

On behalf of **Masimo Corporation**

By: Jarom D. Kesler (Reg. No. 57,046)  
Ted M. Cannon (Reg. No. 55,036)  
Philip M. Nelson (Reg. No. 62,676)  
KNOBBE, MARTENS, OLSON & BEAR, LLP  
2040 Main Street, Fourteenth Floor  
Irvine, CA 92614  
Tel.: (949) 760-0404  
Fax: (949) 760-9502  
Email: MasimoIPR-257@knobbe.com

UNITED STATES PATENT AND TRADEMARK OFFICE

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**BEFORE THE PATENT TRIAL AND APPEAL BOARD**

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MASIMO CORPORATION  
Petitioner,

v.

APPLE INC.  
Patent Owner.

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Case No. IPR2023-00745  
U.S. Patent No. 10,076,257

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**PETITION FOR *INTER PARTES* REVIEW OF  
U.S. PATENT NO. 10,076,257**

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**EXHIBIT LIST**

<b>Exhibit No.</b>	<b>Description</b>
1001	U.S. Patent No. 10,076,257 (“the ’257 patent”)
1002	File history of the ’257 patent
1003	Declaration of Alan L. Oslan
1004	<i>Curriculum Vitae</i> of Alan L. Oslan
1005	U.S. Pat. Pub. No. 2007/0021677, published January 25, 2007 (“Markel”)
1006	U.S. Pat. No. 5,351,695, issued Oct. 4, 1994 (“Mills”)
1007	Reserved
1008	Leslie Cromwell et al., <u>Biomedical Instrumentation and Measurements</u> (1973)
1009	Reserved
1010	Reserved
1011	Reserved
1012	US Pat. Pub. No. 2008/015063
1013	US Pat. Pub. No. 2005/0033284
1014	<i>ABS Plastic Properties</i> , ADECRO PLASTICS (last visited March 13, 2023), <a href="http://www.adrecoplastics.co.uk/abs-plastic-properties/#:~:text=Finally%2C%20ABS%20has%20low%20heat,absorb%20shock%20effectively%20and%20reliably">www.adrecoplastics.co.uk/abs-plastic-properties/#:~:text=Finally%2C%20ABS%20has%20low%20heat,absorb%20shock%20effectively%20and%20reliably</a>
1015	Carl R. Nave, <i>Conductors and Insulators</i> , HYPERPHYSICS (last visited March 13, 2023), <a href="http://hyperphysics.phy-astr.gsu.edu/hbase/electric/conins.html#c1">http://hyperphysics.phy-astr.gsu.edu/hbase/electric/conins.html#c1</a>

<b>Exhibit No.</b>	<b>Description</b>
1016	<u>Merriam-Webster’s Collegiate Dictionary</u> (11 <sup>th</sup> ed. 2004)
1017	<u>Random House Unabridged Dictionary</u> (2 <sup>nd</sup> ed. 1993)
1018	<u>The American Heritage Dictionary of the English Language</u> (4 <sup>th</sup> ed. 2000)
1019	Steven M. Kaplan, <u>Wiley Electrical and Electronics Engineering Dictionary</u> (2004)
1020	<u>Stedman’s Medical Dictionary</u> (28 <sup>th</sup> ed. 2006)
1021	District of Delaware Time to Trial Statistics – Sept. 2022

**GROUND LISTING**

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

Masimo Corporation (“Petitioner”) requests *inter partes* review of Claims 1-4 and 8-22 of U.S. Patent No. 10,076,257 (“the ’257 patent”).

## **I. MANDATORY NOTICES; FEES; STANDING**

### **A. Mandatory Notices**

#### **1. Real Party-In-Interest (37 C.F.R. § 42.8(b)(1))**

Masimo Corporation is a real party-in-interest.

#### **2. Related Matters (37 C.F.R. § 42.8(b)(2))**

Apple has asserted the ’257 patent against Petitioner in *Apple Inc. v. Masimo Corporation and Sound United, LLC*, U.S. District Court for the District of Delaware, Case No. 1:22-cv-01378-MN (“the Delaware Litigation”).

#### **3. Lead and Backup Counsel (37 C.F.R. § 42.8(b)(3))**

Petitioner provides the following designation of counsel:

<b>Lead Counsel</b>	<b>Back-up Counsel</b>
Jarom Kesler (Reg. No. 57,046) 2jzk@knobbe.com BoxCDMI@knobbe.com  <u>Postal and Hand-Delivery Address:</u> Knobbe, Martens, Olson & Bear, LLP 2040 Main St., 14th Fl. Irvine, CA 92614 Telephone: (949) 760-0404 Facsimile: (949) 760-9502	Ted M. Cannon (Reg. No. 55,036) Knobbe, Martens, Olson, & Bear, LLP 2tmc@knobbe.com <u>Postal and Hand-Delivery Address:</u> Same as lead counsel  Philip M. Nelson (Reg. No. 62,676) Knobbe, Martens, Olson, & Bear, LLP 2pmn@knobbe.com <u>Postal and Hand-Delivery Address:</u> Same as lead counsel



Pursuant to 37 C.F.R. § 42.10(b), a Power of Attorney accompanies this petition. The above-identified lead and backup counsel are registered practitioners associated with Customer No. 20,995 listed in that Power of Attorney.

**4. Service Information (37 C.F.R. § 42.8(b)(4))**

Service information above. Petitioner consents to electronic service by email to MasimoIPR-257@knobbe.com.

**B. Payment of Fees**

The fee set forth in 37 C.F.R. § 42.15(a) has been paid. The undersigned further authorizes payment for any additional fees that may be due in connection with this petition to be charged to Deposit Account 11-1410.

**C. Grounds for Standing**

Petitioner certifies that the '257 patent is available for IPR and that Petitioner is not barred or estopped from requesting IPR.

**II. BACKGROUND**

**A. Reliance on Expert Analysis and Testimony**

The predominant issues in this Petition, as in most patentability challenges, are technical issues for which expert analysis is relevant, particularly with respect to what would have been known or understood by a person of ordinary skill in the art

(“POSITA”). Accordingly, this Petition largely adopts the expert analysis and testimony of Mr. Alan L. Oslan EX1003 ¶¶ 1-135; EX1004.<sup>1</sup>

## **B. Overview of the ’257 Patent**

The ’257 patent is directed to an electronic device, such as a mobile phone, that includes “a heart sensor having several leads for detecting a user’s cardiac signals.” EX1001, Abstract. Fig. 3 (reproduced below)<sup>2</sup> depicts a mobile phone 300 including a bezel 310, leads 322, 324 and embedded lead 326. EX1003, ¶39.

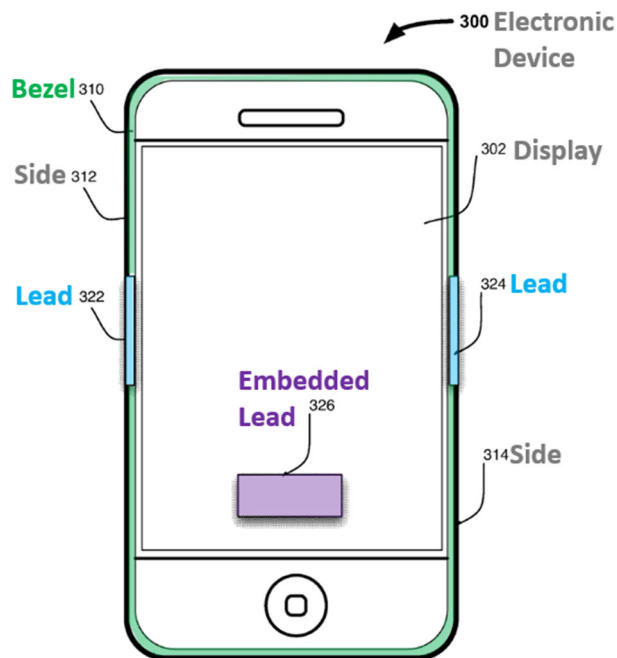


FIG. 3

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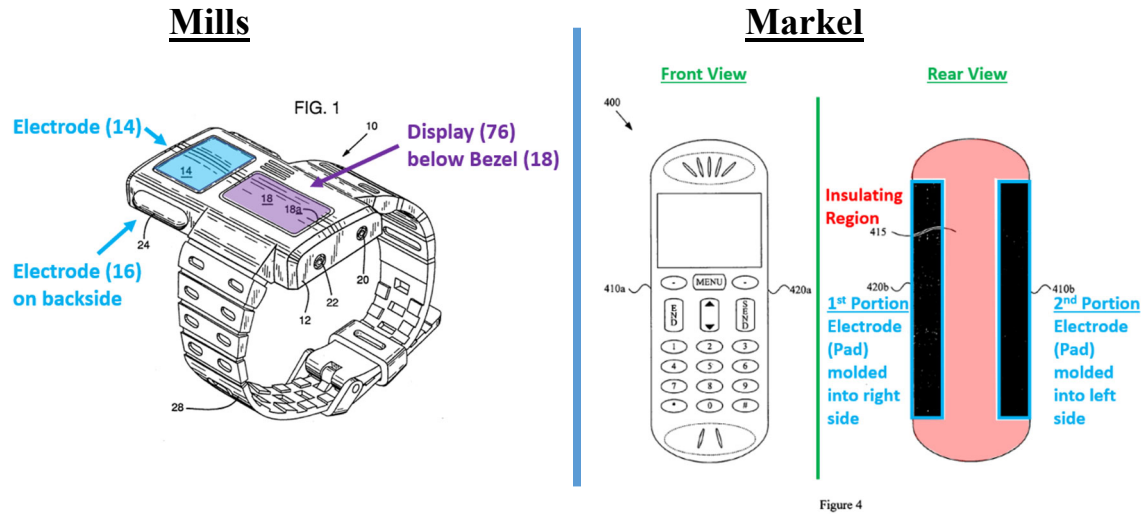
<sup>1</sup> In general, herein, a single citation to Mr. Oslan expert declaration is provided at the end of each paragraph that is supported by Mr. Oslan’s testimony.

<sup>2</sup> All reproduced figures herein are annotated unless otherwise stated.

The '257 patent admits electronic devices incorporating leads for detecting cardiac signals are not innovative. The '257 patent explains existing electronic devices can detect a user's cardiac signals by providing "at least two leads that the user contacts." EX1001 at 1:57-58. Instead, the '257 patent alleges novelty in the improvement of the *aesthetic qualities* of the electronic device with respect to the positioning of the leads. As stated in the background section, the approach of prior art devices placing "the leads ... on the exterior surface" of the housing (or enclosure) of the electronic device "is not aesthetically pleasing." *Id.* at 1:58-63. EX1003, ¶40.

By their own admission, the inventors of the '257 patent did not invent a heart sensor having leads for detecting a user's cardiac signals nor incorporation of a heart sensor into an electronic device. EX1001 at 1:57-58. They did not invent incorporation of a heart sensor into an electronic device. *Id.* Rather, the inventors merely expressed an opinion that embedding the leads in an enclosure allegedly results in aesthetically pleasing qualities. *Id.* at 1:58-63; EX1003, ¶40. Such embedding, however, is also not inventive. As evidenced herein, multiple prior art references recognized and expressly teach concealing leads by embedding them into an enclosure of an electronic device.

For example, both prior art references Mills and Markel disclose embedded ECG leads in electronic devices with aesthetic considerations:



Mills teaches electrodes 14 and 16 are formed as an “integral part” of housing 12. EX1006, 3:47-51. Mills provides a metal-plating composition to its electrodes for “aesthetic reasons.” *Id.*, 5:37-40. Similarly, Markel teaches electrodes that are “integrated into various molded components” of the device and “substantially concealed (or hidden) from a user ... with little or no visible indication of the electrode presence.” EX1005, [0040].

### C. Prosecution History of the ‘257 Patent

The examiner rejected the claims several times before allowing them after Patent Owner made several narrowing amendments to the independent claims. Specifically, Patent Owner added the limitation of an embedded “pad” to claim 1 and the limitation of an electrode embedded in a “display” for Claim 15. EX1002, p77, 80. However, the applicant did not submit, and the examiner did not consider,

any of the prior art references that Petitioner relies on in this Petition. *See generally* EX1002.

**D. Priority of the ‘257 Patent**

The ‘257 patent is a continuation of U.S. App. No. 12/358,905, filed January 23, 2009 (now U.S. Pat. No. 8,615,290), which in turn claims priority to U.S. Prov. App. No. 61/111,498, filed November 5, 2008. Thus, its earliest possible priority date is November 5, 2008. EX1001, cover.

**E. Level of Ordinary Skill in the Art**

A POSITA of the ‘257 patent would have at least a B.S. degree in electrical or biomedical engineering or a related field, with at least two years of experience designing patient monitoring or similar systems. A higher level of education may compensate for less work experience and vice versa. EX1003, ¶38.

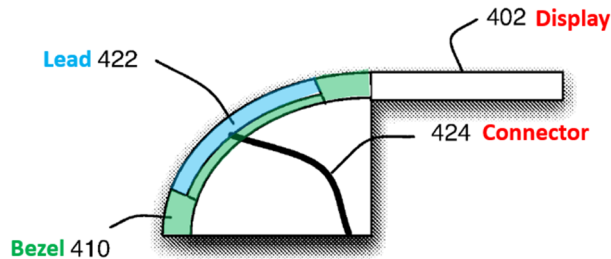
**F. Claim Construction**

**1. Embedded**

Independent Claim 1 recites “embedded” first and second pads of respective first and second leads. Dependent Claim 9 recites a third lead “embedded” with a display. Independent Claim 15 recites “embedded” first and second leads. The ‘257 patent does not provide a definition of “embedded.”

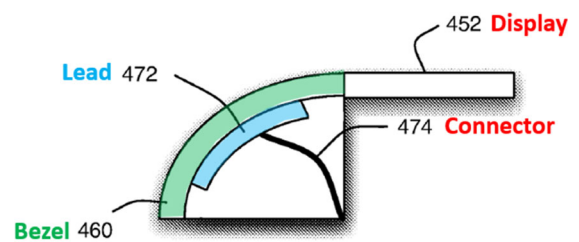
The ‘275 patent discloses two examples of leads 422, 472 “embedded” into portions of the housing or enclosure 410, 460. EX1001 at 9:19-20, 22-24. Fig. 4A

shows embedded lead 422 “along the outer surface of the bezel 410” and “exposed to the user during use.” *Id.* at 9:22-24. In contrast, Fig. 4B shows embedded lead 472 “positioned against the back surface of the bezel 460” *Id.* at 9:34-45. EX1003, ¶44.



**FIG. 4A**

“[A] bezel with an embedded heart sensor lead” Ex. 1001 at 9:19-20.



**FIG. 4B**

“[A]nother ... bezel with an embedded heart sensor lead” Ex. 1001 at 9:37-38.

The ‘257 patent also explains that a lead can be embedded if it is “placed within the thickness of bezel . . . but underneath the outer surface of the bezel.” EX1001, 9:45-48, EX1003, ¶44.

Appropriate dictionary definitions of embedded as used in the ‘257 patent include “to make something an integral part of” (EX1016, 406); “to be or become fixed or incorporated, as into a surrounding mass” (EX1017, 635); “to cause to be an integral part of a surrounding whole” (EX1018, 583). EX1003, ¶45.

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.

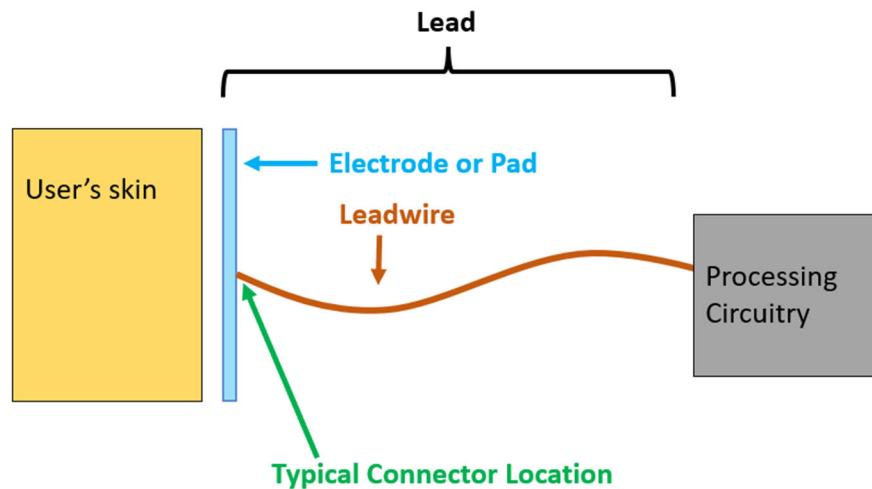
## **2. Lead**

A POSITA would have understood that a common definition of a lead is a “conductor, usually a wire, by which circuit elements or points are connected to components, devices, equipment, systems, points or materials. Also called a lead wire.” EX1019, 414. Another technical dictionary defines a lead as an “electrocardiographic cable with connections within the electronics of the machine designated for an electrode placed at a particular point on the body surface.” EX1020, 10162; EX1003, ¶47.

A POSITA would understand a common basic electrocardiogram (ECG)<sup>3</sup> system to include a number of “leads” typically formed from an “electrode” in contact with the user’s skin (sometimes referred to as a “pad”) and may include a “lead wire”, one or more connectors, and other components to electrically couple a body electrical signal at the electrode to processing circuitry. For example, a typical ECG lead can be graphically illustrated as follows:

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<sup>3</sup> Electrocardiogram is commonly abbreviated as either ECG or EKG. EX1008, 31.



Electric potentials measured by each lead are compared to other electrodes to determine a voltage (*e.g.*, a difference between two electrical potentials). The measured voltage is the ECG signal. EX1003, ¶48.

The '257 describes an electronic device with a sensor such that “electrical signals generated by the user can be transmitted from the user's skin through the electronic device housing to the leads.” EX1001, Abstract. Accordingly, this device is a type of electrocardiogram (ECG). In the context of an ECG system, an “electrode” is a well-known term of art that a POSITA understands to mean a structure, such as a pad, that contacts the user’s skin to detect the user’s ECG. EX1003, ¶49.

The '257 patent does not explicitly use the term “electrode,” but does describe a structure a POSITA would understand to mean an electrode, including a “pad.” EX1001, 6:28-33. For example, the '257 patent explains: “to detect a user's



heartbeat or heart rhythm, however, the electronic device must provide at least two leads that the user contacts to detect the user's cardiac signals” and “contact is made between the user (e.g., the user's hand or finger) and the leads for cardiac signals to be detected.” EX1001, 1:56-58, 6:27-28; EX1003, ¶50.

The '257 patent states that to “provide an electrical signal from the user to the processing circuitry, the leads can be exposed such that the user may directly contact the leads, or may instead or in addition be coupled to an electrically conductive portion of the device enclosure (e.g., a metallic bezel or housing forming the exterior of the device).” EX1001, 2:44-50. Consistent with its ordinary meaning as shown in dictionary definitions and based on the claims and disclosure of the '257 patent, a POSITA would understand a **“lead”** in context of the '257 patent to mean *“one or more conductive components that form at least a part of an electrical path from the user's skin to the processor.”* EX1003, ¶51.

### **3. Pad**

The term “pad” is recited in independent Claim 1 and a number of its dependent claims. The '257 patent states that a “lead can include a pad ... placed on the outer or inner surface of an electronic device bezel or housing [which] can then be coupled to a wire or other connector for providing cardiac signals to a processor for processing.” EX1001, 6:28-33. An electrode is often a conductive pad. The dictionary meaning of pad is “a thin flat mat or cushion.” EX1016, 890. The '257

patent states a “pad” as “an extended area placed on the outer or inner surface of an electronic device bezel or housing” and which can then be “coupled to a wire or other connector for providing cardiac signals to a processor for processing.” EX1001, 6:29-33. Consistent with its ordinary meaning to a POSITA, a “**pad**” in the context of the ‘257 patent means “*a thin mat that may be part of the electrical path of a lead, such as an electrode or a connection that is part of the lead.*” EX1003, ¶52.

