ALIVECOR, INC.,
Petitioner,
v.
APPLE INC.,
Patent Owner.

U.S. Patent Nos.
U.S. Patent No. 10,076,257 B2
AIA Review Nos. IPR2023-00950

Petitioner's Demonstratives
Under 37 C.F.R. § 42.70(b) for
November 5, 2024, Oral Argument

AliveCor Exhibit 1024
AliveCor, Inc. v. Apple Inc.
IPR2023-00950, U.S. Patent No. 10,076,257
1 of 249

ROADMAP

1. Overview of the Challenged Patent
2. Claim Construction
3. Ground 1 - Markel
4. Ground 2 - Markel + Nissilä
5. Ground 3 - Markel + Righter
6. Apple's Motion to Amend

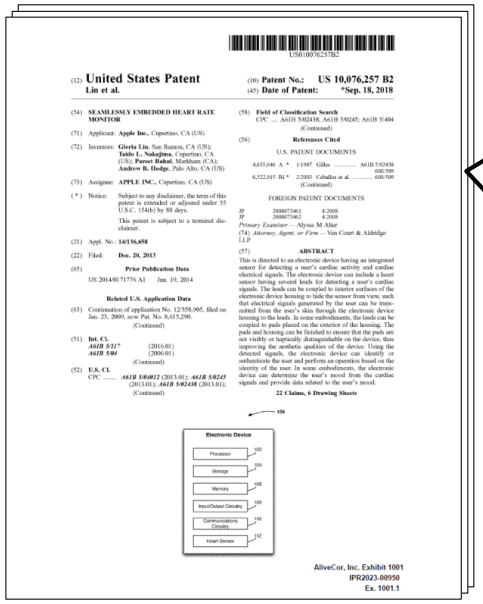
AliveCor Exhibit 1024
AliveCor, Inc. v. Apple Inc.
IPR2023-00950, U.S. Patent No. 10,076,257
2 of 249

ROADMAP

1. Overview of the Challenged Patent
2. Claim Construction
3. Ground 1 - Markel
4. Ground 2 - Markel + Nissilä
5. Ground 3 - Markel + Righter
6. Apple's Motion to Amend

AliveCor Exhibit 1024
AliveCor, Inc. v. Apple Inc.
IPR2023-00950, U.S. Patent No. 10,076,257
3 of 249

Overview of the ’257 Patent



(12) **United States Patent**
Lin et al.

(10) **Patent No.: US 10,076,257 B2**
(45) **Date of Patent: *Sep. 18, 2018**

(54) **SEAMLESSLY EMBEDDED HEART RATE MONITOR**

(71) Applicant: **Apple Inc.**, Cupertino, CA (US)

(72) Inventors: **Gloria Lin**, San Ramon, CA (US); **Taido L. Nakajima**, Cupertino, CA (US); **Pawet Rakul**, Markham (CA); **Andrew B. Hodge**, Palo Alto, CA (US)

(73) Assignee: **APPLE INC.**, Cupertino, CA (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 88 days.

This patent is subject to a terminal disclaimer.

(21) Appl. No.: **14/136,658**

(22) Filed: **Dec. 20, 2013**

(65) **Prior Publication Data**

US 2014/0171775 A1 Jun. 19, 2014

Related U.S. Application Data

(63) Continuation of application No. 12/358,905, filed on Jan. 25, 2009, now Pat. No. 8,615,290.
(Continued)

(51) **Int. Cl.**
A61B 5/117 (2016.01)
A61B 5/04 (2006.01)
(Continued)

(52) **U.S. Cl.**
CPC ***A61B 5/04012*** (2013.01); ***A61B 5/0245*** (2013.01); ***A61B 5/02438*** (2013.01);
(Continued)

(58) **Field of Classification Search**
CPC ... A61B 5/02438; A61B 5/0245; A61B 5/404
(Continued)

(56) **References Cited**

U.S. PATENT DOCUMENTS

4,635,646 A * 1/1987 Gilles A61B 5/02438 600/509
6,522,915 B1 * 2/2003 Ceballos et al. 600/509
(Continued)

FOREIGN PATENT DOCUMENTS

JP 2008073461 4/2008
JP 2008073462 4/2008

Primary Examiner — Alyssa M Alter
(74) *Attorney, Agent, or Firm* — Van Court & Aldridge LLP

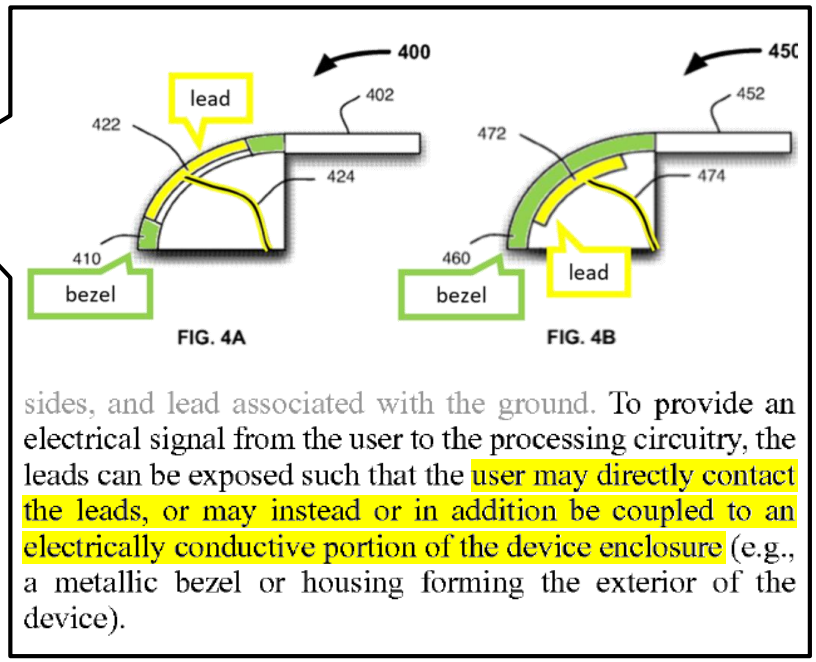
(57) **ABSTRACT**

This is directed to an electronic device having an integrated sensor for detecting a user's cardiac activity and cardiac electrical signals. The electronic device can include a heart sensor having several leads for detecting a user's cardiac signals. The leads can be coupled to interior surfaces of the electronic device housing to hide the sensor from view, such that electrical signals generated by the user can be transmitted from the user's skin through the electronic device housing to the leads. In some embodiments, the leads can be coupled to pads placed on the exterior of the housing. The pads and housing can be finished to ensure that the pads are not visibly or tactically distinguishable on the device, thus improving the aesthetic qualities of the device. Using the detected signals, the electronic device can identify or authenticate the user and perform an operation based on the identity of the user. In some embodiments, the electronic device can determine the user's mood from the cardiac signals and provide data related to the user's mood.

22 Claims, 6 Drawing Sheets

AliveCor, Inc. Exhibit 1001
IPR2023-00950
Ex. 1001.1

’257 Patent

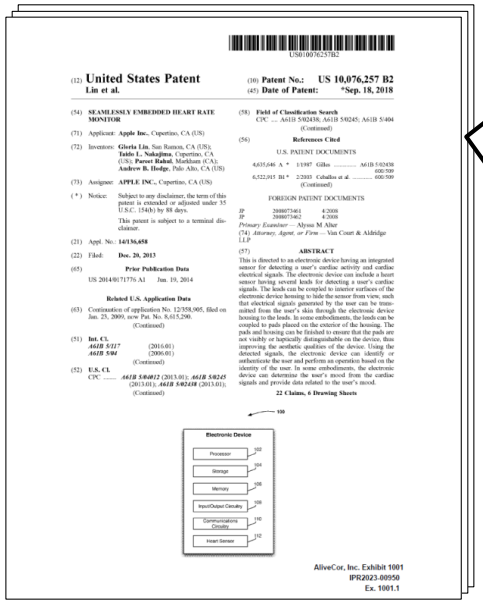


sides, and lead associated with the ground. To provide an electrical signal from the user to the processing circuitry, the leads can be exposed such that the user may directly contact the leads, or may instead or in addition be coupled to an electrically conductive portion of the device enclosure (e.g., a metallic bezel or housing forming the exterior of the device).

Ex. 1001, 2:45-50, Figs. 4A, 4B (annotated) (Paper 2, 2)

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE – 4

Overview of the ’257 Patent



(12) **United States Patent**
Lin et al.

