extracted one or more characteristics with one or more characteristics previously stored in memory that were associated with an authorized user; and

wherein if the extracted one or more characteristics match those of an authorized user, the electronic device authenticates the user.

Markel:

MCD **1700**). In a non-limiting exemplary scenario where the cardiac information acquisition module **1710** acquires cardiac information from a plurality of users, the acquisition module **1710** may store at least a portion of such acquired information in the memory **1740** (e.g., indexed by user identification).

Markel:

[**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.

Kyoso also teaches authentication:

Abstract – The purpose of this paper is to present a new identification engine for an ECG identification system. The system identifies subjects based on a comparison of a patient's ECG with previously registered ECG feature parameters. These feature parameters are sampled from the intervals and durations of the electrocardiographic waves extracted using characteristic points appearing on the waveform of the second order derivative and are identified using discriminant analysis. Suitable combinations of feature parameters are selected and the accuracy of the proposed technique verified using ECGs from nine normal subjects.

Lack of Written Description Support – Proposed Claims 23-27

Lack of Written Description Support – Proposed Claims 23-27

Apple "cannot show written description support by picking and choosing claim elements from different embodiments that are never linked together in the specification." *See NeuroDerm Ltd. v. AbbVie Inc.*, PGR2022-00040, Paper 77 at 31 (PTAB, Oct. 31, 2023)) (citing *Flash-Control, LLC v. Intel Corp.*, No. 2020-2141, 2021 WL 2944592, at *4 (Fed. Cir. July 14, 2021)); *see also Ariad Pharms., Inc. v. Eli Lilly & Co.*, 598 F.3d 1336, 1356 (Fed. Cir. 2010) ("a description which renders obvious a claimed invention is not sufficient to satisfy the written description requirement").

Lack of Written Description Support – Proposed Claims 23-27 (cont'd)

Claim	Written Description Support		
	APPLE-2009	APPLE-2010	APPLE-2002
23	Amended features: ¶¶[0009]-[0011], [0033], [0047], [0050], [0055]; FIGS. 3, 5	Amended features: ¶¶[0009]-[0011], [0033], [0047], [0050], [0055]; FIGS. 3, 5	Amended features: ¶¶[0008]-[0010], [0032], [0046], [0049], [0054], cl. 18; FIGS. 3, 5
24	Amended features: ¶¶[0009], [0016]-[0018], [0034], [0042], [0044]-[0050], [0055]; FIGS. 3, 4B, 5	Amended features: ¶¶[0009], [0016]-[0018], [0034], [0042], [0044]-[0050], [0055]; FIGS. 3, 4B, 5	Amended features: ¶¶[0008], [0015]-[0017], [0033], [0041], [0043]-[0049], [0054], cl. 18; FIGS. 3, 4B, 5
25	Amended features: ¶¶[0009], [0016]-[0018], [0024]-[0025], [0034], [0042], [0044]-[0050], [0055], Abstract; FIGS. 3, 4B, 5	Amended features: ¶¶[0009], [0016]-[0018], [0024]-[0025], [0034], [0042], [0044]-[0050], [0055], Abstract; FIGS. 3, 4B, 5	Amended features: ¶¶[0008], [0014]-[0017], [0023]-[0024], [0033], [0041], [0042]-[0054], [0058]; FIGS. 3, 4B, 5
26	Amended features: ¶¶[0009], [0033]-[0034], [0042]-[0044], [0046]-[0047], [0050], [0055], Abstract; FIGS. 3, 4B, 5	Amended features: ¶¶[0009], [0033]-[0034], [0042]-[0044], [0046]-[0047], [0050], [0055], Abstract; FIGS. 3, 4B, 5	Amended features: ¶¶[0008], [0032]-[0033], [0041]-[0043], [0045]-[0046], [0049], [0054], [0058]; FIGS. 3, 4B, 5
27	Amended features: ¶¶[0007], [0033], [0047]-[0048], [0051], Abstract, cls. 1, 16, 20; FIG. 4B	Amended features: ¶¶[0007], [0033], [0047]-[0048], [0051], Abstract, cls. 1, 16, 20; FIG. 4B	Amended features: ¶¶[0006], [0032], [0046]-[0047], [0050], [0058] (Abstract), cls. 1, 16, 20; FIG. 4B

Opp. RMTA, 8; RMTA, 13-14; Sur-Reply RMTA, 11-12

Lack of Written Description Support – Proposed Claims 24-25

Claims 24 and 25 both recite the limitation that a "first pad is ***embedded in*** an inner surface" of a bezel, but in the POR (9-10) Apple argued that "placed on" is not sufficient for "embedded in."

Sole use of "inner surface" in '257:

For example, each lead can include a pad or extended area placed on the outer or inner surface of an electronic device bezel or housing.

Apple's RMTA Reply:

RMTA, 12-15. For example, contrary to Masimo's assertions (Opp., 8-10), the priority documents support the recitation of substitute claims 24 and 25 of the first pad being embedded in an inner surface of a bezel, stating that "[l]eads 322 and 324 can be integrated in bezel 310 using any suitable approach" such as "***placed within the thickness of bezel 460…but underneath the outer surface of the bezel***" and that "bezel 310 can include…***any other suitable distribution of leads***." APPLE-2009, [0046]-[0047], [0042], [0009], FIG. 4B; APPLE-2010, [0046]-[0047], [0042], [0009], FIG. 4B; APPLE-2002, [0045]-[0046], [0041], [0008], FIG. 4B, cl. 18 ("the first lead further comprises ***a pad embedded underneath the outer surface of the bezel***").

Opp. RMTA, 8-9; EX1001, 6:28-31; RMTA Reply, 1; POR 9-10; Sur-Reply RMTA, 11-12