#### **4. Pocket**

The term “pocket” which is recited in dependent Claim 8. The ‘257 patent specification does not define the term pocket nor are there any drawings that illustrate what is meant by a pocket. Pocket is defined in the dictionary to be: “any pouchlike receptacle, compartment, hollow or cavity.” EX1021. Consistent with this definition, a POSITA would understand the term **pocket** in the context of the ‘257 patent disclosure to be “*any pouchlike receptacle, compartment, hollow or cavity.*” EX1003, ¶53.

### **III. STATEMENT OF PRECISE RELIEF REQUESTED**

#### **A. Statutory Grounds for Cancellation**

Ground 1: Petitioner requests that the Board cancel claims 1-4, 8, 10, 11 and 14 as unpatentable under pre-AIA 35 U.S.C. § 102 because these claims are anticipated by Mills.

Ground 2: Petitioner requests that the Board cancel claims 1-4 and 8-22 as unpatentable under pre-AIA 35 U.S.C. § 103 because they are obvious in view of Markel in combination with Mills.

**B. Status of References as Prior Art**

The following references are prior art for the following reasons:

Exhibit No.	Description	Prior Art Basis
1001	'257 patent (background section)	Admitted Prior Art
1005	Markel	Pre-AIA102(b) – published January 25, 2007
1006	Mills	Pre-AIA 102(b) – published October 4, 1994

These references constitute analogous art because they are from the same field of endeavor as the '257 patent, *e.g.*, devices for detecting cardiac signals via user contact. *Unwired Planet, LLC v. Google Inc.*, 841 F.3d 995, 1000 (Fed. Cir. 2016). They are also reasonably pertinent to a particular problem with which the inventor was involved, *e.g.*, detecting cardiac signals via a device exterior while maintaining an aesthetically pleasing design. As these references are analogous art, a POSITA is presumed to have been aware of them. *In re Nilssen*, 851 F.2d 1401, 1403 (Fed. Cir. 1988).

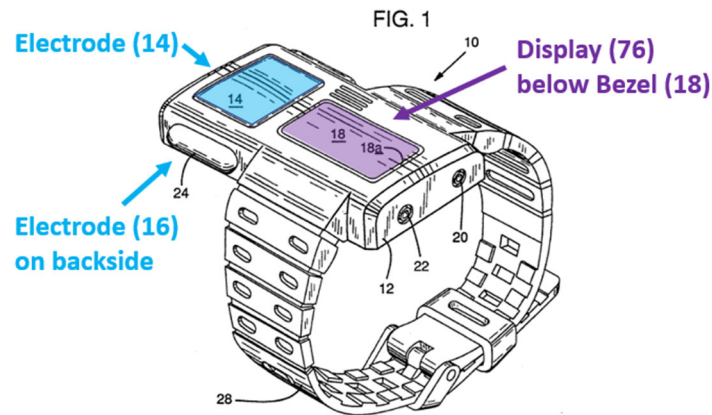
#### **IV. SPECIFIC PROPOSED GROUNDS FOR UNPATENTABILITY**

As explained below, claims 1-4 and 8-22 of the '257 patent are either anticipated or would have been obvious in view of the prior art identified below.

##### **A. Overview of Key Prior Art**

###### **1. Mills**

Mills published on October 4, 1994, as U.S. Patent No. 5,351,695. Mills discloses a “cardiac and data event monitor having dry skin electrodes integral with the monitor’s housing.” EX1006, Abstract. As shown in Fig. 1 (reproduced with annotations below), a wrist-worn ECG monitor 10 includes a first electrode 14 incorporated within housing 12 and a second electrode 16. According to Mills, an “object [of the invention] is to provide such a monitor that reliably detects and records ECG signals without the use of external electrodes or messy gels.” EX1006, 1:39-42. Mills also states that “an object of the invention [is] to provide an improved dry skin electrode system that is an integral part of the housing of such a monitor. *Id.*, 1:43-45; EX1003, ¶54.



## 2. Markel

Markel published on January 25, 2007, as U.S. Patent Publication No. 2007/0021677. Markel discloses a device that comprises one or more electrodes that are “adapted to detect cardiac activity of a user” of the device. EX1005, [0035]. In Fig. 4 of Markel (below), a mobile communication device 400 includes electrodes placed on or molded into regions 410b, 420b, that are “substantially concealed (or hidden) from a user.” EX1005, Fig. 4 (reproduced below with annotations), [0039], [0040], [0045]. Markel provides an example, disclosing that “an electrode may comprise molded conductive plastic with little or no visible indication of the electrode presence.” *Id.*, [0040]; EX1003, ¶55.

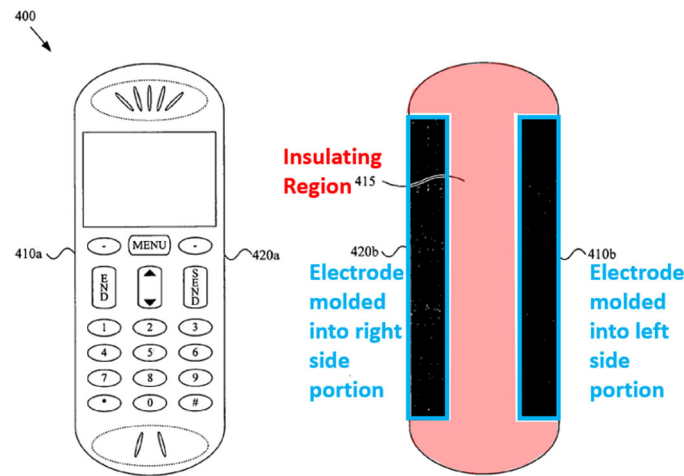


Figure 4

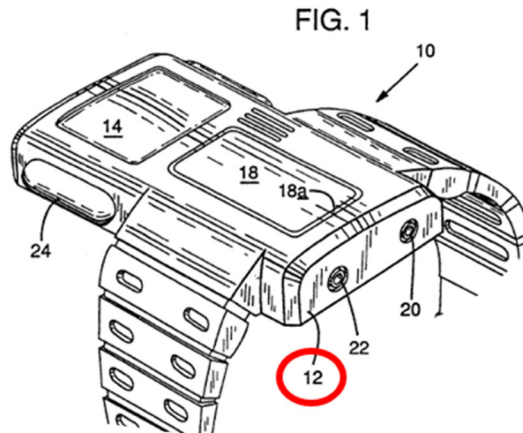
**B. Ground 1: Claims 1-4, 8, 10, 11 and 14 are unpatentable as anticipated by Mills**

**1. Claim 1: “An electronic device for detecting a user’s cardiac signal, comprising”**

Mills discloses a “wrist-worn cardiac data and event monitor having dry skin electrodes integral with the monitor’s housing.” EX1006, Abstract; EX1003, ¶56.

**a. Limitation 1[a]: “an enclosure”**

Fig. 1 of Mills (partially reproduced below) discloses an electronic device 10 for detecting a user's cardiac signal. EX1006, Fig. 1; 3:7-8. The device 10 includes a housing or enclosure 12. *Id.*; EX1003, ¶57.

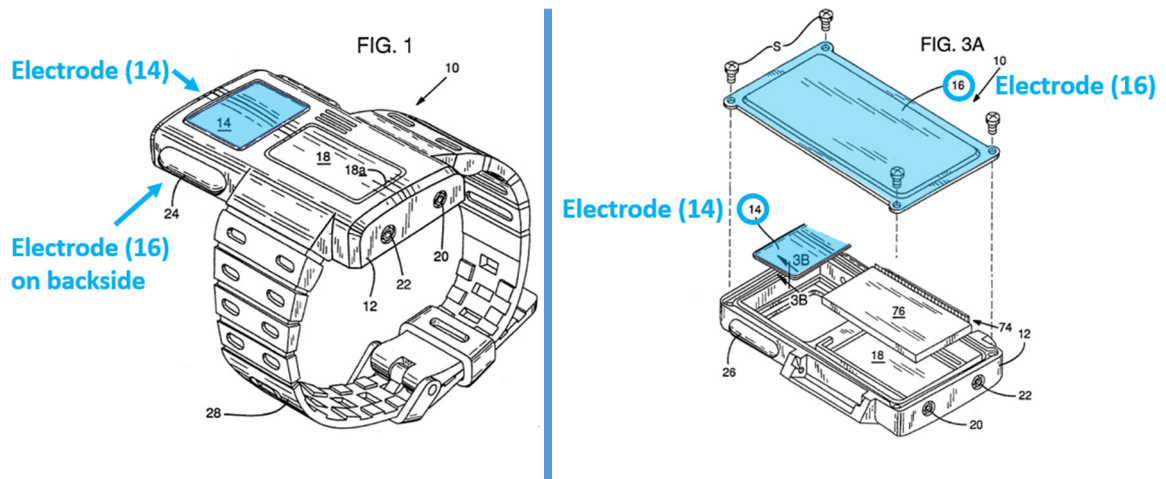


**b. Limitation 1[b]: “a heart sensor configured to detect the user's cardiac signal”**

Mills discloses a “wrist-worn cardiac monitor” (*i.e.*, a heart sensor) that “reliably detects and records ECG signals” (*i.e.*, cardiac signals). EX1006, Abstract, 1:11-12, 1:39-40; EX1003, ¶58. Mills discloses a wrist-worn ECG monitor 10. EX1006, Abstract, 1:11-12; 9:12-15. The '257 patent equates an ECG (or EKG)<sup>4</sup> monitor with a heart sensor: “heart sensor 112 can serve as an EKG monitor.” EX1001, 6:5-6. The heart sensor of Mills comprises two leads (electrodes) designated 14 and 16, as annotated below in Figs. 1 (top view) and 3A (bottom exploded view). Lead 14 is the “first lead” and lead 16 is the “second lead” of Claim 1 as discussed further below.

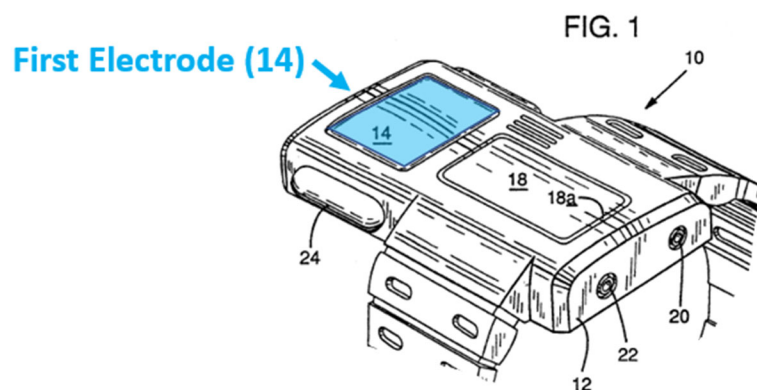
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<sup>4</sup> Electrocardiogram is abbreviated as both ECG and EKG. EX1003, ¶48, n.2.



**i. Limitation 1[b(i)]: “a first lead comprising a first pad”**

As explained above, a POSITA would understand a pad to be an electrode and a lead to be one or more conductive components that form at least a part of an electrical path from the user’s skin to the processor, including an electrode. Electrode 14 of Mills (Fig. 1, partially reproduced below) is a pad that forms part of the first lead of Mills. EX1006, 7:16-18; EX1003, ¶59.





To be sure, Mills equates the term electrode with a pad:

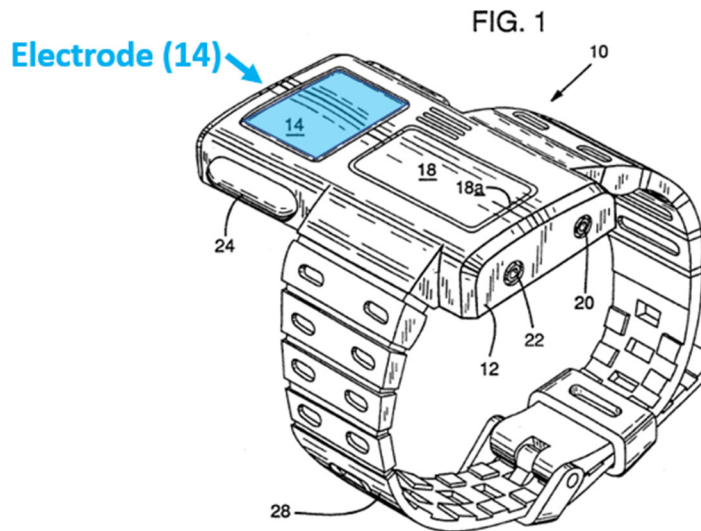
“*electrode 14* comprising such plated expanse obviates use of a messy, conductive gel, and even the so-called “residue-free” self-adhesive gelatinous *pads* that often are used to enhance conductivity between an electrode and a patient's skin.”

EX1006, 4:19-24 (emphasis added); EX1003, ¶59. And the ‘257 patent states that a “lead can include a pad or extended area placed on the outer or inner surface of an electronic device ... housing” and which can then be “coupled to a wire or other connector for providing cardiac signals to a processor for processing.” EX1001, 6:29-33.

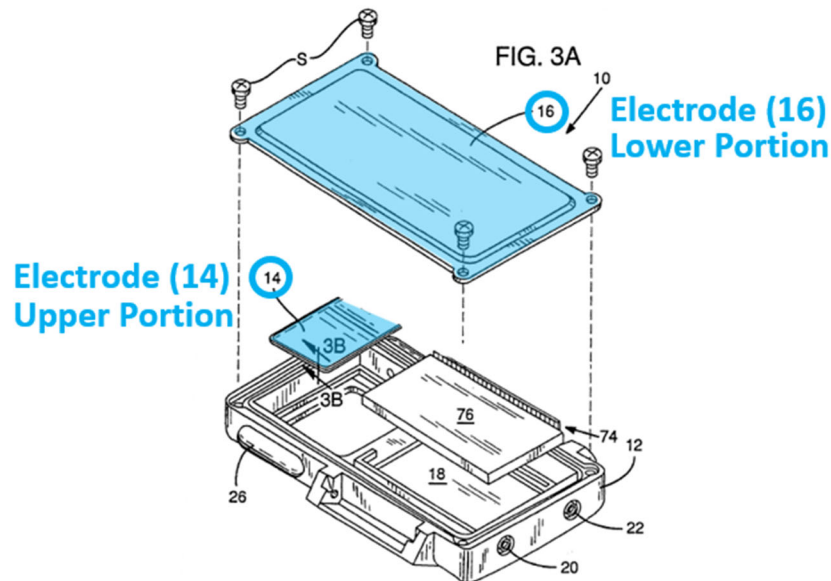
Electrode 14 of Mills is a thin mat that is part of the electrical path and covers an extended area on the outer surface of the device housing (as shown above in Fig. 1) and is internally connected to provide cardiac signals as explained below. EX1006, 4:67-5:3; 7:16-18. Accordingly, Mills discloses a first pad - electrode 14. EX1003, ¶59.

**ii. 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.

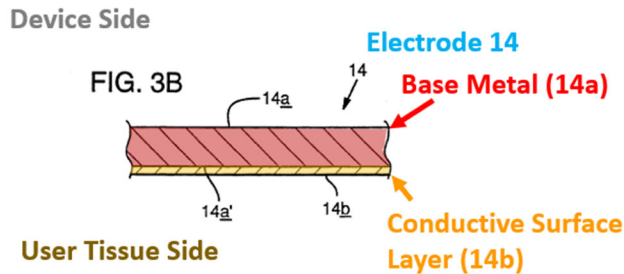


Mills further discloses the heart sensor “comprises a housing 12 including first and second dry skin electrodes 14, 16 unitarily connected therewith and forming an *integral* part thereof.” 1006, 3:8-11 (emphasis added). Mills refers to electrode 14 as the “upper electrode” and electrode 16 as the “lower electrode.” EX1006, 4:65-67. Fig. 3A of Mills, partially reproduced below, illustrates these electrodes, 14 and 16, located on different portions of the enclosure, which may be referred to as an upper portion and a lower portion, respectively. EX1003, ¶59.

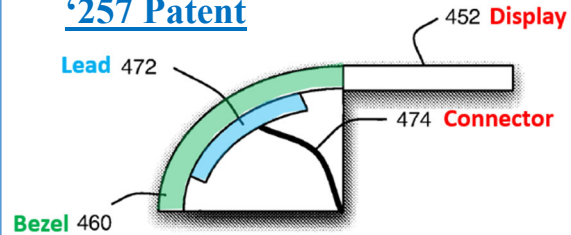


Not only is each of electrodes 14 and 16 embedded into the housing 12 by being “integrally molded” into housing 12, each electrode 14 and 16 also has a base material embedded underneath an outer surface coating. Fig. 3B of Mills (reproduced below left with annotations) illustrates a cross-section of “an electrode such as electrode 14.” EX1006, 3:67-68. The construction shown consists of a base metal **14a** on an inner surface and “an outer, skin-contactable region or 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 construction is similar to the construction shown in Fig. 4B of the ‘257 patent (below right with annotations) and both are motivated mainly for aesthetic reasons. EX1006, 4:35-39; EX1001, Abstract; EX1003, ¶59.

### Mills



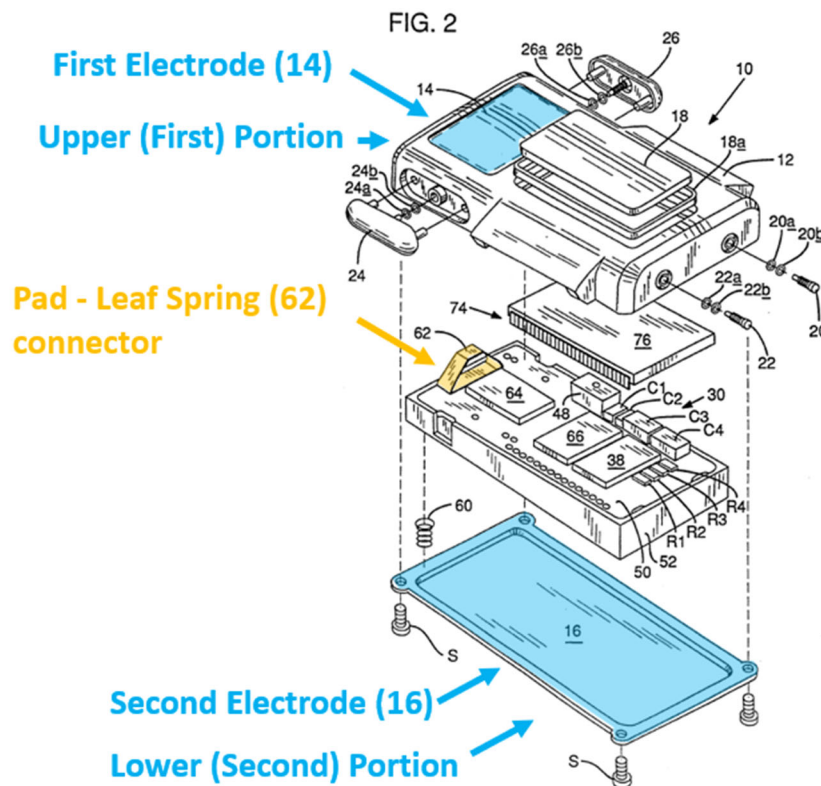
### '257 Patent



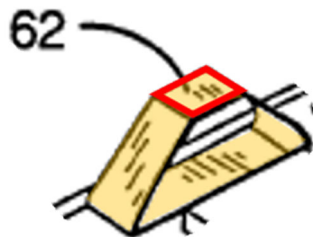
"[A]nother ... bezel with an embedded heart sensor lead" Ex. 1001 at 9:37-38.

Mills explains "14a [is] electrically connectable with such monitoring equipment, as illustrated in FIGS. 1 and 2." EX1006, 4:2-3. Mills further explains its "plating [exterior surface 14b] 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." EX1006, 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.

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.



Mills teaches that “electrode 14 is connected to the ... signal input terminal of ECG amplifier 32 via a generally trapezoid-shaped, split and thus slidably yielding, leaf spring 62 connected to a circuit pad formed on the top side of PCB 50.” EX1006, 4:67 – 5:3. The top of the trapezoid-shaped leaf spring 62 is a pad.