(10) **Patent No.: US 10,076,257 B2**
(45) **Date of Patent: *Sep. 18, 2018**

(54) **SEAMLESSLY EMBEDDED HEART RATE MONITOR**

(71) Applicant: **Apple Inc.**, Cupertino, CA (US)

(72) Inventors: **Gloria Lin**, San Ramon, CA (US); **Taido L. Nakajima**, Cupertino, CA (US); **Parsel Rahul**, Markham (CA); **Andrew B. Hodge**, Palo Alto, CA (US)

(73) Assignee: **APPLE INC.**, Cupertino, CA (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 88 days.

This patent is subject to a terminal disclaimer.

(21) Appl. No.: **14/156,658**

(22) Filed: **Dec. 20, 2013**

(65) **Prior Publication Data**

US 2014/0171775 A1 Jun. 19, 2014

Related U.S. Application Data

(63) Continuation of application No. 12/358,905, filed on Jan. 25, 2009, now Pat. No. 8,615,290.
(Continued)

(51) **Int. Cl.**
A61B 5/117 (2016.01)
A61B 5/04 (2006.01)
(Continued)

(52) **U.S. Cl.**
CPC ***A61B 5/04012*** (2013.01); ***A61B 5/0245*** (2013.01); ***A61B 5/02438*** (2013.01);
(Continued)

(58) **Field of Classification Search**
CPC ... A61B 5/02438; A61B 5/0245; A61B 5/404
(Continued)

(56) **References Cited**

U.S. PATENT DOCUMENTS

4,635,646 A * 1/1987 Gilles A61B 5/02438 600/509
6,522,915 B1 * 2/2003 Caballos et al. 600/509
(Continued)

FOREIGN PATENT DOCUMENTS

JP 2008073461 4/2008
JP 2008073462 4/2008

Primary Examiner — Alyssa M Alter
(74) *Attorney, Agent, or Firm* — Van Court & Aldridge LLP

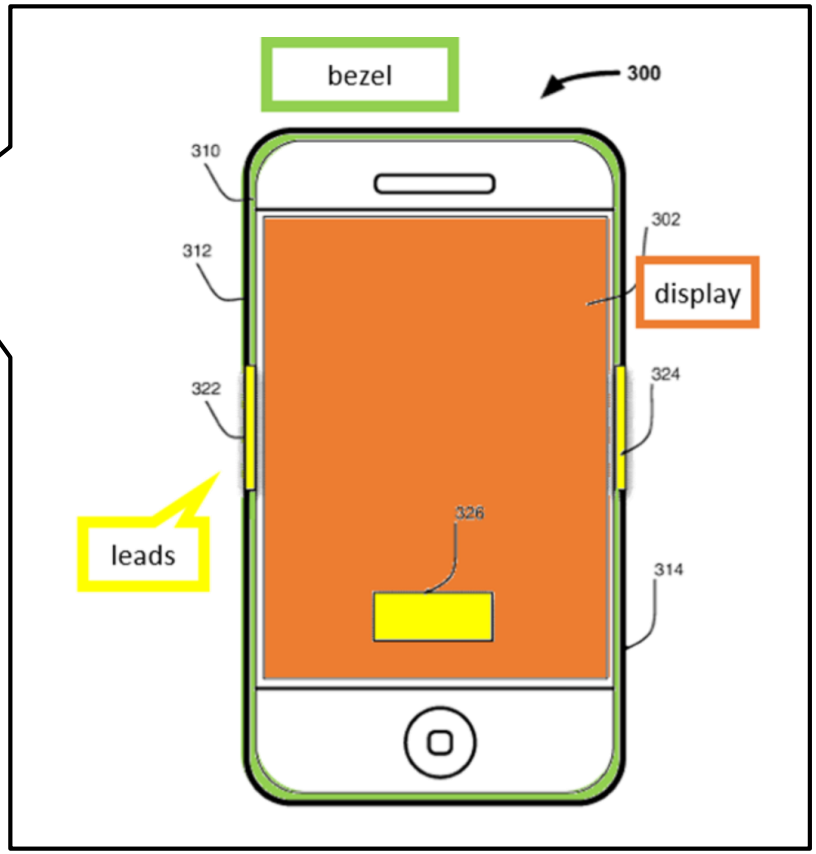
(57) **ABSTRACT**

This is directed to an electronic device having an integrated sensor for detecting a user's cardiac activity and cardiac electrical signals. The electronic device can include a heart sensor having several leads for detecting a user's cardiac signals. The leads can be coupled to interior surfaces of the electronic device housing to hide the sensor from view, such that electrical signals generated by the user can be transmitted from the user's skin through the electronic device housing to the leads. In some embodiments, the leads can be coupled to pads placed on the exterior of the housing. The pads and housing can be finished to ensure that the pads are not visibly or haptically distinguishable on the device, thus improving the aesthetic qualities of the device. Using the detected signals, the electronic device can identify or authenticate the user and perform an operation based on the identity of the user. In some embodiments, the electronic device can determine the user's mood from the cardiac signals and provide data related to the user's mood.

22 Claims, 6 Drawing Sheets

AliveCor, Inc. Exhibit 1001
IPR2023-00950
Ex. 1001.1

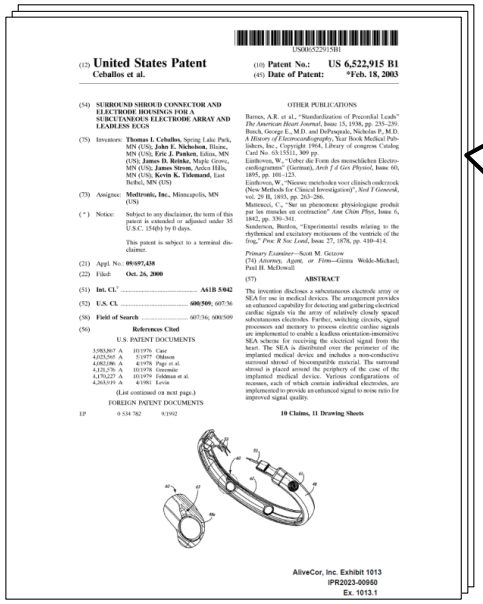
’257 Patent



Ex. 1001, Fig. 3 (annotated) (Paper 2, 3)

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE – 5

Overview of the ’257 Patent



US006522915B1

(12) **United States Patent**
Ceballos et al.

(10) **Patent No.: US 6,522,915 B1**
(45) **Date of Patent: *Feb. 18, 2003**

(54) **SURROUND SHROUD CONNECTOR AND ELECTRODE HOUSINGS FOR A SUBCUTANEOUS ELECTRODE ARRAY AND LEADLESS ECGS**

(75) Inventors: **Thomas I. Ceballos**, Spring Lake Park, MN (US); **John E. Nicholson**, Blaine, MN (US); **Eric J. Panken**, Edina, MN (US); **James D. Reinke**, Maple Grove, MN (US); **James Strom**, Arden Hills, MN (US); **Kevin K. Tidemand**, East Bethel, MN (US)

(73) Assignee: **Medtronic, Inc.**, Minneapolis, MN (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

This patent is subject to a terminal disclaimer.

(21) Appl. No.: **09/597,438**

(22) Filed: **Oct. 26, 2000**

(51) **Int. Cl.**[7] **A61B 5/042**

(52) **U.S. Cl.** **600/509**; 607/36

(58) **Field of Search** 607/36; 600/509

(56) **References Cited**

U.S. PATENT DOCUMENTS

3,983,867 A 10/1976 Case
4,025,565 A 5/1977 Ohkoso
4,082,086 A 4/1978 Page et al.
4,121,576 A 10/1978 Greenisle
4,170,227 A 10/1979 Feldman et al.
4,268,910 A 4/1981 Levin

(List continued on next page.)

FOREIGN PATENT DOCUMENTS

EP 0 534 582 9/1992

OTHER PUBLICATIONS

Barnes, A.R. et al., "Standardization of Precordial Leads" *The American Heart Journal*, Issue 15, 1938, pp. 235–239.
Burch, George E., M.D. and DePasquale, Nicholas P., M.D. *A History of Electrocardiography*, Year Book Medical Publishers, Inc., Copyright 1964, *Library of congress* Catalog Card No. 63-15511, 309 pp.
Einthoven, W., "Ueber die Form des menschlichen Electrocardiogramms" (German), *Arch f d Ges Physiol*, Issue 60, 1895, pp. 101–123.
Einthoven, W., "Nieuwe methoden voor clinisch onderzoek (New Methods for Clinical Investigation)", *Ned T Geneesk*, vol. 29 II, 1893, pp. 263–286.
Mutrecicz, C., "Sur un phenomene physiologique produit par les muscles en contraction" *Ann Chim Phys*, Issue 6, 1862, pp. 350–341.
Sanderson, Burdon, "Experimental results relating to the rhythmical and excitatory mctiaeum of the ventricle of the frog," *Proc R Soc Lond*, Issue 27, 1878, pp. 410–414.