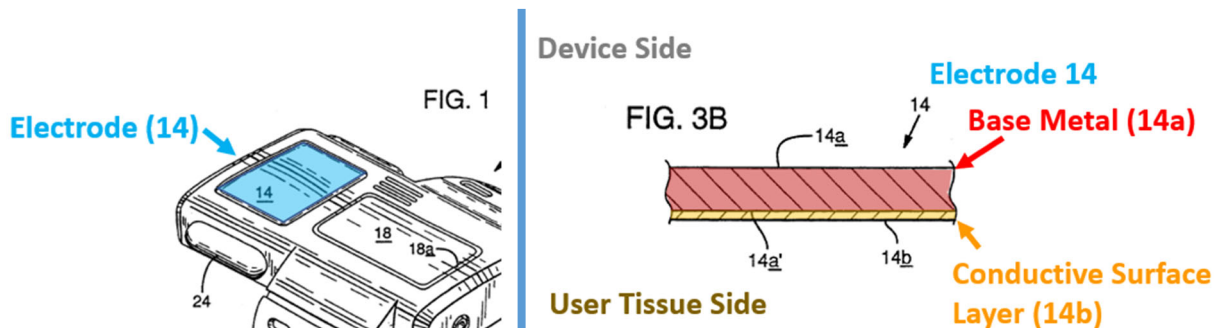


The pad is pressed against the inner wall of electrode 14 in Mills and surrounded by the housing 12 of Mills and is therefore embedded in the device of Mills.

Accordingly, leaf spring 62 is a pad that is embedded in the enclosure of device of Mills. The pad is underneath the exterior surface and the pad is configured to detect an ECG signal of the user via its contact with electrode 14 located on the exterior surface. EX1003, ¶60.

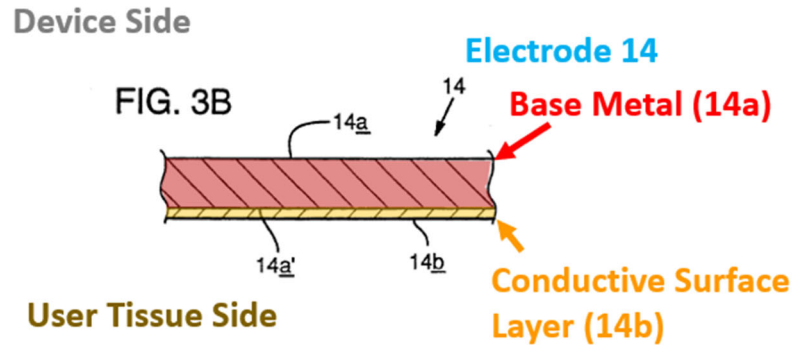
**iii. Limitation 1[b(iii)]: “an exterior surface of the enclosure comprises an exterior surface of the first portion”**

Fig. 1 of Mills (below left) discloses a housing 12 with electrode 14 which is a first portion forming part of the exterior surface of Mills. Further, electrode 14 (first portion) has an exterior surface 14b shown in Fig. 3B, below right. *Id.* at 2:16-20; EX1003, ¶60.

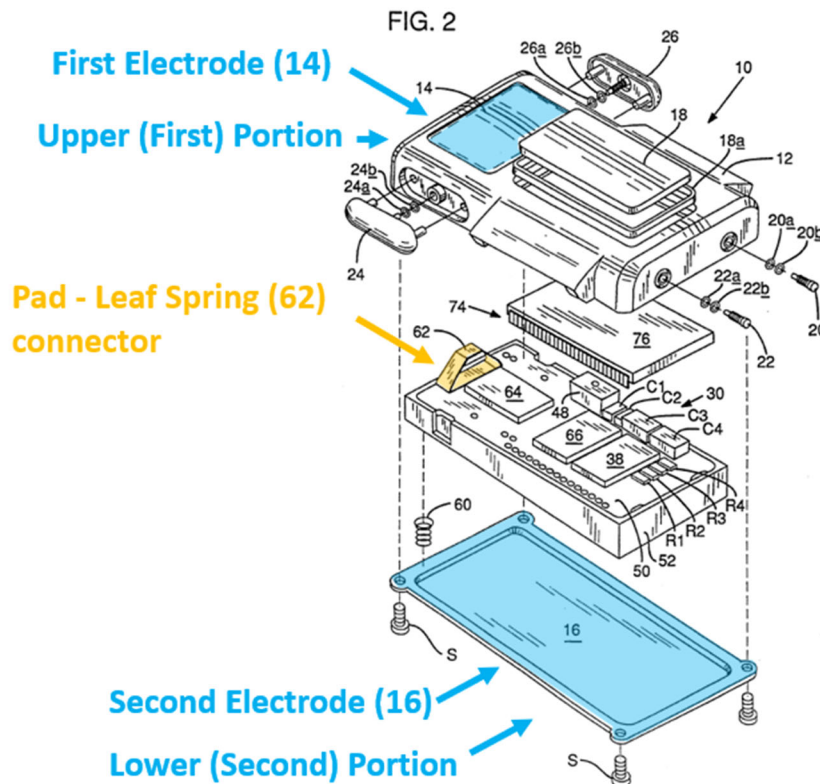


**iv. Limitation 1[b(iv)]: “the first pad is positioned underneath the exterior surface of the first portion”**

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.



Alternatively, the pad of leaf spring 62 is positioned underneath the electrodes/first portion 410b which forms an exterior surface of Markel. EX1006, Fig. 2; EX1003, ¶60.



**v.      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”**

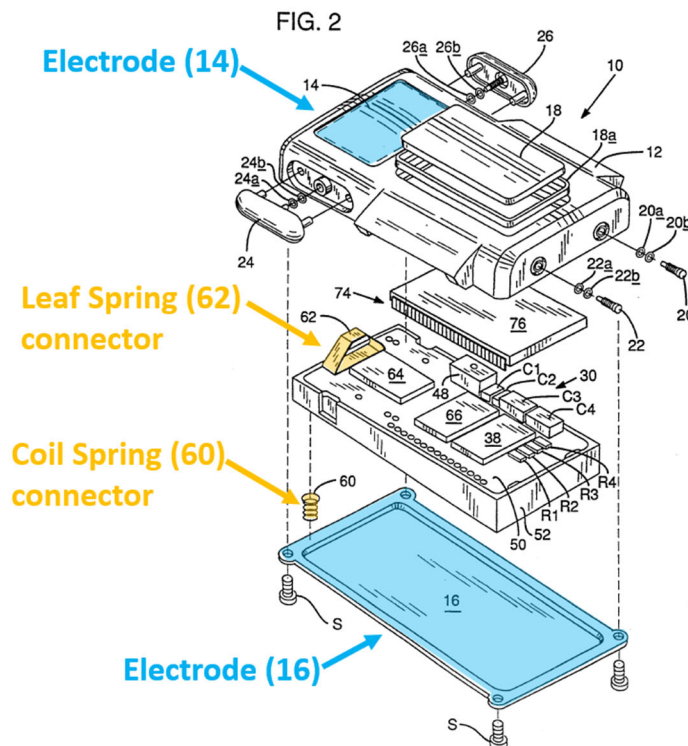
Mills discloses that when the cardiac data apparatus 10 is positioned on the left wrist, the palm of the right hand is placed into contact with upper electrode 14. EX1006, 6:63–7:1. Mills further discloses “Dry skin electrodes 14, 16 are designed for use with equipment capable of producing or monitoring 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 understand from this disclosure the electrode 14 (pad) of Mills 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 electrode 14b which passes through base portion 14a of electrode 14. EX1003, ¶60.

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. EX1006, 4:55-60; 4:68-5:3; EX1003, ¶60.



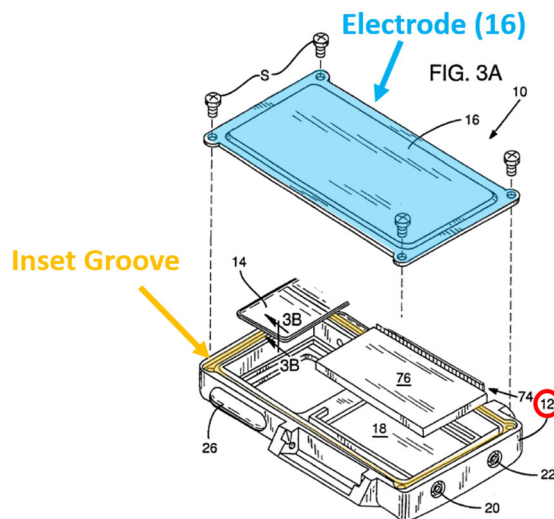
**vi. Limitation 1[b(vi)]: A second lead comprises a second pad**

Electrode 16 of Mills (Fig. 2 reproduced below with annotations) is a second pad and coil spring 60 is a leadwire. Electrode 16 and coil spring 62 form a second lead. As above, Mills teaches and a POSITA would understand that this second pad, electrode 16, is configured to detect an electrical cardiac signal via the user's skin's contact with the exterior surface of the second portion of the enclosure and communicate that electrical cardiac signal through coil spring 60 to a processing arrangement discussed below. EX1006 at 3:8-9; 4:17-19; 8:10; EX1003, ¶61.



**i. Limitation 1[b(vii)]: embedded in a second portion of the enclosure**

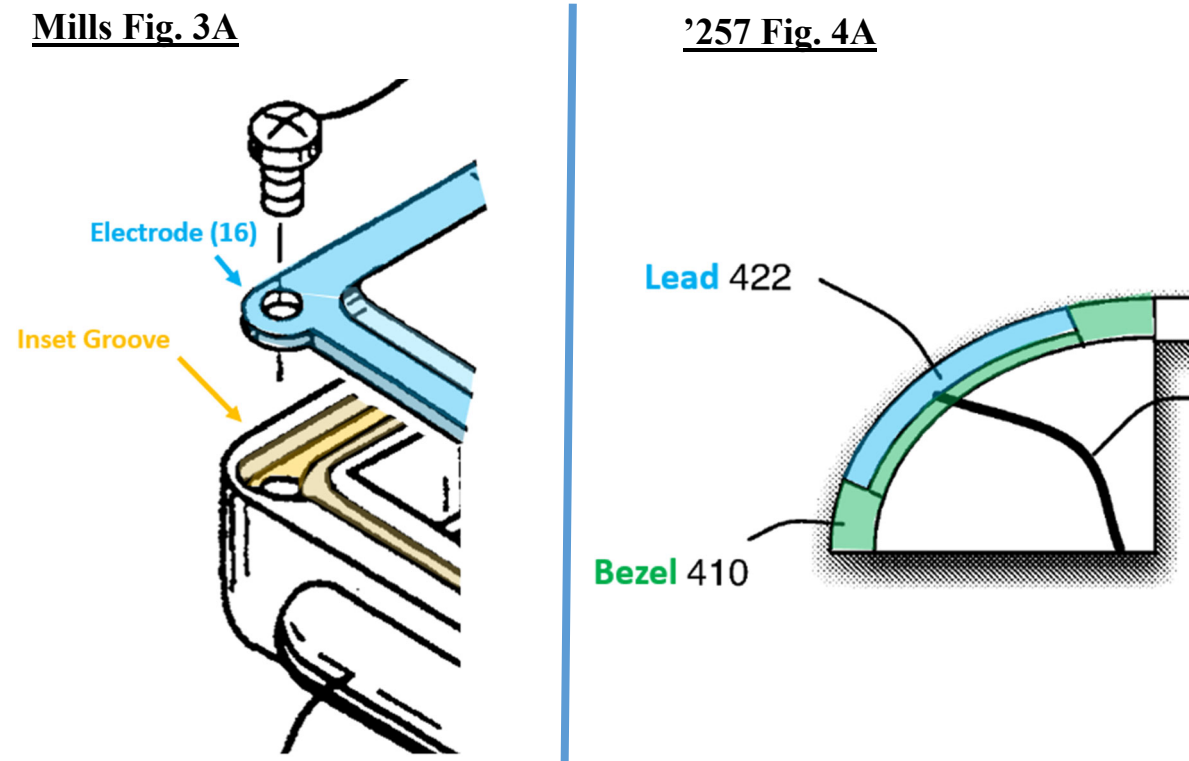
Electrode 16 of Mills is embedded in housing 12. Fig. 3A of Mills shows the electrode 16 attached by screws and inserted into an inset groove of the housing 12. Mills at Fig. 3A. Electrode 16 of Mills is embedded in housing 12 because it is placed in the thickness of a surrounding material and forms an outer surface. Fig. 3A of Mills shows the electrode 16 attached by screws and is integral with housing 12. EX1006, 1:12-13, 3:47-51, Fig 3A. Electrode 16 is embedded into the housing 12 because a portion of electrode 16 is inset (placed in the thickness) into a groove (surrounding material) of housing 12 and forms an outer surface. *Id.* As shown, the electrode 16 is shaped to fit within the hollowed inset groove. *Id.*; EX1003, ¶62.



Comparing this inset groove of Mills to the ‘257 patent’s disclosure in Fig. 4A, the resulting embedded nature of electrode 16 of Mills inserted into the inset groove of

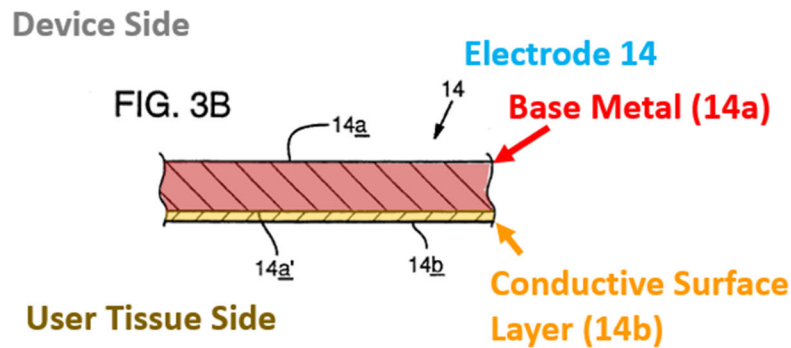
its housing is nearly identical to the embedded nature of the electrode (lead 422) of

Fig. 4A of the '257 patent:



EX1003, ¶62.

Additionally, Mills' second electrode 16 includes identical material content and cross-sectional structure as the first lead 14 discussed above. EX1006, 4:10-13. 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.



A POSITA would understand from the above disclosure that electrode 16 with its base metal pad 14a is embedded into the housing 12 with exposed outer conductive surface 14b forming an exterior surface. *Id.* at Fig. 3A; EX1003, ¶63.

- ii. **Limitation 1[b(viii)]: “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”**

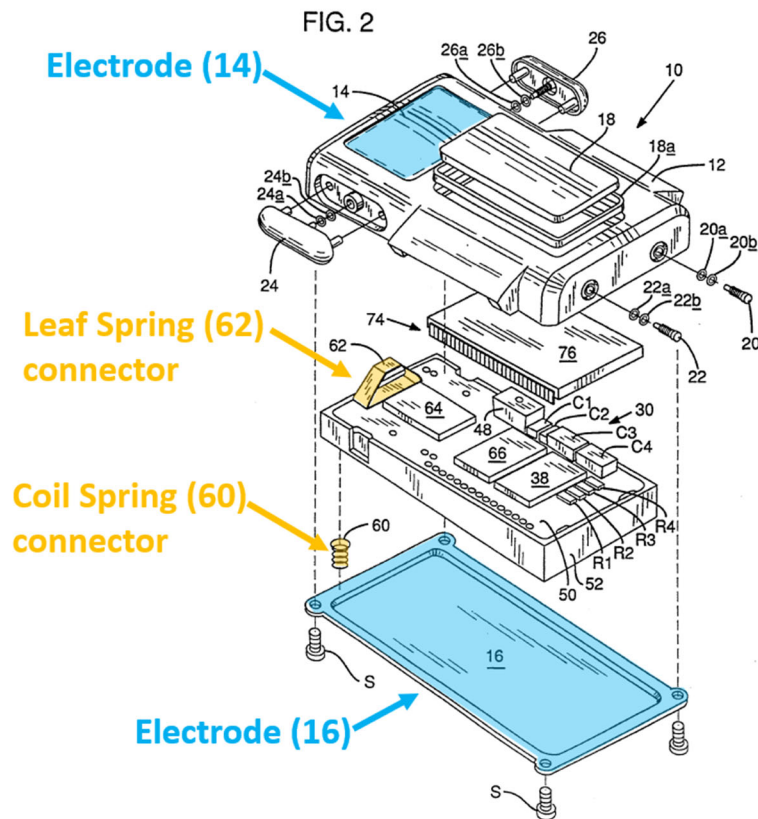
Mills discloses that when the cardiac data apparatus 10 is positioned on the left wrist, the electrode 16 is in contact with the user's skin of the left wrist thus providing an electrical signal representative of the patient's cardiography. EX1006, 6:63–7:1. Mills further discloses “Dry skin electrodes 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.”. EX1006, 3:62-67. A POSITA would understand Mills discloses this limitation based on the above disclosure. EX1003, ¶63.

**c. Limitation 1[c]: “a processor coupled to the heart sensor and configured to receive and process the detected cardiac signal”**

Mills discloses that the housing 12 comprises a very-large scale integrated (VLSI) circuit chip that includes an “ECG signal and abnormal event detection circuitry, analog-to-digital (AD) and digital-to-analog (DA) conversion circuitry, memory and processor circuitry.” EX1006, 2:3-68. Mills also discloses its “microprocessor and associated electronics, including firmware executed thereby, employs a digital bandpass filter reliably to detect ECG signals.” EX1006, 2:20-23. Mills further specifies that the VLSI is surface-mounted on the top side of printed circuit board (PCB) 50. *Id.* at 5:18-19. Electrodes 14 and 16 are electrically connected to the PCB 50 via a respective spring (60/62). *Id.* at 4:55-5:3. Accordingly, a POSITA would understand the VLSI is a processor coupled to the heart sensor (electrodes) and is configured to receive and process the detected cardiac signal. EX1003, ¶65.

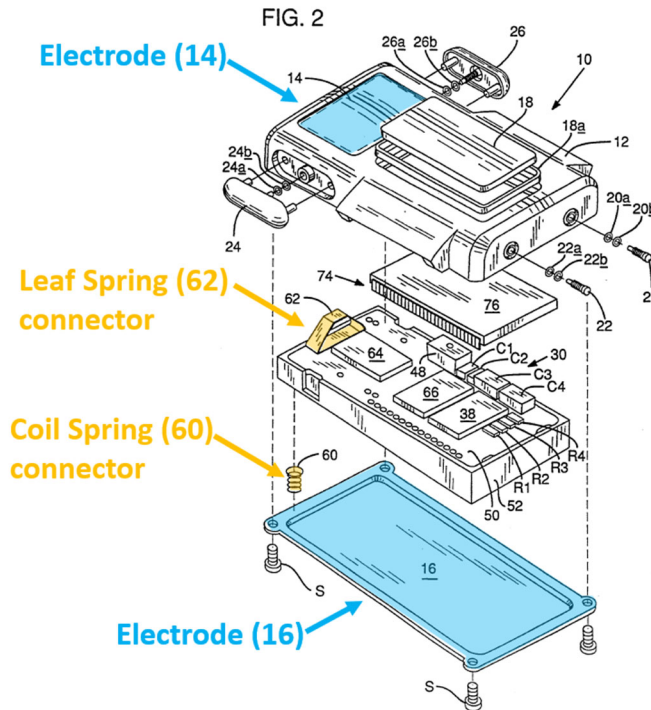
**i. Limitation 1[c(i)]: “wherein the first lead comprises a first connector coupled to the first pad and provides the first electrical signal detected by the first pad to the processor”**

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 first connector coupling electrode 14 (first pad) to the processor of Mills. EX1003, ¶¶60, 65.



- ii. **Limitation 1[c(ii)]: “wherein the second lead comprises a second connector coupled to the second pad and provides the second electrical signal detected by the second pad to the processor”**

Fig. 3A of Mills (reproduced in part and annotated below) discloses lead 16 connected to the coil spring 60 which in turn connects to a circuit pad 58 on PCB 50 and the VLSI. EX1006 at 4:55 – 5:3; *See also Id.* at 4:1-3; EX1003, ¶¶61, 65.