Primary Examiner—Scott M. Getzow
(74) *Attorney, Agent, or Firm*—Girma Wolde-Michael; Paul H. McDowall

(57) **ABSTRACT**

The invention discloses a subcutaneous electrode array or SEA for use in medical devices. The arrangement provides an enhanced capability for detecting and gathering electrical cardiac signals via the array of relatively closely spaced subcutaneous electrodes. Further, switching circuits, signal processors and memory to process electric cardiac signals are implemented to enable a leadless orientation-insensitive SEA scheme for receiving the electrical signal from the heart. The SEA is distributed over the perimeter of the implanted medical device and includes a non-conductive surround shroud of biocompatible material. The surround shroud is placed around the periphery of the case of the implanted medical device. Various configurations of neasures, each of which contain individual electrodes, are implemented to provide an enhanced signal to noise ratio for improved signal quality.

10 Claims, 11 Drawing Sheets

AliveCor, Inc. Exhibit 1013
IPR2023-00950
Ex. 1013.1

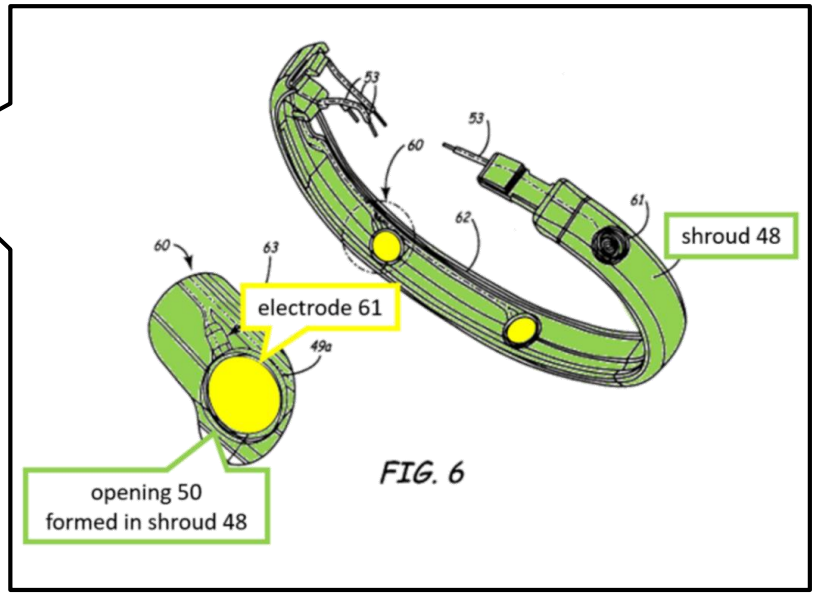


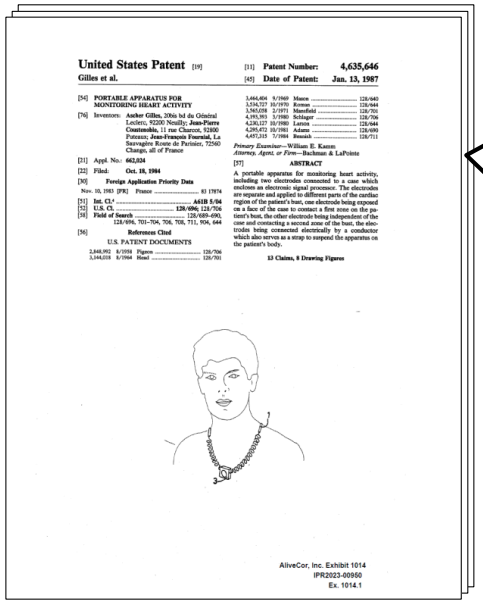
FIG. 6

Ceballos
(distinguished in prosecution)

Ex. 1003, ¶¶ 63-64 (annotating Ex. 1013 (Ceballos), Fig. 6) (Paper 2, 3-4)

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE – 6

Overview of the ’257 Patent



United States Patent [19]
Gilles et al.

[11] Patent Number: 4,635,646
[45] Date of Patent: Jan. 13, 1987

[54] PORTABLE APPARATUS FOR MONITORING HEART ACTIVITY

[76] Inventors: Ancher Gilles, 20bis bd du Général Leclerc, 92200 Neuilly; Jean-Pierre Coatmeshlo, 11 rue Charcot, 92800 Puteaux; Jean-François Fournial, La Sauvagère Route de Parisier, 72560 Change, all of France

[21] Appl. No.: 662,024
[22] Filed: Oct. 18, 1984
[30] Foreign Application Priority Data
Nov. 10, 1983 [FR] France 83 17874
[51] Int. Cl.⁴ A61B 5/04
[52] U.S. Cl. 128/696; 128/706
[58] Field of Search 128/689-690, 128/696, 701-704, 706, 708, 711, 904, 644

[56] References Cited
U.S. PATENT DOCUMENTS
2,848,992 8/1958 Pigeon 128/706
3,344,018 8/1964 Head 128/701
3,464,404 9/1969 Mance 128/640
3,534,727 10/1970 Rotton 128/644
3,565,058 2/1971 Mansfield 128/701
4,193,393 3/1980 Schlager 128/706
4,230,127 10/1980 Larsen 128/644
4,295,472 10/1981 Adams 128/690
4,457,315 7/1984 Bozzuk 128/711

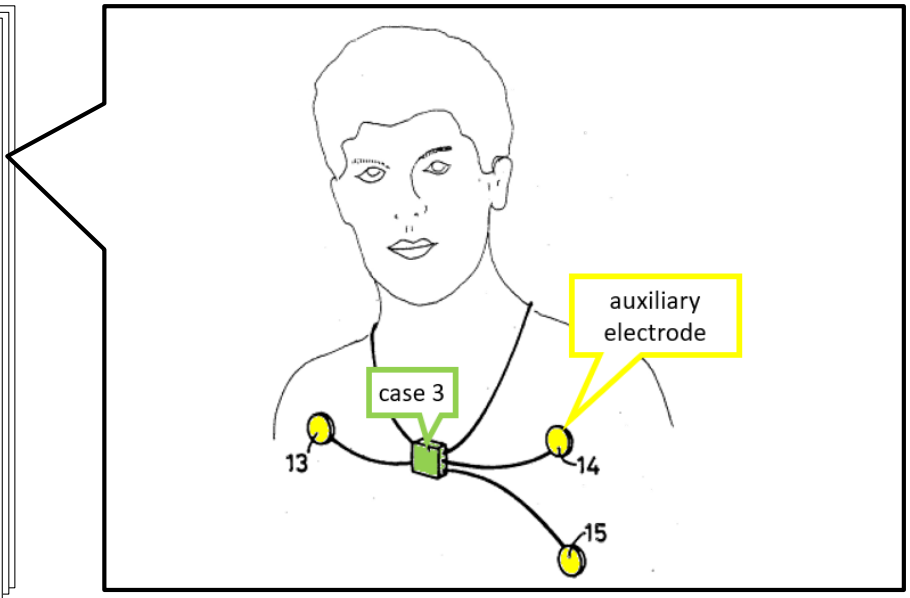
Primary Examiner—William E. Kamm
Attorney, Agent, or Firm—Bachman & LaPointe

[57] ABSTRACT

A portable apparatus for monitoring heart activity, including two electrodes connected to a case which encloses an electronic signal processor. The electrodes are separate and applied to different parts of the cardiac region of the patient's bust, one electrode being exposed on a face of the case to contact a first zone on the patient's bust, the other electrode being independent of the case and contacting a second zone of the bust, the electrodes being connected electrically by a conductor which also serves as a strap to suspend the apparatus on the patient's body.

13 Claims, 8 Drawing Figures

AliveCor, Inc. Exhibit 1014
IPR2023-00950
Ex. 1014.1



Gilles
(distinguished in prosecution)

Ex. 1003, ¶¶ 69-70 (annotating Ex. 1014 (Gilles), Fig. 8) (Paper 2, 3-4)

AliveCor Exhibit 1024
AliveCor, Inc. v. Apple Inc.
IPR2023-00950, U.S. Patent No. 10,076,257
7 of 249

ROADMAP

1. Overview of the Challenged Patent
2. Claim Construction
3. Ground 1 - Markel
4. Ground 2 - Markel + Nissilä
5. Ground 3 - Markel + Righter
6. Apple's Motion to Amend

AliveCor Exhibit 1024
AliveCor, Inc. v. Apple Inc.
IPR2023-00950, U.S. Patent No. 10,076,257
8 of 249

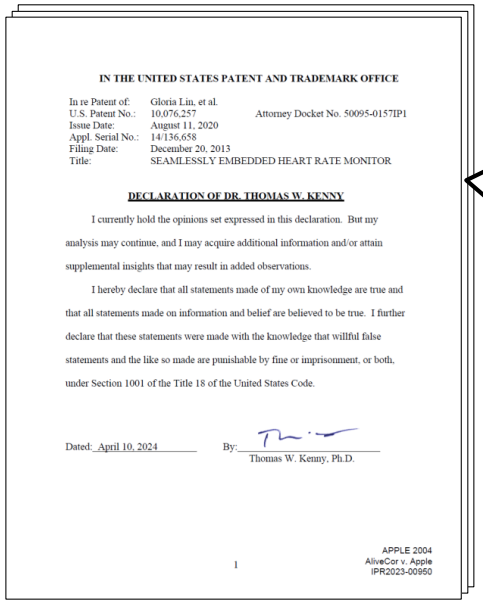
"embedded in"

[1.c.i] a first lead comprising a first pad that is <u>embedded in</u> a first portion of the enclosure,

AliveCor's Construction	Apple's Construction
"plain and ordinary meaning," "which simply requires inclusion within a larger entity"	"The term 'embedded in' should be given its plain and ordinary meaning." "However, should the Board determine that the term 'embedded in' requires an express construction, consistent with the plain and ordinary meaning of this term, 'embedded in' should be interpreted to mean 'at least partially set in or partially surrounded by a material.'"

AliveCor Exhibit 1024
AliveCor, Inc. v. Apple Inc.
IPR2023-00950, U.S. Patent No. 10,076,257
9 of 249

"embedded in" – Apple's Extrinsic Evidence



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent of: Gloria Lin, et al.
U.S. Patent No.: 10,076,257 Attorney Docket No. 50095-0157IP1
Issue Date: August 11, 2020
Appl. Serial No.: 14/136,658
Filing Date: December 20, 2013
Title: SEAMLESSLY EMBEDDED HEART RATE MONITOR

DECLARATION OF DR. THOMAS W. KENNY

I currently hold the opinions set expressed in this declaration. But my analysis may continue, and I may acquire additional information and/or attain supplemental insights that may result in added observations.

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

Dated: April 10, 2024 By: Thomas W. Kenny, Ph.D.

1

APPLE 2004
AliveCor v. Apple
IPR2023-00950

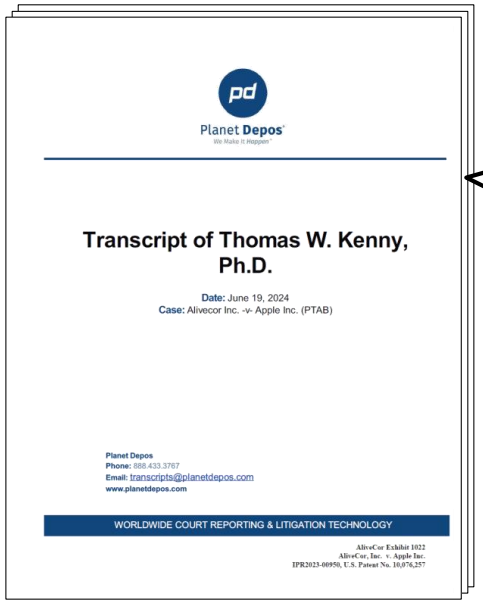
Kenny Decl.

34. Dictionary definitions of the terms "embedded" and "embed" similarly support the above conclusion that the plain and ordinary meaning for the term "embedded in" as it is used in the '257 patent is "at least partially set in or partially surrounded by a material." For example, a POSITA would have been aware that in the context of computing devices and computing technology, the term "embedded" means "[t]hat which has been ***incorporated into a surrounding mass or enclosure***." APPLE-2005, 3. This definition taken from the Wiley Electrical and Electronics Engineering Dictionary indicates to a POSITA that the term "embedded in" requires more than two materials or substrates that are merely positioned adjacent to, parallel, or against each other. *Id.*

Ex. 1024, ¶ 34

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE – 10

"embedded in" – Apple's Extrinsic Evidence


Planet Depos
We Make It Happen

Transcript of Thomas W. Kenny, Ph.D.

Date: June 19, 2024
Case: Alivecor Inc. -v- Apple Inc. (PTAB)

Planet Depos
Phone: 888.433.3767
Email: transcripts@planetdepos.com
www.planetdepos.com

WORLDWIDE COURT REPORTING & LITIGATION TECHNOLOGY

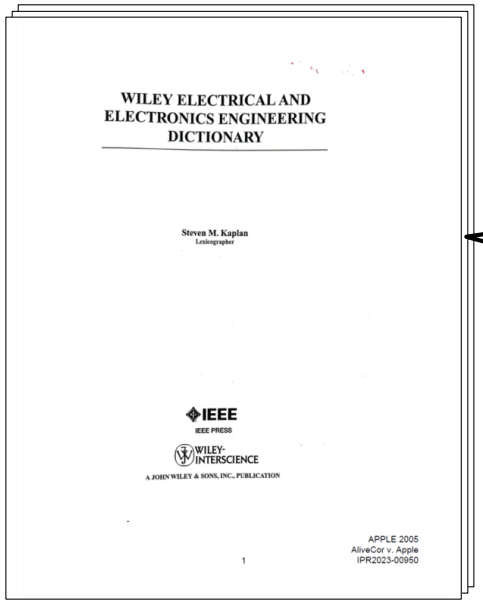
AliveCor Exhibit 1022
AliveCor, Inc. v. Apple Inc.
IPR2023-00950, U.S. Patent No. 10,076,257

Kenny Tr.

Q. Going back to the sort of root word "embedded," did you rely on any dictionary definitions other than the one quoted here in paragraph 34?

A. No. And just my understanding of the word and its plain and ordinary meaning.

"embedded in" – Apple's Extrinsic Evidence



Wiley Electrical and Electronics Engineering Dictionary

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

AliveCor Exhibit 1024
AliveCor, Inc. v. Apple Inc.
IPR2023-00950, U.S. Patent No. 10,076,257
12 of 249

"embedded in" – Multiple Dictionary Definitions

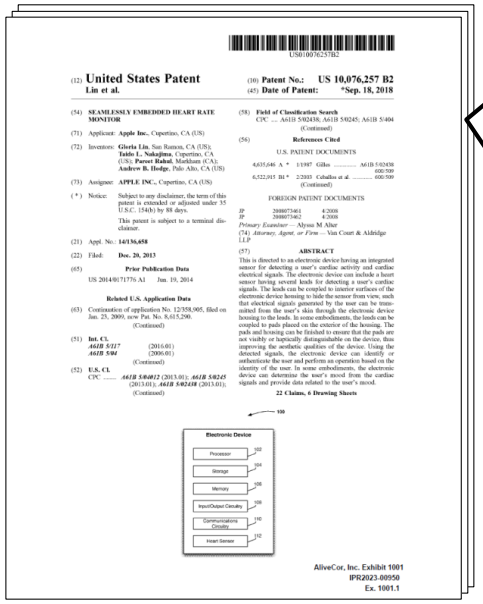
Brookhill-Wilk 1, LLC. v. Intuitive Surgical, Inc.

"If more than one dictionary definition is consistent with the use of the words in the intrinsic record, the claim terms may be construed to encompass all consistent meanings."

334 F.3d 1294, 1300 (Fed. Cir. 2003)

AliveCor Exhibit 1024
AliveCor, Inc. v. Apple Inc.
IPR2023-00950, U.S. Patent No. 10,076,257
13 of 249

“embedded in” – Intrinsic Evidence is Consistent



(12) **United States Patent**
Lin et al.