In other words, the electrical signals detected by the electrode 16 are passed via the coil spring 60 to the PCB 50 and then to the processor of the VLSI. Thus, coil spring 60 is a connector coupled to the second pad. EX1003, ¶¶61, 65.

**d. Claim 1 conclusion**

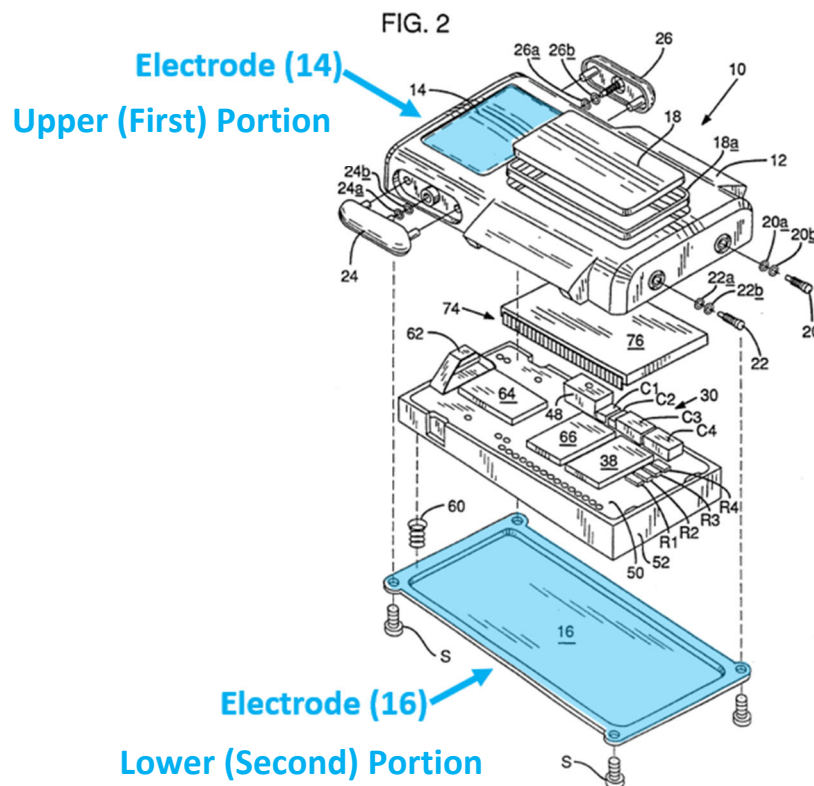
For the reasons set forth above, claim 1 is anticipated by Mills. EX1003, ¶66.

**2. Claim 2: “wherein the first portion and the second portion are located on opposite sides of the electronic device”**

Mills describes electrode 14 as the “upper electrode” and electrode 16 as the “lower electrode.” EX1006, 4:65-67. Fig. 2 of Mills (reproduced below with annotations) shows these electrodes, 14 and 16, which are located on different 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, EX1003, ¶67.



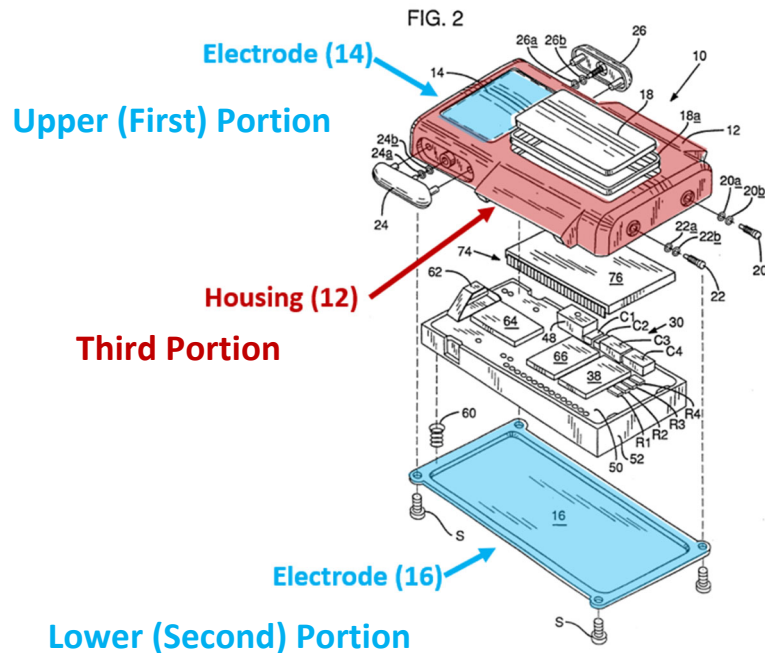
**3. Claim 3: “wherein the first portion is electrically isolated from the second portion”**

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 well-known electrical insulators and ABS plastic is an electrical insulator.



Accordingly, Mills teaches that the first and second portions are electrically isolated.

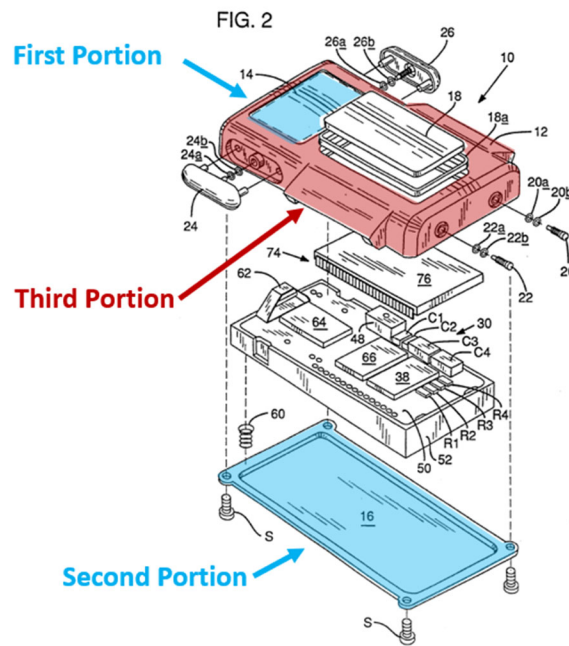
EX1003, ¶68.



4. **Claim 4: “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”**

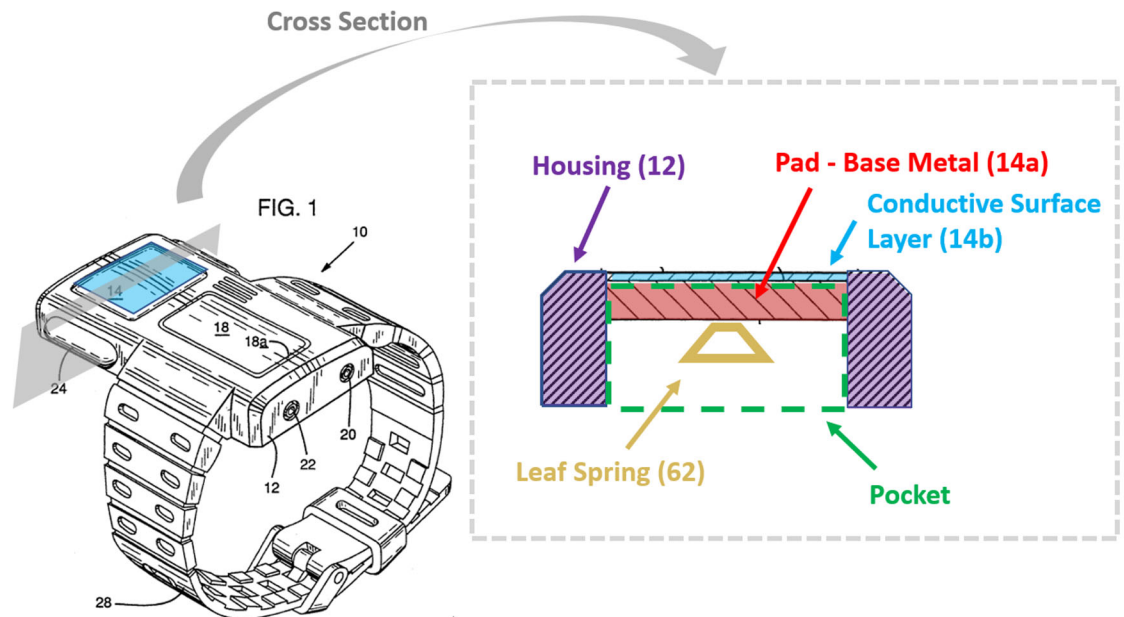
Mills discloses that the housing 12 may be molded plastic, such as ABS plastic. As noted above with regard to Claim 3, ABS plastic is an electrical insulator having a first conductivity. EX1006, 6:40-43. Accordingly, Mills discloses that a first portion of its enclosure, containing a first pad (electrode 14), and a second portion of its enclosure, containing a second pad (electrode 16), are separated by a

third portion of its enclosure, housing 12. Further, a POSITA would understand that the first portion including electrode 14 and the second portion including electrode 16 need to be electrically isolated from each other via housing 12, for example. A POSITA would understand that the housing would need to have a suitably high (“insufficient”) conductivity in order to prevent the differential ECG signal between electrodes 14 and 16 from degrading by going from one electrode to the other rather than each going directly to a different input of the processor. This is basic electrical engineering circuit theory that a POSITA in the relevant time period would have been well aware of. *See, e.g.*, EX1015. A POSITA would understand that two or more wires or other electrical connections would each be separated by an appropriate insulative material to prevent degradation of the measurement caused by the potential shorting between different electrical pathways. Basic electrocardiography teaches that the conductivity of the material separating the two electrodes must have a low enough conductivity such that the cardiac signal from the user does not shunt across the two electrodes. EX1003, ¶¶69-70.

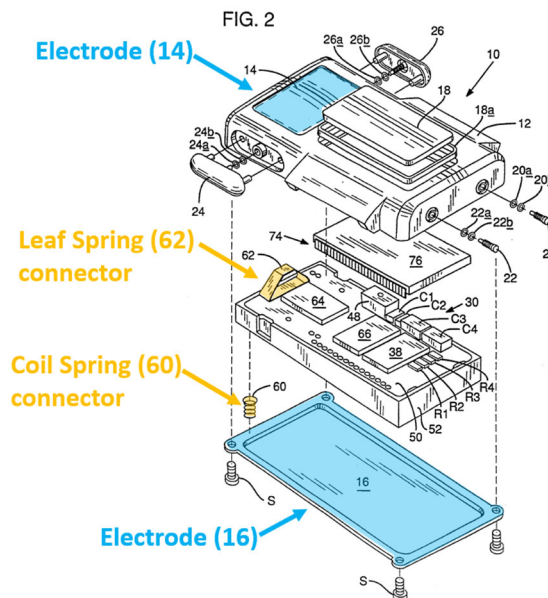


5. **Claim 8: “the enclosure further comprises at least one pocket underneath the exterior surface of the enclosure; and at least one of the first pad and the second pad is placed within the at least one pocket”**

Electrode 14 of Mills has an outer surface portion 14b and an inner base 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 pocket is illustrated below. EX1003, ¶72.



Additionally, leaf spring 62, a pad as explained above in Claim 1, is also within the pocket as shown above (cross section right) and below (Fig. 2 with annotations). EX1003, ¶73



**6. 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”**

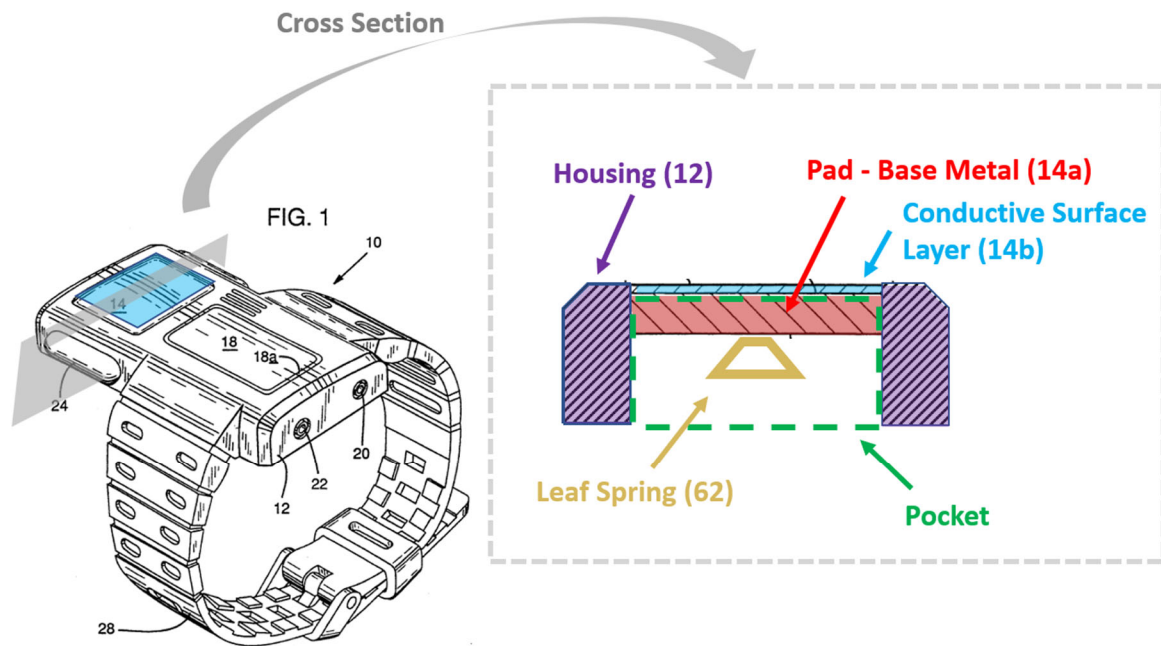
Mills teaches that electrode 16 (second lead), which is part of the second portion of the enclosure, is “designed for use with equipment capable of producing or monitoring changing electrical conditions (indicative of changing cardiographic conditions) at the surface of a patient’s skin, and are particularly suitable in cardiac monitoring, e.g. by apparatus 10.” EX1006, 3:62-67. EX1003, ¶74

**7. Claim 11: “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”**

Mills teaches that electrode 16 (second lead) is “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.” EX1006, 3:62-67; EX1003, ¶75.

**8. Claim 14: “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”**

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 an outer conductive surface 14b and a pad 14a under the conductive surface 14b and positioned on the interior surface of 14b. EX1003, ¶76.



Alternatively, Fig. 2 of Mills illustrates leaf spring 62 (included in illustration above) which forms a pad (top portion of leaf spring 62) which is positioned on an interior side of the first portion of the outer enclosure - electrode 14. EX1003, ¶77.

**C. Ground 2: Claims 1-4 and 8-22 are unpatentable as obvious in view of Markel in combination with Mills.**

**1. Claim 1: “An electronic device for detecting a user’s cardiac signal, comprising”**

Markel discloses “electronic devices with cardiovascular monitoring capability.” See EX1005, Abstract; [0035]; EX1003, ¶78.

**a. Limitation 1[a]: “an enclosure”**

Markel discloses that the mobile communication device MCD 100 (also referred to as “device 100”) includes a main body portion 110 as shown, for example, in Fig. 1. EX1005, [0034], Fig. 1.

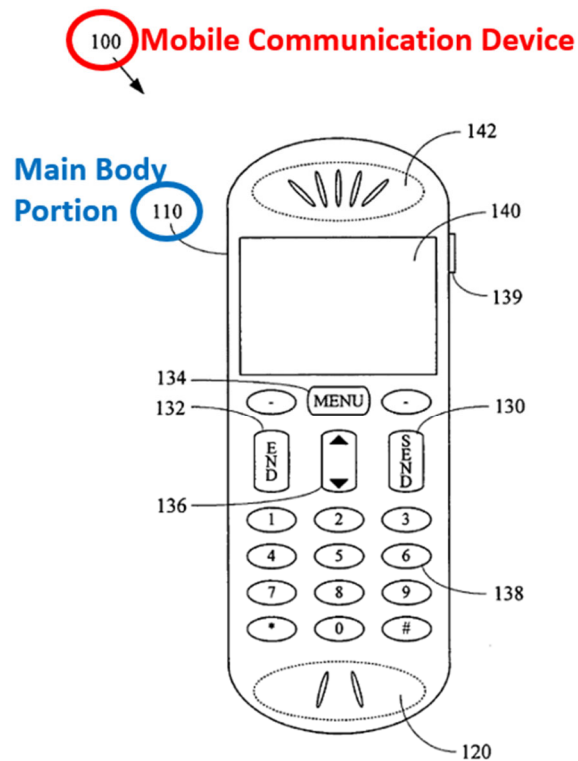


Figure 1

According to Markel, the 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.” EX1005, [0043], [0064]. Furthermore, Markel states that the device “may comprise a primary casing or housing for the user interface device.” EX1005, [0064]. A

POSITA would understand from this disclosure that Markel discloses an enclosure. EX1003, ¶79.

**b. Limitation 1[b]: “a heart sensor configured to detect the user's cardiac signal”**

Markel discloses that the MCD 100 may comprise at least one cardiac sensor “that is adapted to detect cardiac activity of a user of the MCD 100” with the user being “conductively coupled to the electrodes (*e.g.*, by touching the electrodes) which is a type of heart sensor that detects a cardiac signal. EX1005 at [0035]; [0058]; [0082]; [0103]; EX1003, ¶80.

**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.



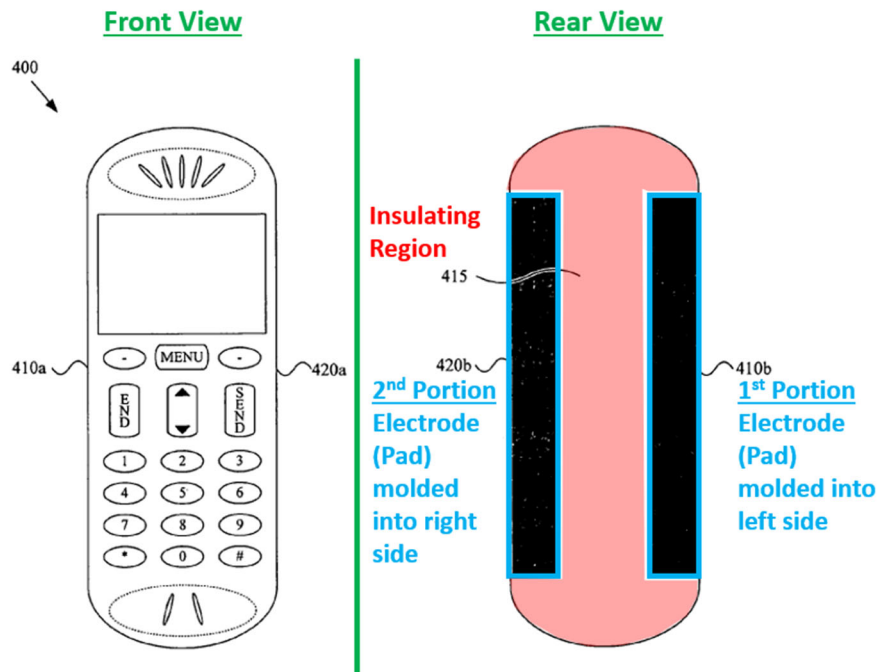


Figure 4

Markel further discloses, as shown in Fig. 10 below, “a cardiac information acquisition module 1010 that is coupled to the first and second electrodes 1020, 1022 and utilizes the first and second electrodes 1020, 1022 to detect and acquire various cardiac (i.e., heart-related) signals from a user.” EX1005, [0058], Fig. 10. A POSITA would understand electrodes 1020, 1022 correspond to electrodes 410b and 420b. Accordingly, Markel teaches an electrode on the exterior surface of an enclosure where the electrode detects an electrical signal of the user’s cardiac signal from contact with the user’s skin. EX1003, ¶83.