(10) **Patent No.: US 10,076,257 B2**
(45) **Date of Patent: *Sep. 18, 2018**

(54) **SEAMLESSLY EMBEDDED HEART RATE MONITOR**

(71) Applicant: **Apple Inc.**, Cupertino, CA (US)

(72) Inventors: **Gloria Lin**, San Ramon, CA (US); **Taido L. Nakajima**, Cupertino, CA (US); **Parsa Rahal**, Markham (CA); **Andrew B. Hodge**, Palo Alto, CA (US)

(73) Assignee: **APPLE INC.**, Cupertino, CA (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 88 days.

This patent is subject to a terminal disclaimer.

(21) Appl. No.: **14/136,658**

(22) Filed: **Dec. 20, 2013**

(65) **Prior Publication Data**

US 2014/0171775 A1 Jun. 19, 2014

Related U.S. Application Data

(63) Continuation of application No. 12/358,905, filed on Jan. 25, 2009, now Pat. No. 8,615,290.
(Continued)

(51) **Int. Cl.**
A61B 5/117 (2016.01)
A61B 5/04 (2006.01)
(Continued)

(52) **U.S. Cl.**
CPC ***A61B 5/04012*** (2013.01); ***A61B 5/0245*** (2013.01); ***A61B 5/02438*** (2013.01);
(Continued)

(58) **Field of Classification Search**
CPC ... A61B 5/02438; A61B 5/0245; A61B 5/404
(Continued)

(56) **References Cited**

U.S. PATENT DOCUMENTS

4,635,646 A * 1/1987 Gilles A61B 5/02438 600/509
6,522,915 B1 * 2/2003 Ceballos et al. 600/509
(Continued)

FOREIGN PATENT DOCUMENTS

JP 2008073461 4/2008
JP 2008073462 4/2008

Primary Examiner — Alyssa M Alter
(74) *Attorney, Agent, or Firm* — Van Court & Aldridge LLP

(57) **ABSTRACT**

This is directed to an electronic device having an integrated sensor for detecting a user's cardiac activity and cardiac electrical signals. The electronic device can include a heart sensor having several leads for detecting a user's cardiac signals. The leads can be coupled to interior surfaces of the electronic device housing to hide the sensor from view, such that electrical signals generated by the user can be transmitted from the user's skin through the electronic device housing to the leads. In some embodiments, the leads can be coupled to pads placed on the exterior of the housing. The pads and housing can be finished to ensure that the pads are not visibly or haptically distinguishable on the device, thus improving the aesthetic qualities of the device. Using the detected signals, the electronic device can identify or authenticate the user and perform an operation based on the identity of the user. In some embodiments, the electronic device can determine the user's mood from the cardiac signals and provide data related to the user's mood.

22 Claims, 6 Drawing Sheets

AliveCor, Inc. Exhibit 1001
IPR2023-00950
Ex. 1001.1

’257 Patent

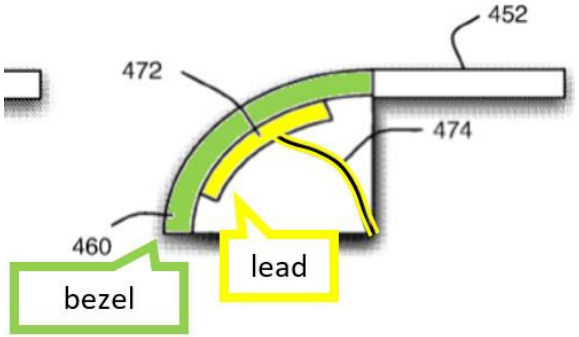


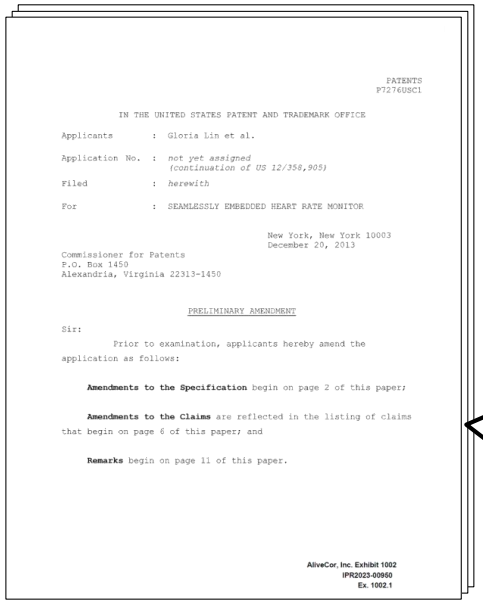
FIG. 4B

FIG. 4B is a cross-sectional view of another illustrative electronic device having a bezel with an embedded heart sensor lead in accordance with one embodiment of the invention. Electronic device **450** can include display **452** and bezel **460**. If the electrical conductivity and size of bezel **460**, and the strength or characteristics of the cardiac signal provided by the user and detected by the heart sensor are adapted such that the signal can be transmitted along short distances in bezel **460**, lead **472** of the heart sensor can be positioned against the back surface of bezel **460**. Alternatively, lead **472** can be placed within the thickness of bezel **460** (e.g., in a pocket within the bezel wall), but underneath the outer surface of the bezel. The short thickness of bezel

Ex. 1001, Fig. 4B, 9:45-51, 3:33-36 (annotated) (Paper 20, 5)

AliveCor Exhibit 1024
AliveCor, Inc. v. Apple Inc.
IPR2023-00950, U.S. Patent No. 10,076,257
14 of 249

“embedded in” – Intrinsic Evidence is Consistent



PATENTS
P72760SC1

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants : Gloria Lin et al.

Application No. : *not yet assigned*
(continuation of US 12/358,905)

Filed : *herewith*

For : SEAMLESSLY EMBEDDED HEART RATE MONITOR

New York, New York 10003
December 20, 2013

Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

PRELIMINARY AMENDMENT

Sir:

Prior to examination, applicants hereby amend the application as follows:

Amendments to the Specification begin on page 2 of this paper;

Amendments to the Claims are reflected in the listing of claims that begin on page 6 of this paper; and

Remarks begin on page 11 of this paper.

AliveCor, Inc. Exhibit 1002
IPR2023-00950
Ex. 1002.1

’257 File History

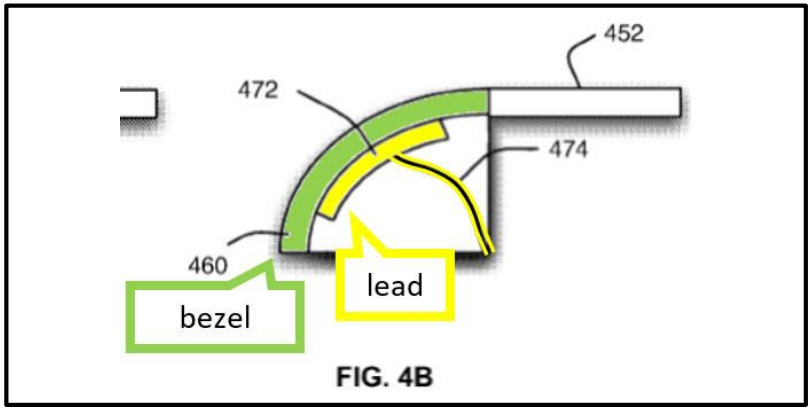


FIG. 4B

signal, and a processor coupled to the heart sensor. The heart sensor includes a first lead embedded in a first portion of the enclosure, wherein an exterior surface of the enclosure includes an

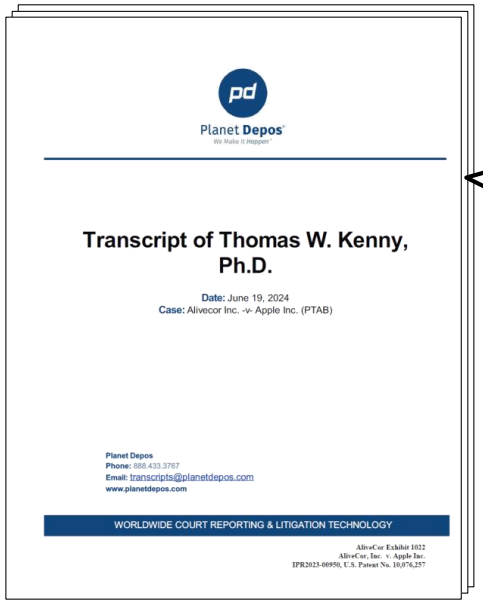
. . . .

specification, paragraph [0034]). As a specific example, with respect to applicants' FIG. 4B, an enclosure of electronic device 450 may include a bezel 460, where, "[i]f the electrical conductivity and size of bezel 460, and the strength or characteristics of the cardiac signal provided by the user and detected by the heart sensor are adapted such that the signal can be transmitted along short distances in bezel 460, lead 472 of the heart sensor can be positioned against the back surface of bezel 460," or "lead 472 can be placed within the thickness of bezel 460 (e.g., in a pocket within the bezel wall), but underneath the outer surface of the bezel," where a "short thickness

AliveCor Exhibit 1024
AliveCor, Inc. v. Apple Inc.
IPR2023-00950, U.S. Patent No. 10,076,257
15 of 249

"embedded in" – Apple's Interpretation is Wrong

[1.c.i] a first lead comprising a first pad that is embedded in a first portion of the enclosure,


Planet Depos
We Make It Happen

Transcript of Thomas W. Kenny, Ph.D.

Date: June 19, 2024
Case: Alivecor Inc. -v- Apple Inc. (PTAB)

Planet Depos
Phone: 888.433.3767
Email: transcripts@planetdepos.com
www.planetdepos.com

WORLDWIDE COURT REPORTING & LITIGATION TECHNOLOGY

AliveCor Exhibit 1022
AliveCor, Inc. v. Apple Inc.
IPR2023-00950, U.S. Patent No. 10,076,257

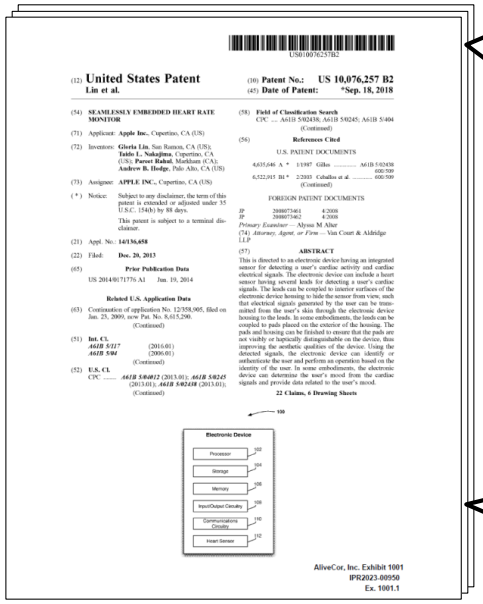
Kenny Tr.

Q. When you formed your opinions in this proceeding, did you assume that the word "in" in the phrase embedded in is an adverb that modifies embedded?

A. . . . I think that's probably an okay description. . . .

The word "in" is a preposition that modifies the object "portion"; it does not narrow "embedded" into the construction advanced by Apple.

“embedded in” – Apple’s Interpretation is Wrong



(12) **United States Patent**
Lin et al.

(10) **Patent No.: US 10,076,257 B2**
(45) **Date of Patent: *Sep. 18, 2018**

(54) **SEAMLESSLY EMBEDDED HEART RATE MONITOR**

(71) Applicant: **Apple Inc.**, Cupertino, CA (US)

(72) Inventors: **Gloria Lin**, San Ramon, CA (US); **Taido L. Nakajima**, Cupertino, CA (US); **Parsa Rahal**, Markham (CA); **Andrew B. Hodge**, Palo Alto, CA (US)

(73) Assignee: **APPLE INC.**, Cupertino, CA (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 88 days.

This patent is subject to a terminal disclaimer.

(21) Appl. No.: **14/136,658**

(22) Filed: **Dec. 20, 2013**

(65) **Prior Publication Data**

US 2014/0171775 A1 Jun. 10, 2014

Related U.S. Application Data

(63) Continuation of application No. 12/358,905, filed on Jan. 25, 2009, now Pat. No. 8,615,290.

(51) **Int. Cl.**
A61B 5/117 (2016.01)
A61B 5/04 (2006.01)

(52) **U.S. Cl.**
CPC ***A61B 5/04012*** (2013.01); ***A61B 5/0245*** (2013.01); ***A61B 5/02438*** (2013.01);

(58) **Field of Classification Search**
CPC ... A61B 5/02438; A61B 5/0245; A61B 5/404

(56) **References Cited**

U.S. PATENT DOCUMENTS

FOREIGN PATENT DOCUMENTS

Primary Examiner — Alyssa M Alter
(74) *Attorney, Agent, or Firm* — Van Court & Aldridge LLP

(57) **ABSTRACT**

This is directed to an electronic device having an integrated sensor for detecting a user’s cardiac activity and cardiac electrical signals. The electronic device can include a heart sensor having several leads for detecting a user’s cardiac signals. The leads can be coupled to interior surfaces of the electronic device housing to hide the sensor from view, such that electrical signals generated by the user can be transmitted from the user’s skin through the electronic device housing to the leads. In some embodiments, the leads can be coupled to pads placed on the exterior of the housing. The pads and housing can be finished to ensure that the pads are not visibly or haptically distinguishable on the device, thus improving the aesthetic qualities of the device. Using the detected signals, the electronic device can identify or authenticate the user and perform an operation based on the identity of the user. In some embodiments, the electronic device can determine the user’s mood from the cardiac signals and provide data related to the user’s mood.

22 Claims, 6 Drawing Sheets

AliveCor, Inc. Exhibit 1001
IPR2023-00950
Ex. 1001.1

’257 Patent

distances in bezel **460**, lead **472** of the heart sensor can be positioned against the back surface of bezel **460**. Alternatively, lead **472** can be placed within the thickness of bezel **460** (e.g., in a pocket within the bezel wall), but underneath the outer surface of the bezel. The short thickness of bezel

. . . .

Other heart sensor leads can be placed at any other suitable position on the electronic device enclosure. For example, if the enclosure is constructed from a bezel supporting a display and a housing forming the exterior surface of the device behind the display, one or more leads can be embedded in or adjacent to the housing. For example, if the

a first lead comprising a first pad that is embedded in a first portion of the enclosure, wherein an exterior

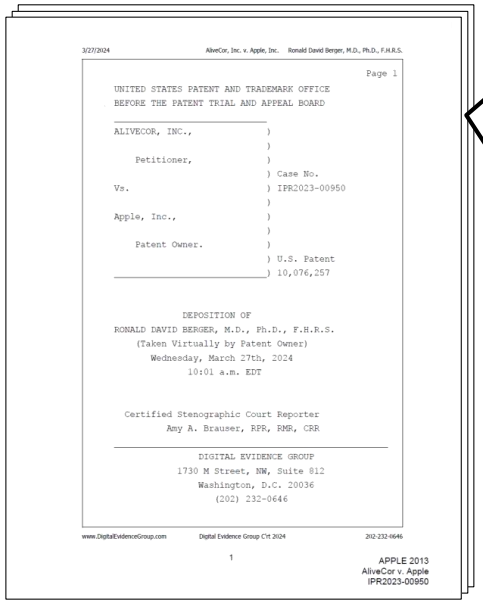
. . . .

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.

Ex. 1001, 10:24-29, 9:44-48, 12:26-27, 13:29 (annotated) (Paper 25, 3-4; Paper 28, 2)

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE – 17

"embedded in" – Apple's Interpretation is Wrong



3/27/2024 AliveCor, Inc. v. Apple, Inc. Ronald David Berger, M.D., Ph.D., F.H.R.S.

Page 1

UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE PATENT TRIAL AND APPEAL BOARD

ALIVECOR, INC., Petitioner, Vs. Apple, Inc., Patent Owner.

Case No. IPR2023-00950

U.S. Patent 10,076,257

DEPOSITION OF
RONALD DAVID BERGER, M.D., Ph.D., F.H.R.S.
(Taken Virtually by Patent Owner)
Wednesday, March 27th, 2024
10:01 a.m. EDT

Certified Stenographic Court Reporter
Amy A. Brauser, RPR, RMR, CRR

DIGITAL EVIDENCE GROUP
1730 M Street, NW, Suite 812
Washington, D.C. 20036
(202) 232-0646

www.DigitalEvidenceGroup.com Digital Evidence Group C'rt 2024 202-232-0646

1

APPLE 2013
AliveCor v. Apple
IPR2023-00950

Berger Tr.

[A. . . .] I think in the '257, embedded is -- the use "embedded" is referring not just to the relationship between the two, but that one of those structures is this perhaps larger, hard enclosure. I think "embedded" has a more specific meaning than just that they're touching each other. . . .