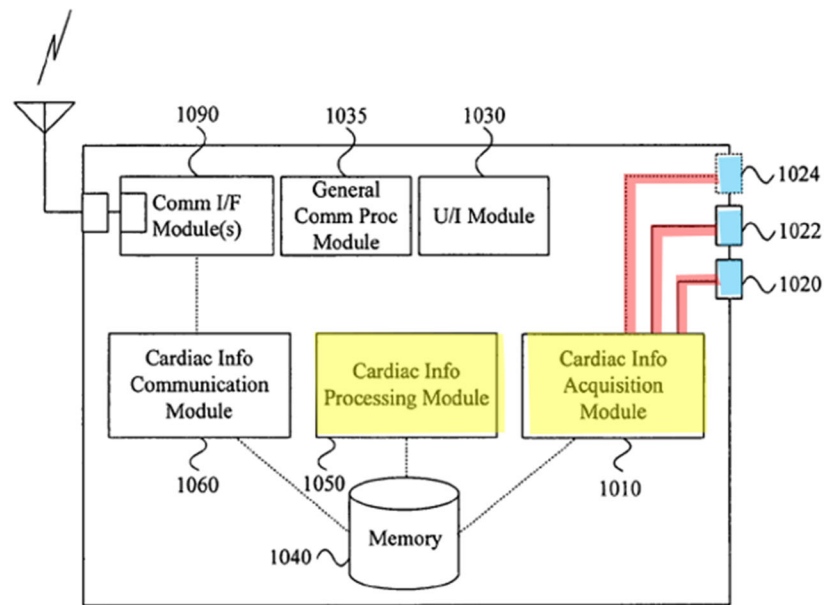
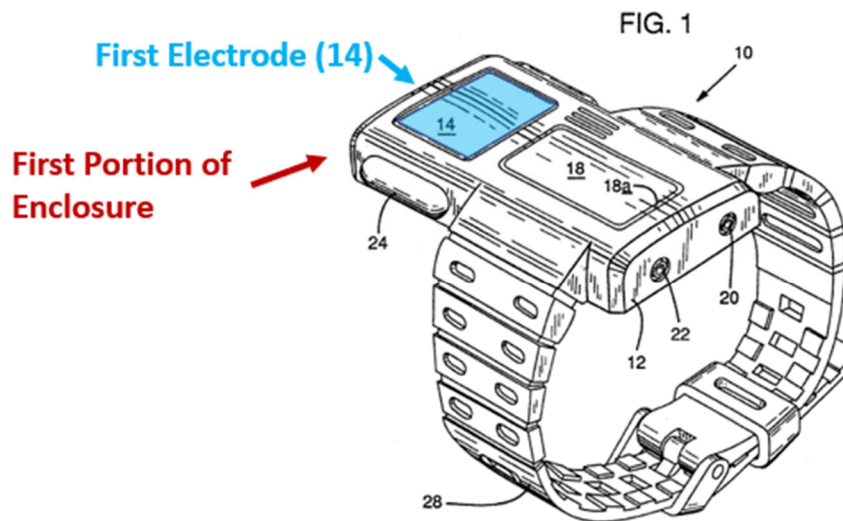
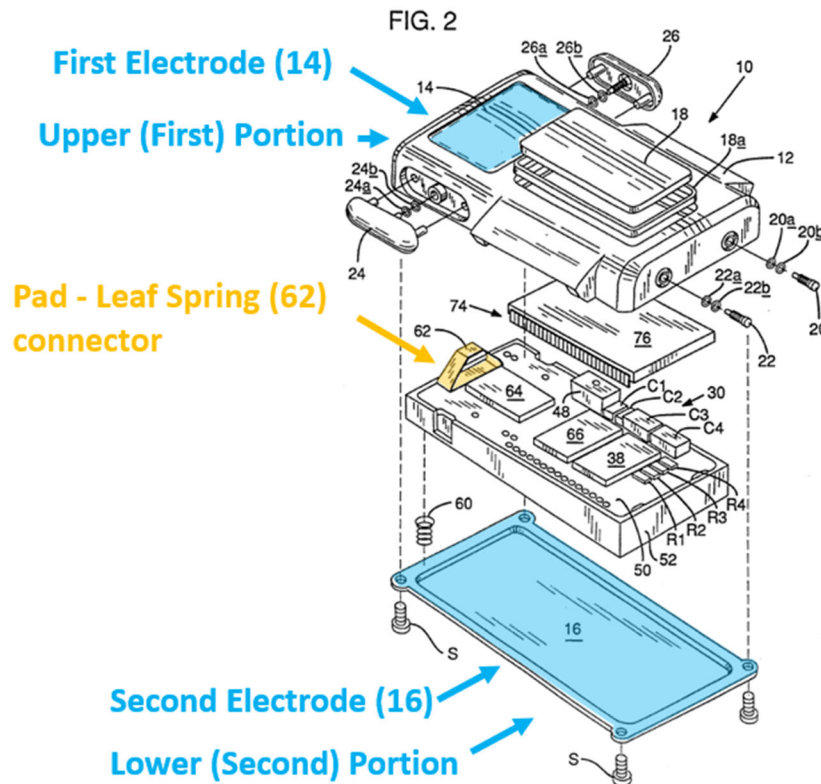


Figure 10

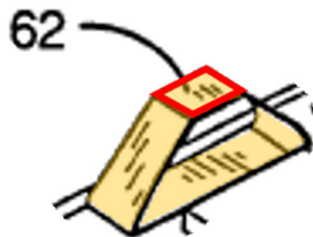
Markel does not provide details of the internal components of its device. A POSITA looking to implement Markel would have looked to other references in the same field of disclosure for information on internal components and structures to make the device of Markel. Mills, for example, discloses an enclosure (housing 12) which includes a first exterior electrode 14. EX1006, Fig. 1, 3:8-9. Mills' electrodes are similar to Markel's electrodes 410b, 420b. EX1003, ¶84.



Mills further specifies that the electrode 14 forms an integral part of the housing 12 by being molded therein, again similar to Markel's disclosure. EX1006, 3:47-51; EX1005, [0045]. 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). EX1006, 4:67-5:3; EX1003, ¶84.



Mills teaches that “electrode 14 is connected to the ... signal input terminal of ECG amplifier 32 via a generally trapezoid-shaped, split and thus slidably yielding, leaf spring 62 connected to a circuit pad formed on the top side of PCB 50.” EX1006, 4:67-5:3. The top of the trapezoid-shaped leaf spring 62 is a pad.



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.

Accordingly, leaf spring 62 is a pad that would be embedded in the enclosure of device of Mills. The pad is underneath the exterior surface and the pad is configured to detect an ECG signal of the user via its contact with electrode 14 located on the exterior surface. EX1003, ¶¶84-85.

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 any of a variety of manners,” which 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 pressure is applied such that the leaf spring pushes against both components to maintain good contact pressure. Leaf springs are commonly used because they solve manufacturing and assembling complexities by, for example, eliminating the need to solder a wire between the electrode and a circuit board to electrically connect the two together. A POSITA seeking to implement Markel’s device would look to Mill’s disclosure for ways to internally connect the electrodes of Markel to internal electronic components using pads. Thus, a POSITA would utilize the leaf spring 62 taught by

Mills to connect the electrodes 410b, 420b of Markel to internal processing components taught by Markel. EX1003, ¶86.

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 known ways in a complementary device. A POSITA would be led to the claimed invention based on the teachings of Markel and Mills. EX1003, ¶87.

**ii. Limitation 1[b(ii)]: “an exterior surface of the enclosure comprises an exterior surface of the first portion”**

As is shown in Fig. 4 of Markel illustrated below, the pad at region 410b is a first portion of the exterior surface of the enclosure of device 400. EX1005, Fig. 4, [0037]. Markel explains that “first and second electrodes may be disposed on a main body portion 110 of the MCD100” and “an electrode (or all electrodes) or other sensor may be substantially concealed (or hidden) from a user .... an electrode may comprise molded conductive plastic with little or no visible indication of the electrode presence.” EX1005, [0040], [0045]; EX1003, ¶82.

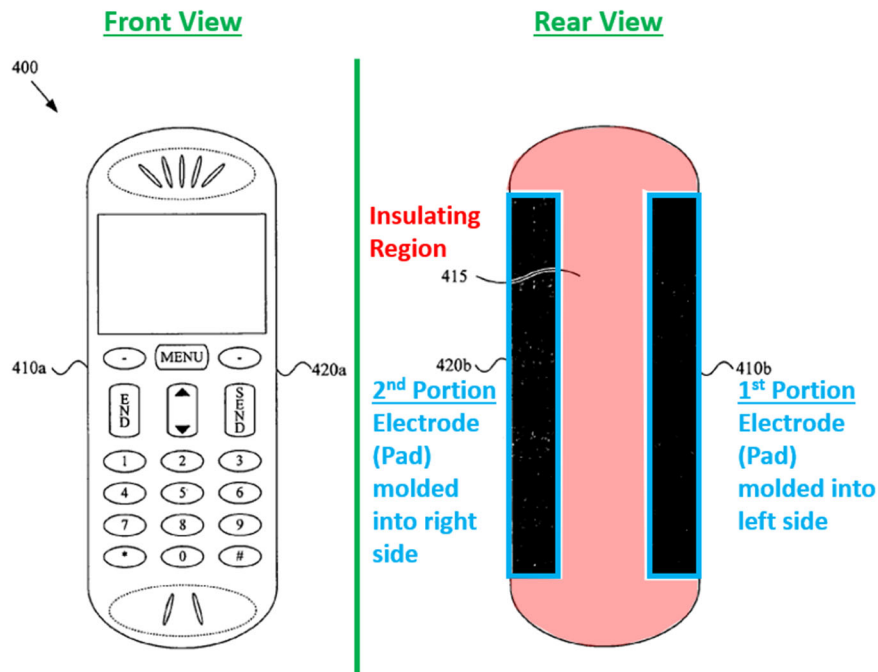


Figure 4

**iii. Limitation 1[b(iii)]: “the first pad is positioned underneath the exterior surface of the first portion”**

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 in view of Markel and Mills. EX1003, ¶¶85-86.

**iv. Limitation 1[b(iv)]: “the first pad detects 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”**

Markel discloses electrode 410b detects and acquires various cardiac signals from a user’s skin contact with the electrode 410b on the exterior of Markel’s housing. EX1005, [0058]. Markel further discloses that the electrodes can detect

cardiac activity of a user “that is conductively coupled to the electrodes (*e.g.*, by 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]. Accordingly, this limitation would have been obvious in view of Markel and Mills. EX1003, ¶¶83-87.

**v. Limitation 1[b(v)]: “a second lead comprises a second pad that is embedded in a second portion of the enclosure”**

Markel discloses a second electrode pad 420b forming a second portion of the enclosure. EX1005, [0045]. Markel states that a second electrode may be molded into the region 420b, which includes conductive plastic. *Id.*; EX1003, ¶88. Accordingly, region 420b forms a second pad.

Alternatively, as discussed above with regard to limitation 1[b(i)], Mills provides details of internal connections including the use of a leaf spring with a top pad portion. As discussed above, a POSITA would have found it obvious to use the leaf spring of Mills to connect the electrode region 420b of Markel to internal processing arrangements. EX1003, ¶88.

**vi. Limitation 1[b(vi)]: “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”**

Markel discloses the electrode in region 420b detects and acquires various cardiac signals from a user. EX1005, [0058]. Markel further discloses that the electrodes can detect cardiac activity of a user “that is conductively coupled to the electrodes (e.g., by touching the electrodes).” *Id.*, [0035], [0068]; *see also, Id.* at [0049] (contact electrodes with hands or fingers). Using the leaf spring of Mills as discussed above, the electrical signal is then carried from the electrode 420b 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. EX1006, 4:55-60, 4:68-5:3. Accordingly, this limitation would have been obvious in view of Markel and Mills. EX1003, ¶89.

- a. **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”**

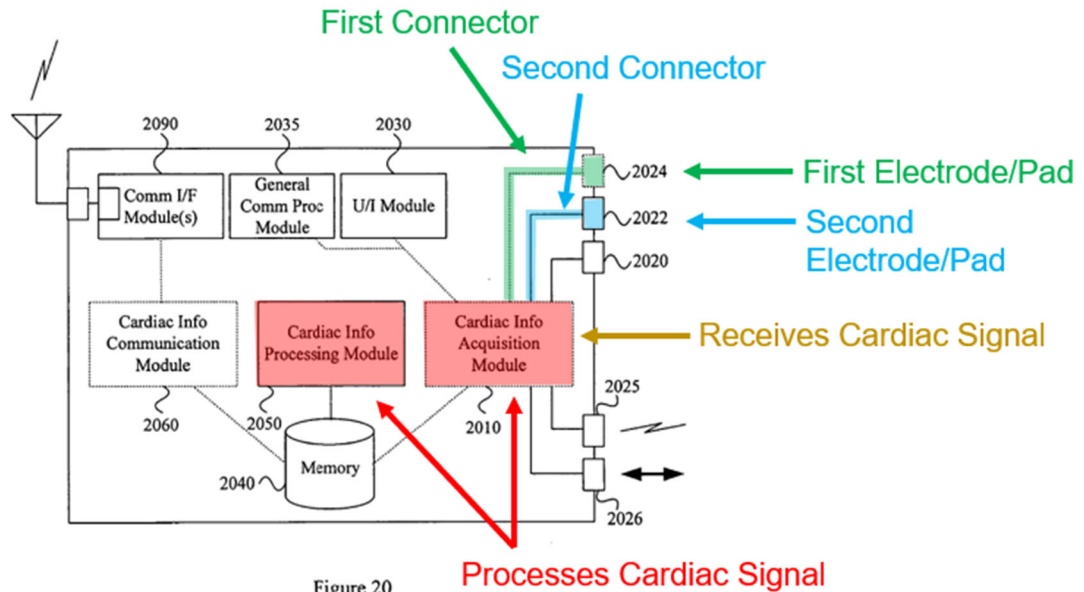
Markel discloses “electronic devices” with “cardiovascular monitoring capability” that may “comprise a cardiac sensor (e.g., electrodes)” that may also “acquire, analyze and/or communicate user health-related information” such as derived from electrodes. EX1005, Abstract. A POSITA would understand from this

disclosure that Markel teaches a processor (e.g., elements that acquire, analyze, and/or communicate heart sensor information) coupled to a heart sensor. Markel discloses the processor can be any of a number of hardware components including an integrated circuit, processor chip and controller chip. EX1005, [0178]; EX1003, ¶90.

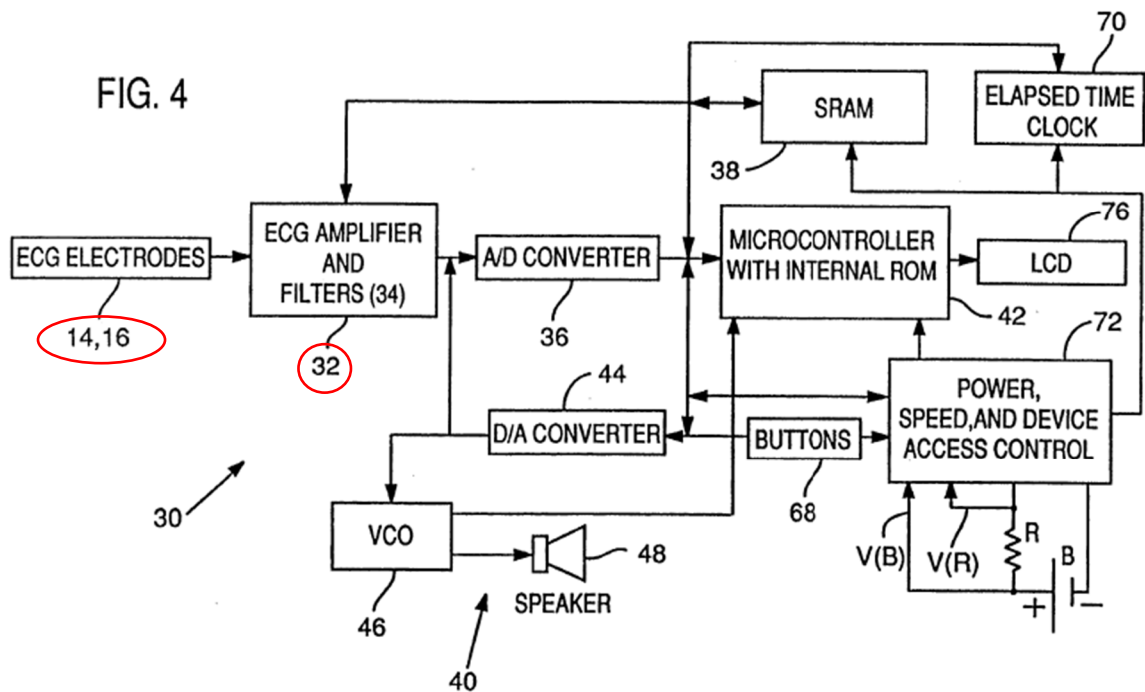
Markel discloses a first and second lead configured as a first and second pad, respectively, on a portion of the exterior housing, and the first and second pads each connected to a processor, as shown in annotated Figs. 4 and 20<sup>5</sup> below. EX1005, Figs. 4 and 20. Accordingly, Markel teaches a first lead with a first connector coupled to a first pad that provides a first electrical signal from the first pad to the processor, and a second lead with a second connector coupled to a second pad that provides a second electrical signal from the second pad to the processor. EX1003, ¶91.

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



Mills also discloses its electrodes 14 and 16 are electrically connected to processing circuitry (ECG amplifier 32), as shown in annotated Fig. 4 below. EX1006, 4:64-5:3, Fig. 4. As an alternative to the processing disclosed in Markel, it would have been obvious to use the internal componentry of Mills as a substitute as Mills provides more specific implementation details missing from Markel. EX1003, ¶92.



**b. Claim 1 conclusion**

For the reasons set forth above, claim 1 is obvious in view of Markel and Mills.

**2. Claim 2: “the first portion and the second portion are located on opposite sides of the electronic device”**

Markel discloses a first portion having a first electrode on an opposite side of an electronic device as a second portion having a second electrode. For example, Markel discloses in Fig. 4 region 420b (*first portion*) and region 410b (*second portion*) are on opposite sides of the device. EX1003, ¶94.

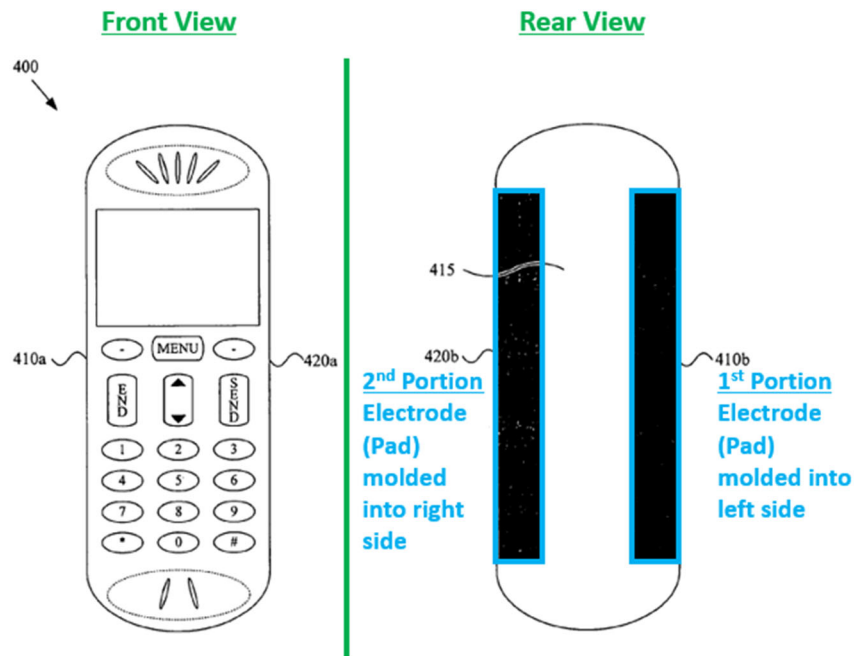


Figure 4

Region 410b is disposed on a left side of the main body portion of the device 400 and region 420b is disposed on a right side of the main body portion of the MCD 400. EX1003, ¶94.