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

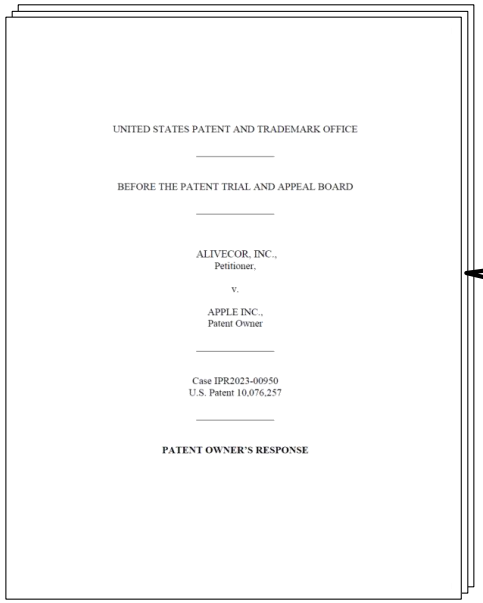
[A.] If you're saying two conductive pieces of metal that are touching each other, I believe they're, then, in electrical contact with each other. . . .

Q. So they wouldn't necessarily be – the first flat pad wouldn't necessarily be embedded in the second flat pad; is that correct? . . . .

[A.] I don't think I'd use the term "embedded" there.

AliveCor Exhibit 1024
AliveCor, Inc. v. Apple Inc.
IPR2023-00950, U.S. Patent No. 10,076,257
18 of 249

"embedded in" – Apple's Interpretation is Wrong



UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ALIVECOR, INC.,
Petitioner,

v.

APPLE INC.,
Patent Owner

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

PATENT OWNER'S RESPONSE

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

Patent Owner's Response

AliveCor Exhibit 1024
AliveCor, Inc. v. Apple Inc.
IPR2023-00950, U.S. Patent No. 10,076,257
19 of 249

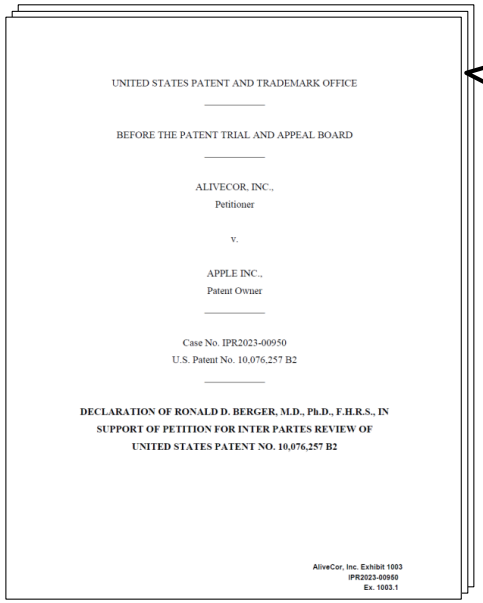
"bezel"

[12.a]: wherein the first portion of the enclosure is a bezel.

AliveCor's Construction	Apple's Construction
"plain and ordinary meaning" "A POSITA would have understood the plain and ordinary meaning of 'bezel' to include a rim that encircles an electronic device"	"plain and ordinary meaning" "The plain and ordinary meaning of the term 'bezel' is '[a] rim that secures a transparent covering for an indicating device such as a meter, oscilloscope, or watch.'"

AliveCor Exhibit 1024
AliveCor, Inc. v. Apple Inc.
IPR2023-00950, U.S. Patent No. 10,076,257
20 of 249

“bezel” – AliveCor’s Interpretation should be Adopted



UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ALIVECOR, INC.,
Petitioner

v.

APPLE INC.,
Patent Owner

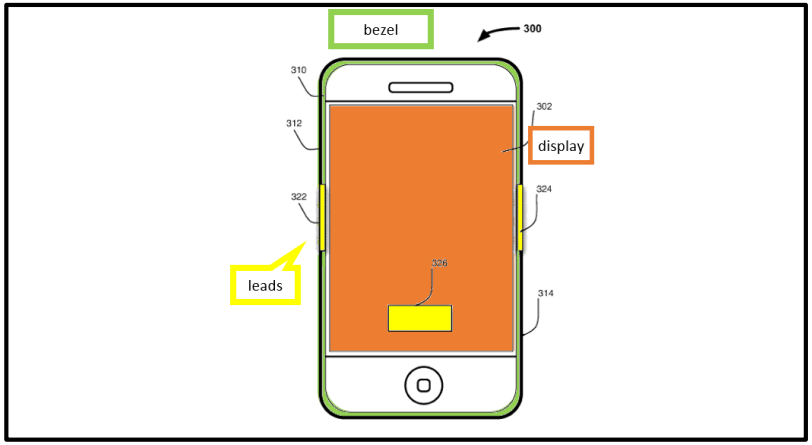
Case No. IPR2023-00950
U.S. Patent No. 10,076,257 B2

DECLARATION OF RONALD D. BERGER, M.D., Ph.D., F.H.R.S., IN SUPPORT OF PETITION FOR INTER PARTES REVIEW OF UNITED STATES PATENT NO. 10,076,257 B2

AliveCor, Inc. Exhibit 1003
IPR2023-00950
Ex. 1003.1

Berger Decl.

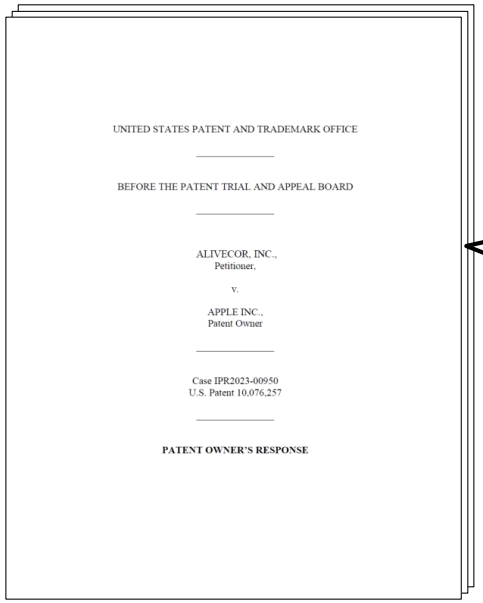
249. In the context of the ’257 patent and the claim language, a person of ordinary skill in the art would have understood the plain and ordinary meaning of “bezel” to include a rim that encircles an electronic device. For example, the ’257 patent’s Figure 3 discloses an “[e]lectronic device 300 [that] can include display 302 and bezel 310” (shown below). I apply this plain and ordinary meaning of “bezel” in my analysis below.



Ex. 1003, ¶ 249 (annotated) (Paper 2, 47); Ex. 1001, Fig. 3 (Paper 25, 8)

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE – 21

"bezel" - Apple's Construction should not be adopted



UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ALIVECOR, INC.,
Petitioner,

v.

APPLE INC.,
Patent Owner

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

PATENT OWNER'S RESPONSE

Patent Owner's Response

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

AliveCor Exhibit 1024
AliveCor, Inc. v. Apple Inc.
IPR2023-00950, U.S. Patent No. 10,076,257
22 of 249

"bezel" - Apple's Construction should not be adopted

Wiley Electrical and Electronics Engineering Dictionary

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

Merriam-Webster's Collegiate Dictionary

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

McGraw-Hill Dictionary of Scientific and Technical Terms

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

AliveCor Exhibit 1024
AliveCor, Inc. v. Apple Inc.
IPR2023-00950, U.S. Patent No. 10,076,257
23 of 249

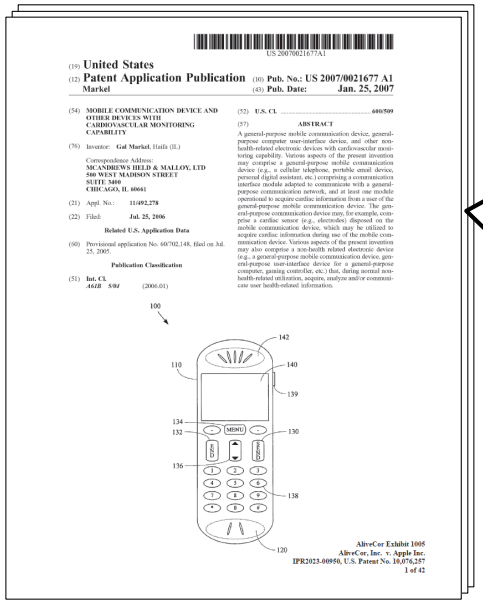
ROADMAP

1. Overview of the Challenged Patent
2. Claim Construction
3. Ground 1 - Markel
4. Ground 2 - Markel + Nissilä
5. Ground 3 - Markel + Righter
6. Apple's Motion to Amend

AliveCor Exhibit 1024
AliveCor, Inc. v. Apple Inc.
IPR2023-00950, U.S. Patent No. 10,076,257
24 of 249

Ground 1 – Overview

Claims 1-22 are unpatentable under pre-AIA 35 U.S.C. §103 over Markel.