Alternatively, Markel's Fig. 5 (below) discloses an MCD 500 with a first electrode 510 positioned on a send button (*first portion*) on a front side, and a second electrode disposed on the opposite back side 520 (*second portion*) of the MCD 500. EX1005, [0046]; EX1003, ¶95.

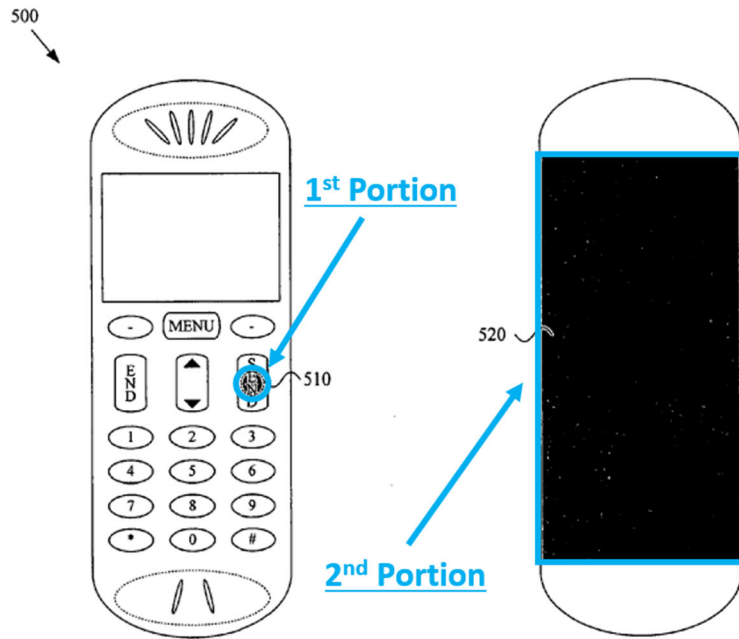
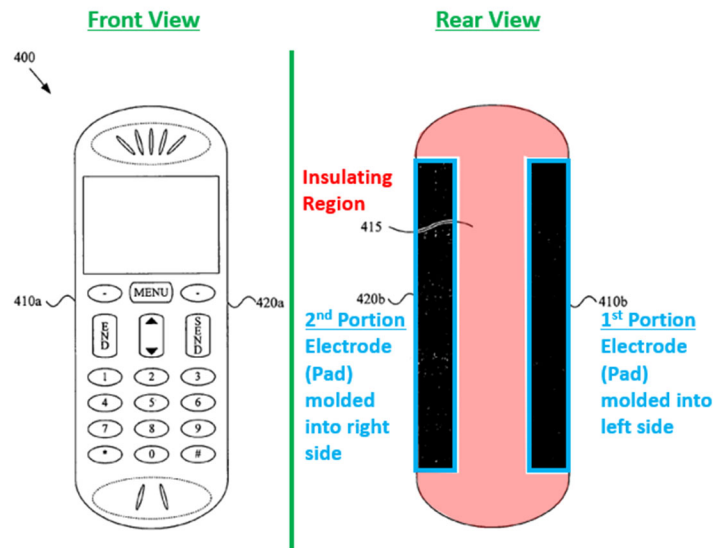


Figure 5

**3. Claim 3: “wherein the first portion is electrically isolated from the second portion”**

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.



4. **Claim 4: “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”**

As discussed above with regard to Claim 3, Markel discloses region 410b (*first portion*) and the region 420b (*second portion*) are separated by insulating region 415. A POSITA would have understood that an insulating region, such as the insulating region discussed above in Markel, is a third portion formed of a material having a first conductivity insufficient to transmit the first electrical signal from the first pad to the second pad via the third portion. EX1003, ¶97.

5. **Claim 8: “the enclosure further comprises at least one pocket underneath the exterior surface of the enclosure; and at least one**

**of the first pad and the second pad is placed within the at least one pocket”**

A POSITA would understand that Markel’s housing encloses an interior housing space forming a pocket (compartment, hollow or cavity) underneath the exterior surface of the enclosure. EX1005, [0064], Figs. 1 and 4-5. The interior space is a pocket. As discussed above, the leaf spring 62 in the combined Markel/Mills device would be positioned within this pocket created by the housing of Markel. EX1003, ¶98.

- 6. 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”**

Fig. 1 of Markel discloses that the enclosure or housing of device 100 supports a display 140. EX1005 at Fig. 1, [0034]; EX1003, ¶99.



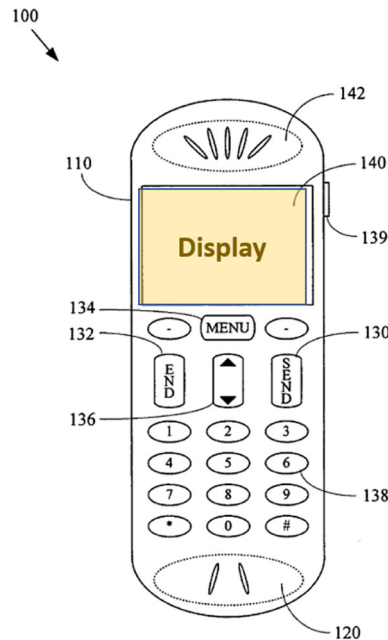


Figure 1

Further, Markel discloses that an electrode may be integrated or embedded into the touch screen of display 140. EX1005, [0044], [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, ¶99.

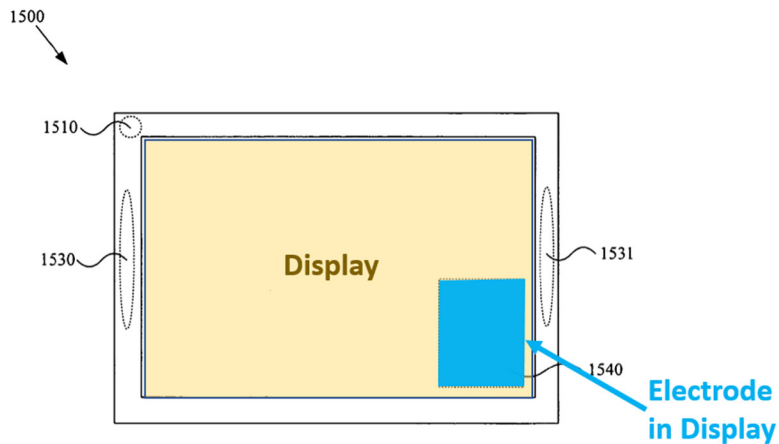


Figure 15

**7. 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”**

Markel discloses an example of MCD (device) 400 in annotated Fig. 4 below. EX1005, Fig. 4. The device has electrodes for detecting cardiac signals that “may be disposed in any of a variety of locations.” EX1005, [0045], [0040]. Such electrodes may be “exposed for user contact.” *Id.*, [0037]; EX1003, ¶100.

Markel discloses a second electrode “placed on or molded into region 420*b*.” EX1005, [0045]. A POSITA would understand from this disclosure that Markel describes a second pad formed of conductive plastic embedded in a second portion of the enclosure. *Id.*; EX1003, ¶101.

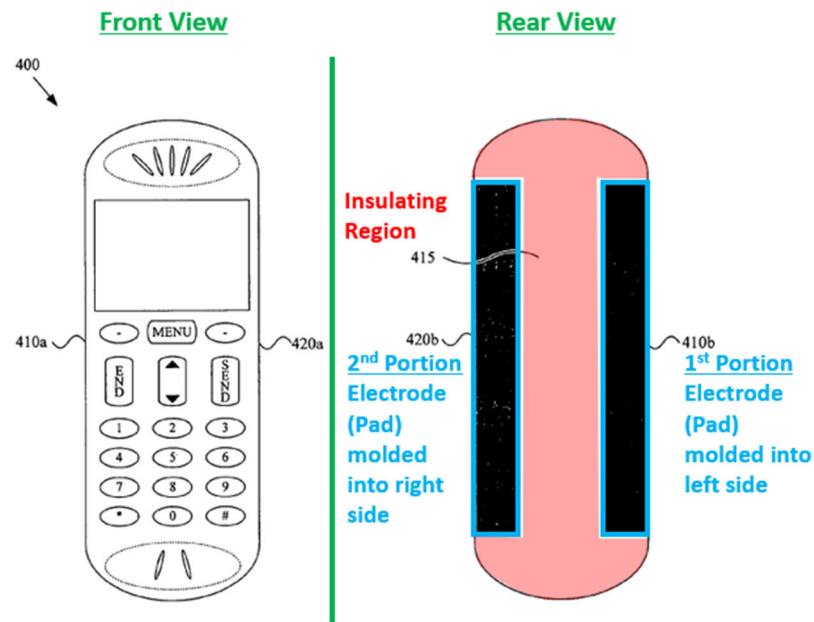


Figure 4

Markel further discloses, as shown in annotated Fig. 10 below, “a cardiac information acquisition module 1010 that is coupled to the first and second electrodes 1020, 1022 and utilizes the first and second electrodes 1020, 1022 to detect and acquire various cardiac (i.e., heart-related) signals from a user.”

EX1005, [0058], Fig. 10. A POSITA would understand from this disclosure that Markel teaches a second lead on the exterior surface of an enclosure whereby the electrode detects an electrical signal of the user’s cardiac signal from the user’s contact with the second portion of the enclosure. EX1003, ¶102.

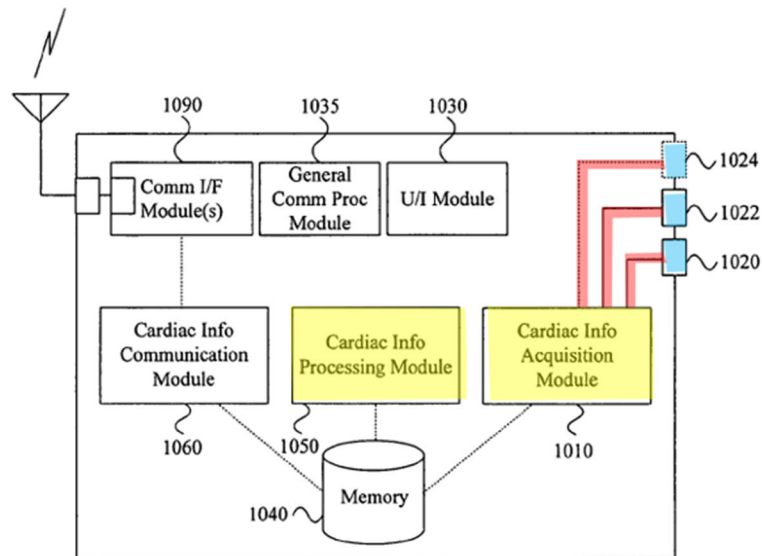


Figure 10

8. **Claim 11: “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”**

As discussed above in Claim 11, the second portion of the enclosure may also be a second lead. A POSITA would understand from this disclosure that Markel

teaches a second lead on the exterior surface of an enclosure whereby the electrode detects an electrical signal of the user's cardiac signal from the user's contact with the second lead. EX1003, ¶103.

**9. Claim 12: “wherein the first portion of the enclosure is a bezel”**

104. Markel discloses that the MCD 100 may include a display 140. 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.

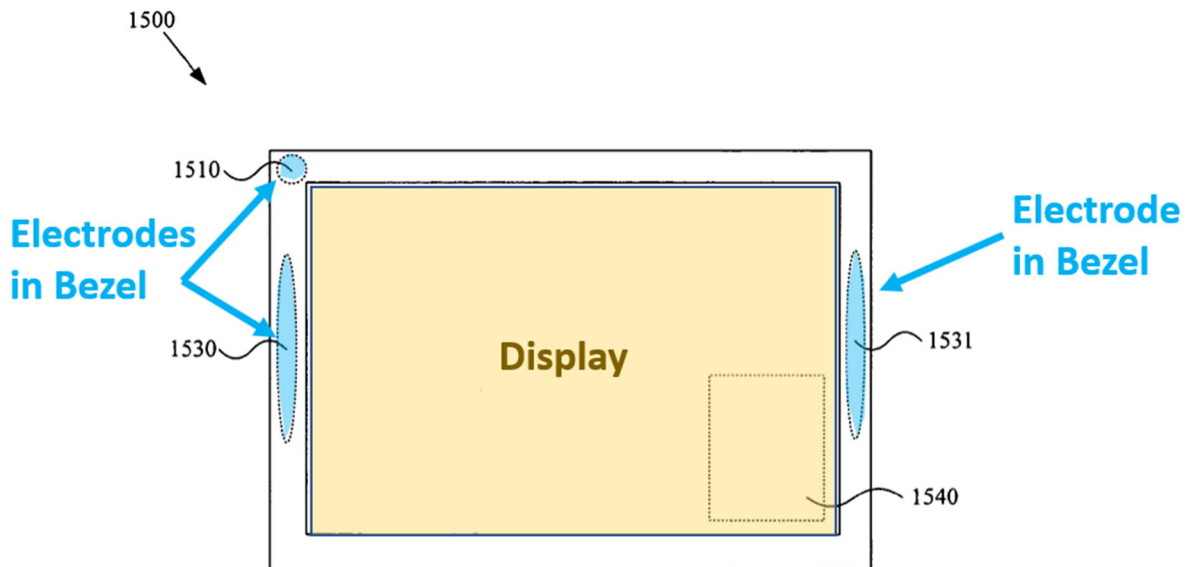


Figure 15

**10. Claim 13: “wherein the second portion of the enclosure is a bezel”**

Markel discloses that the MCD 100 may include a display 140. EX1005, [0034]. Markel further discloses an electrode may be disposed on a border of the display (*i.e.*, bezel). EX1005, [0044]; *see also* EX1005 at [0078] (“The display device 1500 may, for example, comprise an electrode 1510 on a border portion of the display device 1500”). EX1003, ¶105.

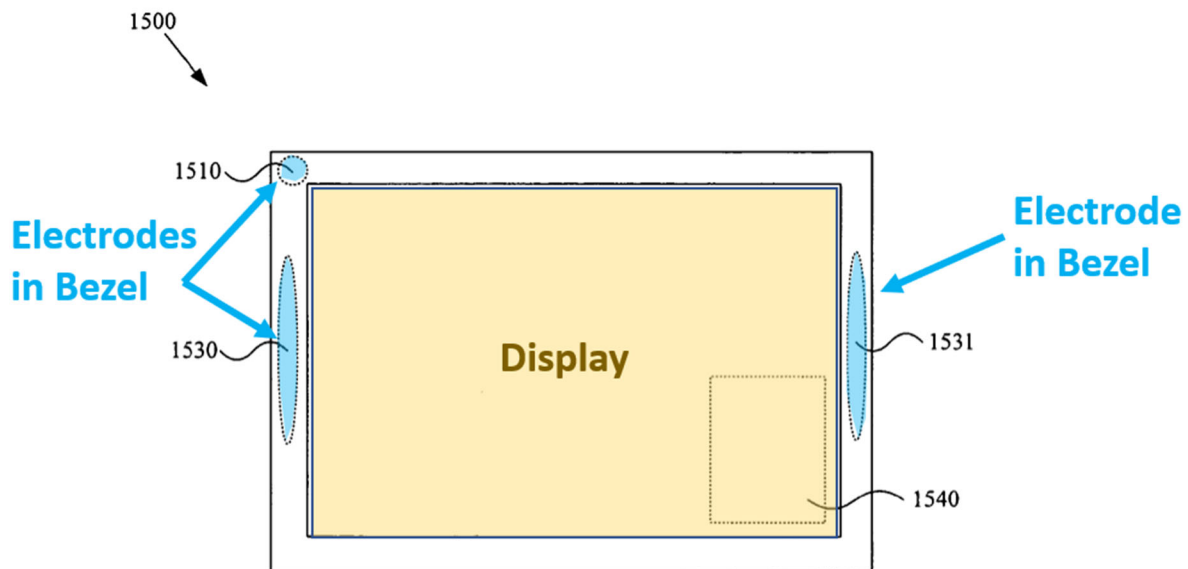


Figure 15

**11. Claim 14: “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”**

As discussed previously, Markel discloses that the first electrode or first lead may be molded into the region 410b, which includes the embedded conductive plastic discussed above. EX1005, [0045]. Further, Markel as modified by Mills

places Mills' leaf spring inside Markel's device. Accordingly, Markel in combination with Mills as discussed above with respect to Claim 1 includes an interior surface with the first pad (leaf spring 62 of Mills) positioned on the interior surface of the first portion (region 410b of Markel). EX1003, ¶¶106-109.

**12. Claim 15: “An electronic device for detecting a user's cardiac signal, comprising:**

Markel discloses a “mobile communication device, general-purpose computer user interface device, and other . . . electronic devices with cardiovascular monitoring capability.” *See* EX1005, Abstract, [0035]; EX1003, ¶110.

**a. Limitation 15[a]: “an enclosure”**

Fig. 1 of Markel discloses that the mobile communication device (MCD) 100 includes a main body portion 110 as shown, for example, in Fig. 1 (reproduced below).

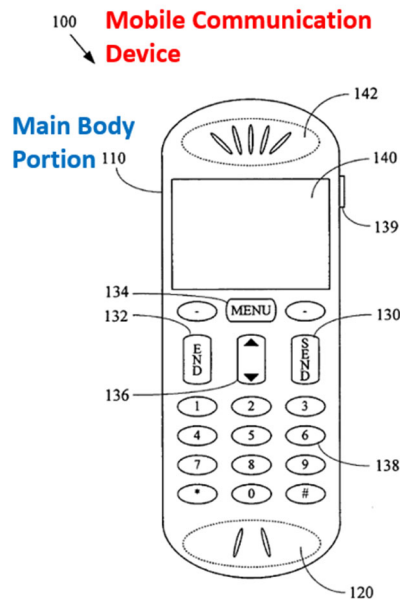


Figure 1

According to Markel, the 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” and the device may comprise a “casing or housing.” EX1005, [0043], [0064]; EX1003, ¶111.

**b. Limitation 15[b]: A display screen exposed to the user through an opening in the enclosure:**

Markel discloses that the device 100 comprises various user output features such as “a display 140 (which may also function as a touch screen input feature).” EX1005, [0034]. As shown in Fig. 1, the display 140 is shown visibly on the device 100 within the main body portion 110 of the device 100. As such, a POSITA would consider the main body portion 110 to have an opening in the main body portion 110 to accommodate the display 140. EX1003, ¶112.

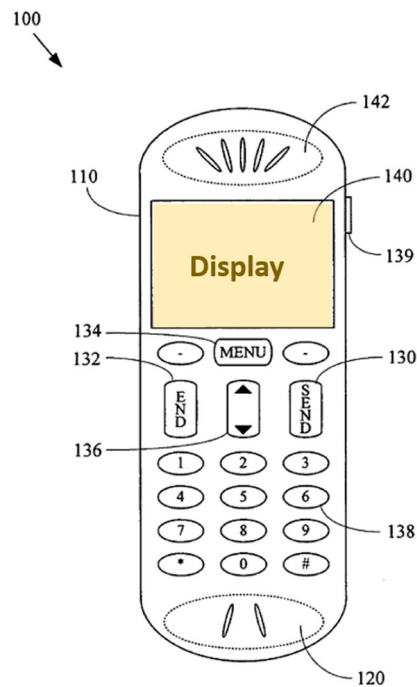


Figure 1

**i. Limitation 15[c]: “a heart sensor configured to detect the user's cardiac signal”**

Markel discloses the device 100 may comprise at least one cardiac sensor “that is adapted to detect cardiac activity of a user” and which is a type of heart sensor that detects a cardiac signal. EX1005, [0035], [0058], [0082], [0103]; EX1003, ¶113.

**ii. Limitation 15[c(i)]: “the heart sensor comprising: a first lead embedded in a first portion of the enclosure of the electronic device”**

Markel describes a first pad formed of conductive plastic 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, ¶114.

Markel discloses an example of MCD (device) 400 in Fig. 4. EX1005, [0045]. Markel discloses a first electrode “placed on or molded into region 410*b*.” *Id.* Accordingly, Markel describes a first pad formed of conductive plastic embedded in a first portion of the enclosure. *Id.*; EX1003, ¶115.

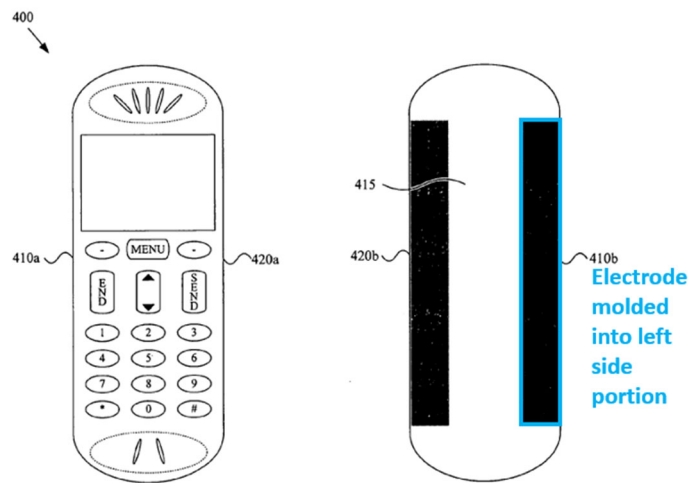


Figure 4

Alternatively, Fig. 5 of Markel discloses “a first electrode 510 positioned on a send button, and a second electrode disposed on the back 520 of the mobile communication device 500.” EX1005, Fig. 5, [0046]. Both of these electrodes are shown as being pad shaped. As explained above, a “lead” is defined as an “electrode.”

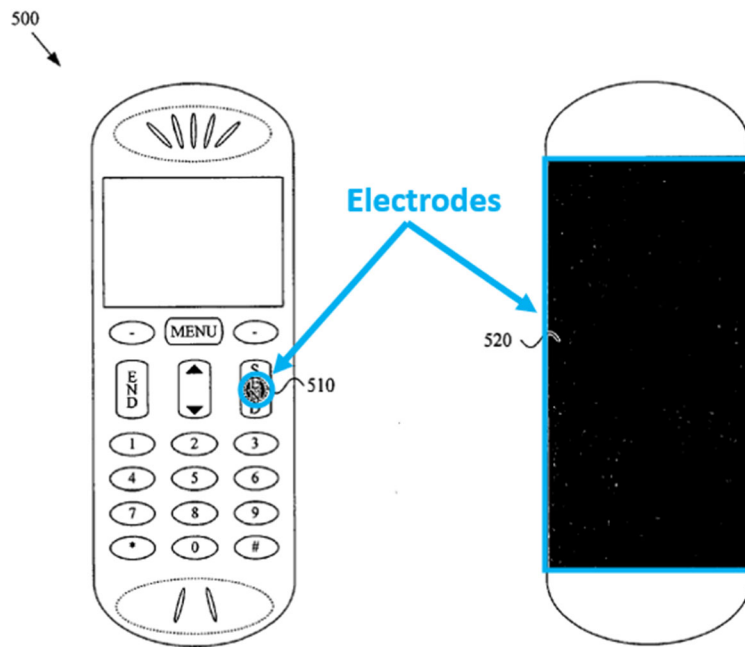


Figure 5

Markel discloses a first pad embedded in a first portion of an enclosure with a connector coupling it to a processor as shown in annotated Fig. 20 below. A POSITA would understand this to be a first lead embedded in a first portion because it couples a body signal at the electrode to processing circuitry. EX1003, ¶116.

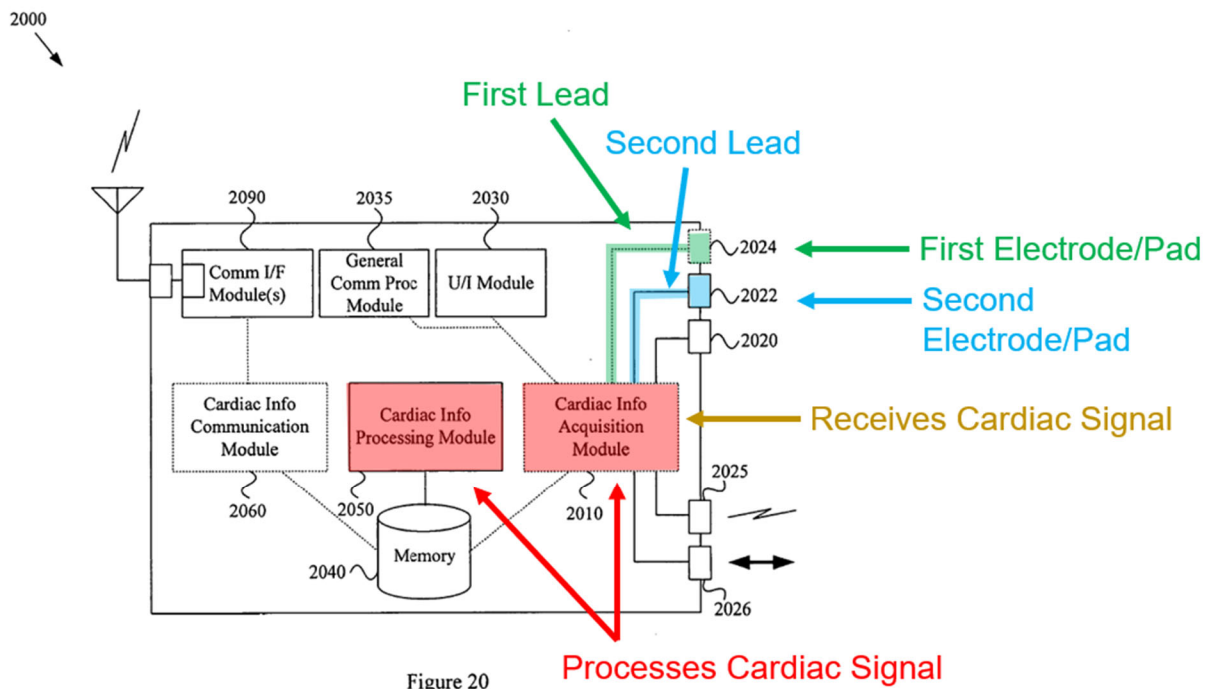
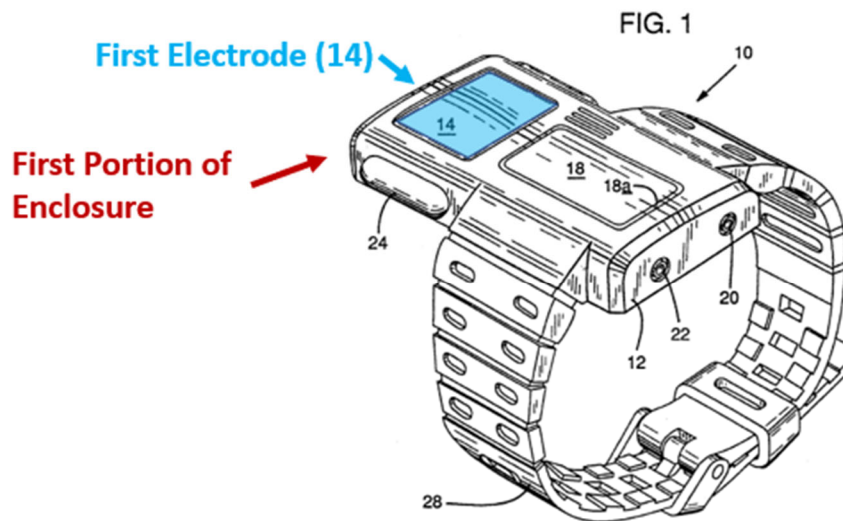
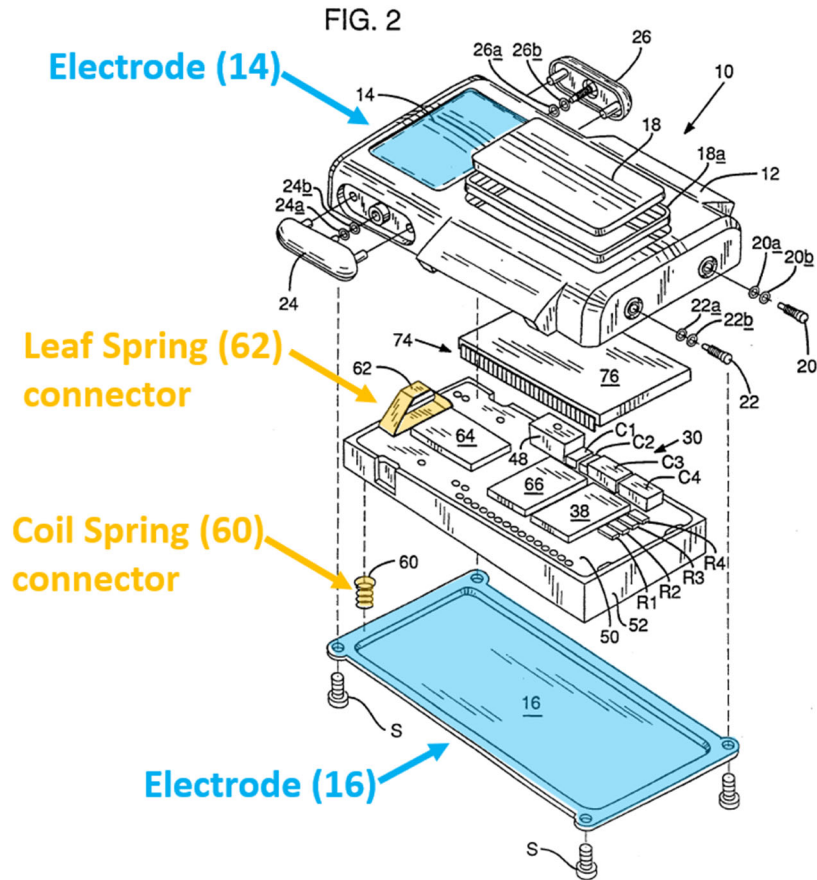


Figure 20

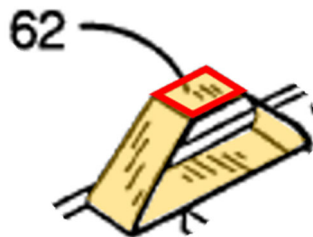
Markel does not provide details of the internal components of its device. A POSITA looking to implement Markel would have looked to other references in the same field of disclosure for information on internal components and structures to make the device of Markel. Mills, which discloses a similar device, discloses an enclosure (housing 12) which includes a first electrode 14. EX1006, Fig. 1 (shown below), 3:8-9. Mill's electrodes are similar to Markel's electrodes 410b, 420b. EX1003, ¶117.



Mills further specifies that the electrode 14 forms an integral part of the housing 12 by being molded therein, again similar to Markel's disclosure. EX1006, 3:47-51. 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.*, 4:67-5:3; *See also Id.*, 4:1-3; EX1003, ¶117.



Mills teaches that “electrode 14 is connected to the ... signal input terminal of ECG amplifier 32 via a generally trapezoid-shaped, split and thus slidably yielding, leaf spring 62 connected to a circuit pad formed on the top side of PCB 50.” EX1006, 4:67-5:3. The top of the trapezoid-shaped leaf spring 62 is a pad.



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. Accordingly, leaf spring 62 is a pad that would be embedded in the enclosure of device of Mills. The pad is underneath the exterior surface and the pad is configured to detect an ECG signal of the user via its contact with electrode 14 located on the exterior surface. EX1003, ¶¶84-85.

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 any of a variety of manners,” which 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 pressure is applied such that the leaf spring pushes against both components to maintain good contact pressure. Leaf springs are commonly used because they solve manufacturing and assembling complexities by, for example, eliminating the need to solder a wire between the electrode and a circuit board to electrically connect the two together. A POSITA seeking to implement Markel’s device would look to Mill’s disclosure for

ways to internally connect the electrodes of Markel to internal electronic components using pads. Thus, a POSITA would utilize the leaf spring 62 taught by Mills to connect the electrodes 410b, 420b of Markel to internal processing components taught by Markel. EX1003, ¶86, ¶118.

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 known ways in a complementary device. A POSITA would be led to the claimed invention based on the teachings of Markel and Mills. EX1003, ¶119.

**iii. Limitation 15[c(ii)]: “the first lead detects a first electrical signal of the user's cardiac signal via the user's contact with at least one of the first lead and the first portion of the enclosure of the electronic device”**

Markel discloses a first electrode 2024 detects and acquires various cardiac signals from a user. EX1005, [0110]. Markel further discloses that the electrodes can detect cardiac activity of a user “that is conductively coupled to the electrodes (e.g., by touching the electrodes).” *Id.*, [0035], [0068]. Markel discloses a first lead in a first portion of an enclosure as shown in annotated Figs. 4 and 20 below. A POSITA would understand from these figures that this is a lead because it couples a body

signal at the first electrode 2024 to processing circuitry 2010. Accordingly, this limitation would have been obvious in view of Markel and Mills. EX1003, ¶120.

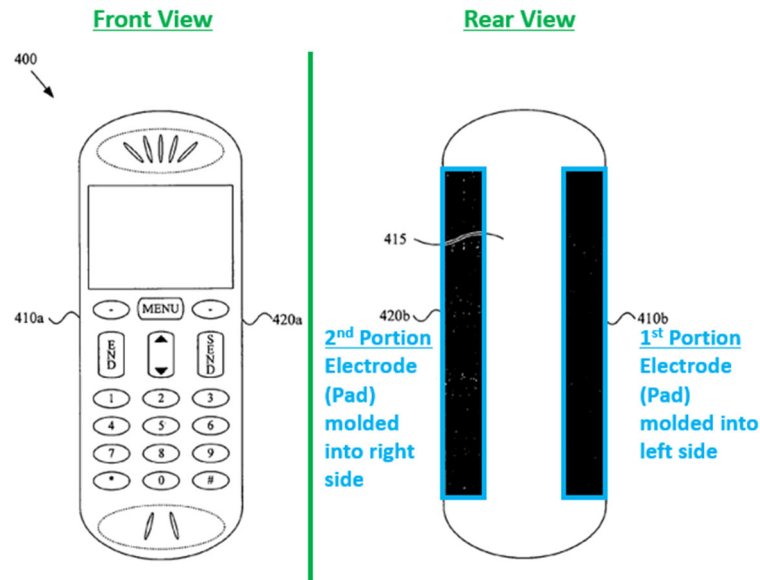


Figure 4

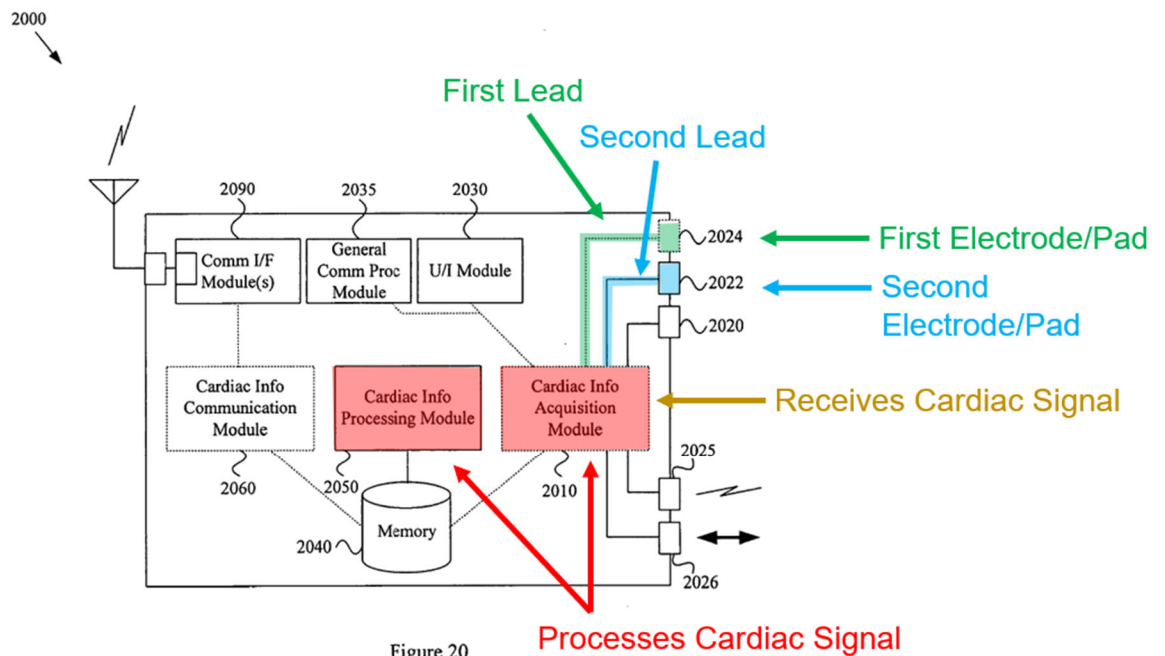


Figure 20



**iv. Limitation 15[c(iii)]: A second lead embedded in the display screen of the electronic device**

Fig. 1 of Markel discloses that the enclosure or housing of MCD 100 supports a display 140. EX1005, Fig. 1, [0034]; EX1003, ¶121.

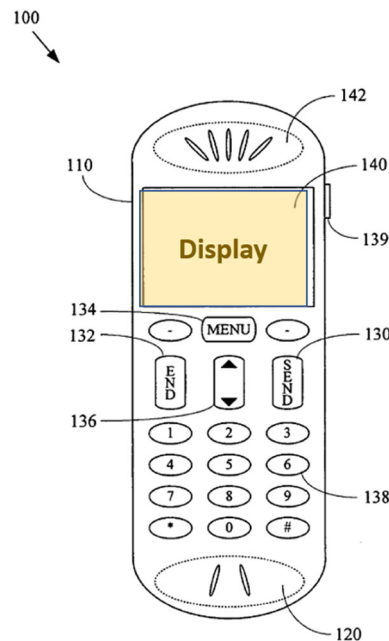


Figure 1

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.

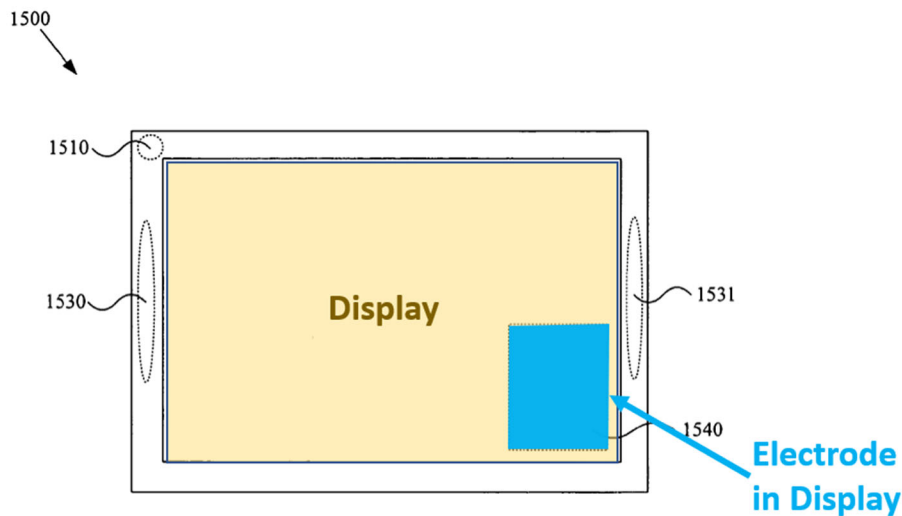


Figure 15

- v. **Limitation 15[c(iv)]: “the second lead detects a second electrical signal of the user's cardiac signal via the user's contact with at least one of the second lead and the display screen of the electronic device”**

Markel discloses that an electrode is integrated or embedded into a touch screen display. EX1005, [0044], [0078]. Markel further discloses that its electrodes can detect cardiac activity of a user “that is conductively coupled to the electrodes (e.g., by touching the electrodes).” *Id.*, [0035], [0068]; EX1003, ¶122.

- c. **Limitation 15(d): “a processor coupled to the heart sensor to receive and process the detected cardiac signal”**

Markel discloses an electronic device 2000 that may “comprise a cardiac information acquisition module 2010 [and] various cardiac sensors (e.g., electrodes) 2020, 2022, 2024.” EX1005, [0110]. According to Markel, such modules or sensors are utilized to acquire (receive) and process cardiac information from the user of the

electronic device. *Id.*, [0110], [0111]. As shown in annotated Fig. 20 below, the cardiac information acquisition module 2010 is coupled to the electrodes 2020, 2022, 2024 which receive and process the cardiac signals from such electrodes. *See also Id.*, [0088], [0096]; EX1003, ¶123.

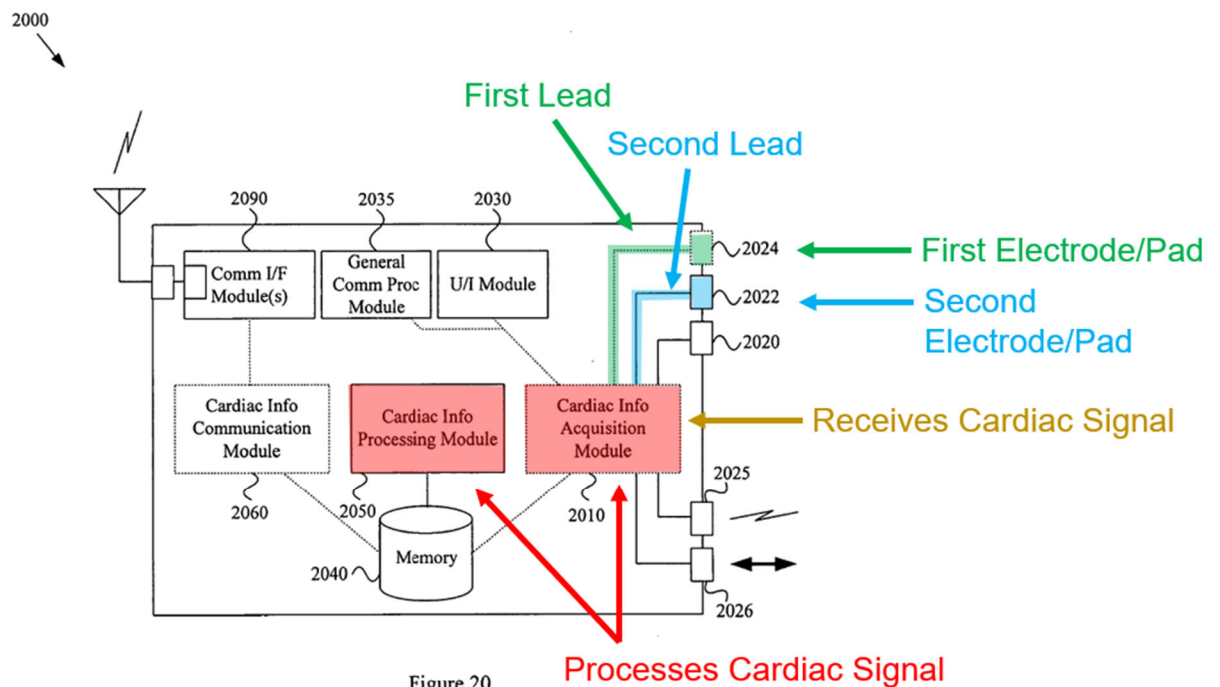


Figure 20

Mills similarly discloses that the housing 12 comprises a very-large scale integrated (VLSI) circuit chip that includes an “ECG signal and abnormal event detection circuitry, analog-to-digital (AD) and digital-to-analog (DA) conversion circuitry, memory and processor circuitry.” EX1006, 2:1-8. Mills specifies that the VLSI is surface-mounted on the top side of printed circuit board (PCB) 50. *Id.*, 5:18-19. Electrodes 14 and 16 are electrically connected to the PCB 50 via a respective spring (60/62). *Id.*, 4:55-5:3. The VLSI is a processor coupled to the heart sensor

(electrodes) and is configured to receive and process the detected cardiac signal. As an alternative to the processing disclosed in Markel, it would have been obvious to use the internal componentry of Mills as a substitute as Mills provides more specific implementation details missing from Markel. EX1003, ¶124.

**d. Claim 15 conclusion**

For the reasons set forth above, Claim 15 is obvious in view of Markel and Mills. EX1003, ¶125.

**13. Claim 16: “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 lead”**

Markel discloses that the electrodes can detect cardiac activity of a user “that is conductively coupled to the electrodes (e.g., by touching the electrodes).” EX1005, [0035], [0068]. Markel discloses, as shown in annotated Fig. 10 below, “a cardiac information acquisition module 1010 that is coupled to the first and second electrodes 1020, 1022 and utilizes the first and second electrodes 1020, 1022 to detect and acquire various cardiac (i.e., heart-related) signals from a user.” EX1005, [0058], Fig. 10. A POSITA would understand from this disclosure that Markel teaches a first lead configured to detect a first electrical signal of the user’s cardiac signal from the user’s contact with the first lead. EX1003, ¶126.

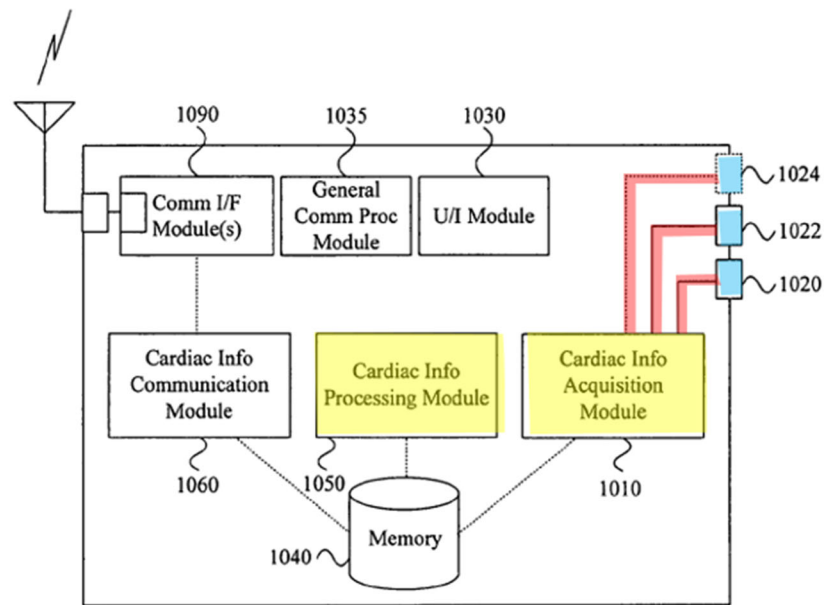


Figure 10

**14. Claim 17: “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”**

Markel discloses that the electrodes can detect cardiac activity of a user “that is conductively coupled to the electrodes (e.g., by touching the electrodes).” EX1005, [0035], [0068]. As in claim 16 above, Markel discloses, as shown in annotated Fig. 10 above, “a cardiac information acquisition module 1010 that is coupled to the first and second electrodes 1020, 1022 and utilizes the first and second electrodes 1020, 1022 to detect and acquire various cardiac (i.e., heart-related) signals from a user.” EX1005, [0058], Fig. 10. A POSITA would understand from this disclosure that Markel teaches a second lead configured to detect a second

electrical signal of the user's cardiac signal from the user's contact with the second lead. EX1003, ¶127.

**15. Claim 18: “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 display screen”**

Markel discloses that an electrode is integrated or embedded into a touch screen display. EX1005, [0044], [0074], [0078]. Markel further discloses that its electrodes can detect cardiac activity of a user “that is conductively coupled to the electrodes (e.g., by touching the electrodes).” *Id.*, [0035], [0068]; EX1003, ¶128.

**16. 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”**

Markel discloses that the device 100 includes a display 140. EX1005, [0034]. Markel discloses that an electrode may be disposed on a border of the display (*i.e.*, bezel). EX1005, [0044]. Markel further discloses an electrode may be disposed on a border of a display (*i.e.*, bezel) as shown in annotated Fig. 15 below. *Id.*, [0044]; *see also Id.*, [0078] (“The display device 1500 may, for example, comprise an electrode 1510 on a border portion of the display device 1500”). Markel also discloses “a first electrode 242 (e.g., a first conductive plastic region) and a second electrode 244 (e.g., a second conductive plastic region) separated by an insulating 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. EX1003, ¶129.

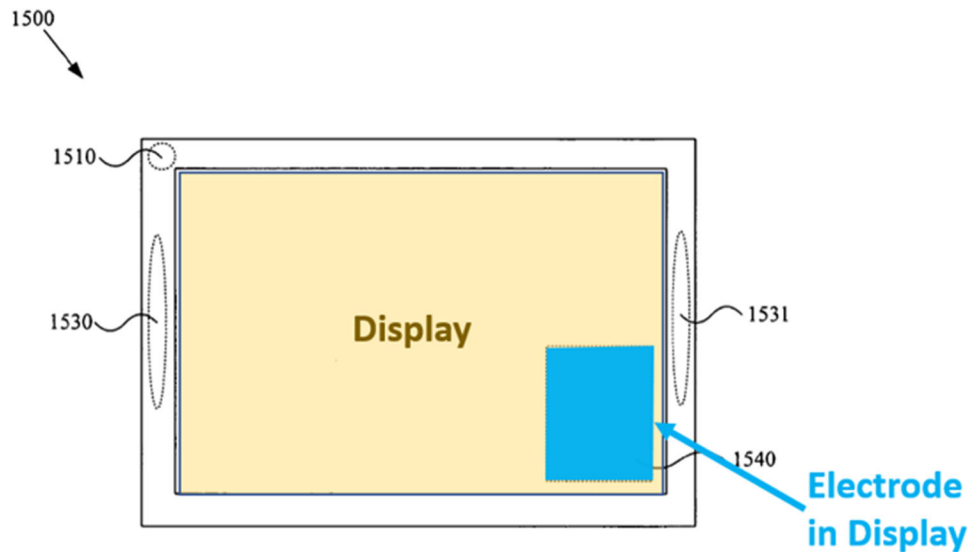


Figure 15

- 17. 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”**

Markel discloses that the electrodes can detect cardiac activity of a user “that is conductively coupled to the electrodes (e.g., by touching the electrodes).” 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 and shown above in annotated Fig. 10, “a cardiac information acquisition module 1010 that is coupled to the first and second electrodes 1020, 1022 and utilizes the first and second electrodes 1020, 1022 to detect and acquire various cardiac (i.e.,

heart-related) signals from a user.” EX1005, [0058], Fig. 10. A POSITA would understand from this disclosure that Markel teaches a first lead configured to detect a first electrical signal of the user’s cardiac signal from the user’s contact with the first portion of the enclosure. EX1003, ¶130.

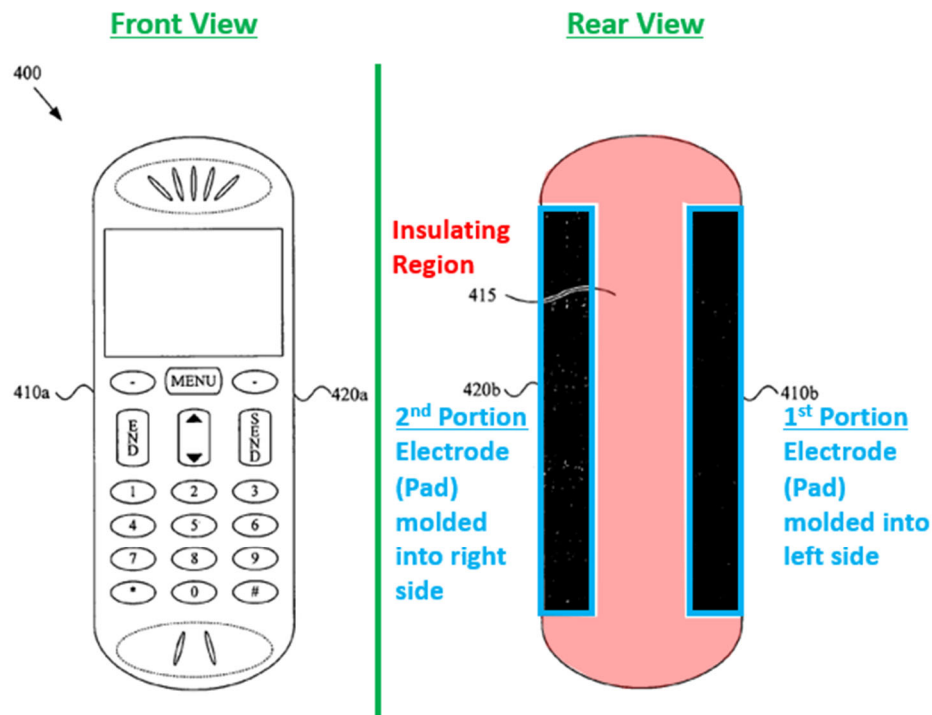


Figure 4

18. **Claim 21: “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”**

Markel discloses that the electrodes can detect cardiac activity of a user “that is conductively coupled to the electrodes (e.g., by touching the electrodes).” EX1005, [0035], [0068]. Markel discloses, as shown in annotated Fig. 10 below, “a cardiac information acquisition module 1010 that is coupled to the first and



second electrodes 1020, 1022 and utilizes the first and second electrodes 1020, 1022 to detect and acquire various cardiac (i.e., heart-related) signals from a user.” *Id.*, [0058], Fig. 10. A POSITA would understand from this disclosure that Markel teaches a second lead configured to detect a second electrical signal of the user’s cardiac signal from the user’s contact with the second lead. EX1003, ¶131.

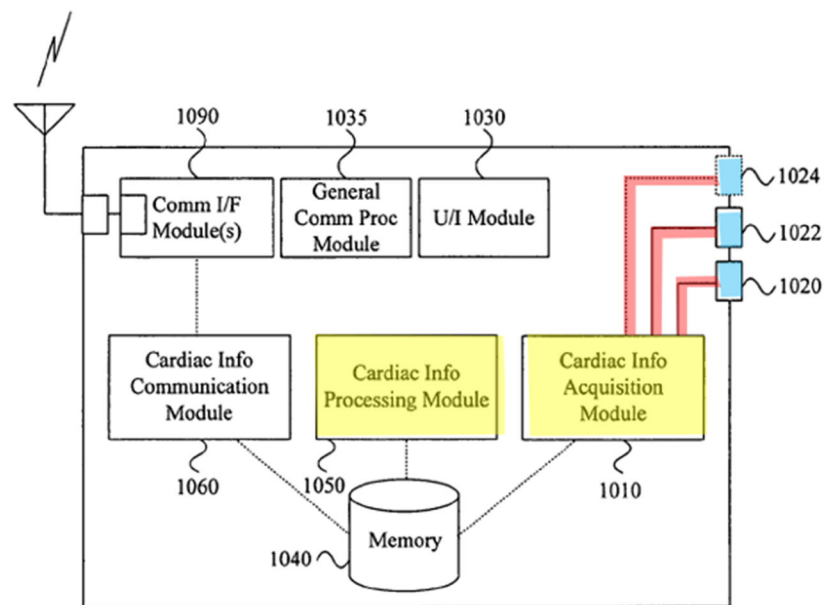


Figure 10

- 19. Claim 22: “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 display screen”**

As discussed previously, Markel discloses that an electrode may be disposed on a video display device 140, in which the electrode is integrated into a touch screen display 140. EX1005, [0044], [0074], [0078]. Markel discloses that the electrodes

can detect cardiac activity of a user “that is conductively coupled to the electrodes (e.g., by touching the electrodes).” *Id.*, [0035], [0068]. Markel discloses, as shown in annotated Fig. 10 above, “a cardiac information acquisition module 1010 that is coupled to the first and second electrodes 1020, 1022 and utilizes the first and second electrodes 1020, 1022 to detect and acquire various cardiac (i.e., heart-related) signals from a user.” EX1005, [0058], Fig. 10. A POSITA would understand from this disclosure that Markel teaches a second lead configured to detect a second electrical signal of the user’s cardiac signal from the user’s contact with the display screen. EX1003, ¶132.

## **V. SECONDARY CONSIDERATIONS**

Secondary considerations should be considered but do not control an obviousness conclusion, particularly where, as here, a strong *prima facie* showing of obviousness exists. *Leapfrog Enters., Inc. v. Fisher-Price, Inc.*, 485 F.3d 1157, 1162 (Fed. Cir. 2007). Petitioner is unaware of evidence of secondary considerations, and any such evidence could not outweigh the strong *prima facie* case of obviousness. Petitioner reserves the right to respond to any evidence of secondary considerations.

## **VI. DISCRETIONARY FACTORS FAVOR INSTITUTION**

With respect to 35 U.S.C. § 314(a), *Fintiv* factors 2, 3, 4, and 6 strongly favor institution of this IPR, and factors 1 and 5 are neutral. Regarding factor 2, the final

written decision in this IPR is expected long before trial in the Delaware Litigation. Apple filed its complaint in the Delaware Litigation less than five months ago, on October 20, 2022, and the most recent published statistics indicate that the median time to trial for a civil action in the District of Delaware is almost three years. EX1021.

For factor 3, the parties and the court have made little investment in the Delaware Litigation. No discovery or infringement or invalidity contentions have been exchanged and claim construction briefing has not started.

For factor 4, Petitioner stipulates that, if the Board institutes this IPR, Petitioner will not pursue, in the Delaware Litigation, the specific invalidity grounds for the challenged claims raised in this Petition or that reasonably could have been raised in this Petition. This stipulation “mitigates any concerns of duplicative efforts between the district court and the Board,” and, thus, factor 4 “weighs strongly in favor of not exercising discretion to deny institution.” *Sotera Wireless, Inc. v. Masimo Corp.*, IPR2020-01019, Paper 12 at 19 (PTAB Dec. 1, 2020) (precedential as to § II.A).

For factor 6, this Petition presents a compelling case of unpatentability of the challenged claims. For factor 1, Petitioner has not moved for a stay of the Delaware Litigation but may do so upon institution of this IPR. For factor 5, Petitioner Masimo is a defendant in the Delaware Litigation. In view of all circumstances, the

judicial and administrative efficiency considerations underlying *Fintiv* are not implicated here. Therefore, the Board should institute this IPR.

With respect to 35 U.S.C. § 325(d), this Petition presents the first *inter partes* challenge to the '257 patent and none of the references the Petition relies on were considered during examination. Further, the references presented herein are materially better than the references considered during examination.

## **VII. CONCLUSION**

Petitioner respectfully requests that the Board institute an IPR and cancel claims 1-4 and 8-22 of the '257 patent.

Respectfully submitted,

KNOBBE, MARTENS, OLSON & BEAR, LLP

Dated: March 22, 2023

By: /Jarom Kesler/

Jarom Kesler (Reg. No. 57,046)  
Customer No. 20,995  
Attorneys for Petitioner  
Masimo Corporation  
(949) 760-0404

**CERTIFICATE OF COMPLIANCE**

Pursuant to 37 C.F.R. § 42.24(d), the undersigned certifies that foregoing  
**PETITION FOR INTER PARTES REVIEW OF U.S. PATENT NO.**  
**10,076,257**, exclusive of the parts exempted as provided in 37 C.F.R. § 42.24(a),  
contains 13,860 words and therefore complies with the type-volume limitations of  
37 C.F.R. § 42.24(a).

Dated: March 22, 2023

By: /Jarom Kesler/  
Jarom Kesler (Reg. No. 57,046)  
Customer No. 20,995  
Attorneys for Petitioner  
Masimo Corporation  
(949) 760-0404

**CERTIFICATE OF SERVICE**

I hereby certify that a true and correct copy of the foregoing **PETITION FOR  
INTER PARTES REVIEW OF U.S. PATENT NO. US 10,076,257** and  
**EXHIBITS 1001-1006, 1008, 1012-1021** are being served on March 22, 2023, via  
Federal Express overnight delivery on counsel of record for U.S. Patent No.  
US 10,076,257 as addressed below:

62579 - APPLE INC./BROWNSTEIN  
c/o Brownstein Hyatt Farber Schreck, LLP  
410 Seventeenth Street  
Suite 2200  
Denver, CO 80202

Dated: March 22, 2023

By: /Jarom Kesler/  
Jarom Kesler (Reg. No. 57,046)  
Customer No. 20,995  
Attorneys for Petitioner  
Masimo Corporation  
(949) 760-0404

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