(19) **United States**
(12) **Patent Application Publication**
Markel

(10) **Pub. No.: US 2007/0021677 A1**
(43) **Pub. Date: Jan. 25, 2007**

(54) **MOBILE COMMUNICATION DEVICE AND OTHER DEVICES WITH CARDIOVASCULAR MONITORING CAPABILITY**

(76) Inventor: **Gal Markel**, Haifa (IL)

Correspondence Address:
MCANDREWS HELD & MALLOY, LTD
500 WEST MADISON STREET
SUITE 3400
CHICAGO, IL 60661

(21) Appl. No.: **11/492,278**

(22) Filed: **Jul. 25, 2006**

Related U.S. Application Data

(60) Provisional application No. 60/702,148, filed on Jul. 25, 2005.

Publication Classification

(51) **Int. Cl.**
A61B 5/04 (2006.01)

(52) **U.S. Cl.** **600/509**

(57) **ABSTRACT**

A general-purpose mobile communication device, general-purpose computer user-interface device, and other non-health-related electronic devices with cardiovascular monitoring capability. Various aspects of the present invention may comprise a general-purpose mobile communication device (e.g., a cellular telephone, portable email device, personal digital assistant, etc.) comprising a communication interface module adapted to communicate with a general-purpose communication network, and at least one module operational to acquire cardiac information from a user of the general-purpose mobile communication device. The general-purpose communication device may, for example, comprise a cardiac sensor (e.g., electrodes) disposed on the mobile communication device, which may be utilized to acquire cardiac information during use of the mobile communication device. Various aspects of the present invention may also comprise a non-health related electronic device (e.g., a general-purpose mobile communication device, general-purpose user-interface device for a general-purpose computer, gaming controller, etc.) that, during normal non-health-related utilization, acquire, analyze and/or communicate user health-related information.

Markel

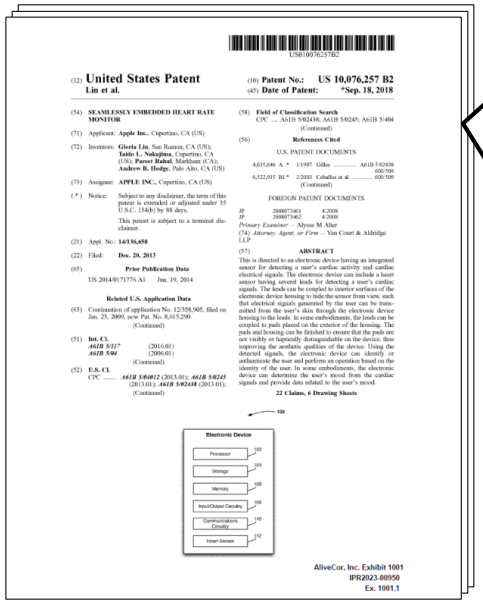
AliveCor Exhibit 1024
AliveCor, Inc. v. Apple Inc.
IPR2023-00950, U.S. Patent No. 10,076,257
25 of 249

Ground 1 – Disputes

Claims for which Petitioners rely on disclosure from *Markel*	Indep. Cls. 1, 15; Dep. Cls. 2-14, 16-22
Unpatentability based on *Markel*'s disclosure is Disputed	Indep. Cl. 1; Dep. Cls. 5-9, 12, 13, 19, 20
Unpatentability based on *Markel*'s disclosure is Undisputed	Indep. Cl. 15; Dep. Cls. 2-4, 10-11, 14, 16-18, and 21-22

AliveCor Exhibit 1024
AliveCor, Inc. v. Apple Inc.
IPR2023-00950, U.S. Patent No. 10,076,257
26 of 249

Ground 1 – Disputes on Claim 1



(12) **United States Patent**
Lin et al.

(10) **Patent No.: US 10,076,257 B2**
(45) **Date of Patent: *Sep. 18, 2018**

(54) **SEAMLESSLY EMBEDDED HEART RATE MONITOR**

(71) Applicant: **Apple Inc.**, Cupertino, CA (US)

(72) Inventors: **Gloria Lin**, San Ramon, CA (US); **Taido L. Nakajima**, Cupertino, CA (US); **Parsa Rahal**, Markham (CA); **Andrew B. Hodge**, Palo Alto, CA (US)

(73) Assignee: **APPLE INC.**, Cupertino, CA (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 88 days.

This patent is subject to a terminal disclaimer.

(21) Appl. No.: **14/136,658**

(22) Filed: **Dec. 20, 2013**

(65) **Prior Publication Data**

US 2014/0171776 A1 Jun. 19, 2014

Related U.S. Application Data

(63) Continuation of application No. 12/358,905, filed on Jan. 25, 2009, now Pat. No. 8,615,290.

(57) **ABSTRACT**

This is directed to an electronic device having an integrated sensor for detecting a user's cardiac activity and cardiac electrical signals. The electronic device can include a heart sensor having several leads for detecting a user's cardiac signals. The leads can be coupled to interior surfaces of the electronic device housing to hide the sensor from view, such that electrical signals generated by the user can be transmitted from the user's skin through the electronic device housing to the leads. In some embodiments, the leads can be coupled to pads placed on the exterior of the housing. The pads and housing can be finished to ensure that the pads are not visibly or haptically distinguishable on the device, thus improving the aesthetic qualities of the device. Using the detected signals, the electronic device can identify or authenticate the user and perform an operation based on the identity of the user. In some embodiments, the electronic device can determine the user's mood from the cardiac signals and provide data related to the user's mood.

22 Claims, 6 Drawing Sheets

AliveCor, Inc. Exhibit 1001
IPR2023-00950
Ex. 1001.1

’257 Patent

1. An electronic device for detecting a user's cardiac signal, comprising:	[1.pre] ✓
an enclosure;	[1.a] ✓
a heart sensor configured to detect the user's cardiac signal, the heart sensor comprising:	[1.b] ✓
a first lead comprising a first pad that is embedded in a first portion of the enclosure,	[1.c.i]
wherein an exterior surface of the enclosure comprises an exterior surface of the first portion,	[1.c.ii] ✓
wherein the first pad is positioned underneath the exterior surface of the first portion, and wherein the first pad is configured to detect a first electrical signal of the user's cardiac signal via the user's skin's contact with the exterior surface of the first portion of the enclosure; and	[1.c.iii]
a second lead comprising a second pad that is embedded in a second portion of the enclosure,	[1.d.i] ✓
wherein the second pad is configured to detect a second electrical signal of the user's cardiac signal via the user's skin's contact with at least one of the second pad and the second portion of the enclosure; and	[1.d.ii] ✓
a processor coupled to the heart sensor and configured to receive and process the detected cardiac signal, wherein the first lead further comprises a first connector coupled to the first pad and configured to provide the first electrical signal detected by the first pad to the processor, and wherein the second lead further comprises a second connector coupled to the second pad and configured to provide the second electrical signal detected by the second pad to the processor.	[1.e] ✓

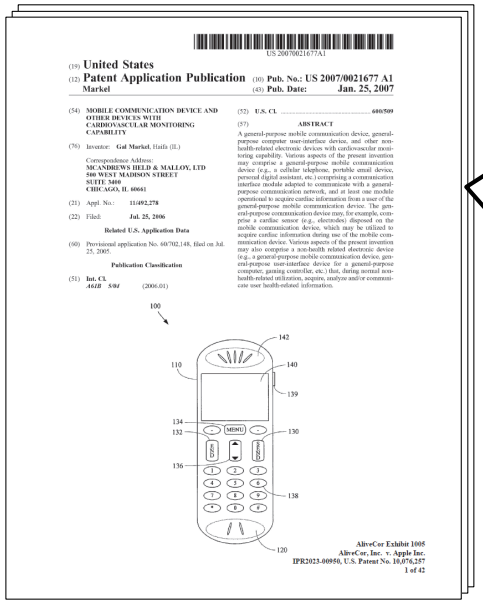
Ex. 1001, Cl. 1 (annotated) (-00948, Paper 21, 3; -00949, Paper 21, 1)

AliveCor Exhibit 1024
AliveCor, Inc. v. Apple Inc.
IPR2023-00950, U.S. Patent No. 10,076,257
27 of 249

Ground 1 – Claim 1, [1.pre]

[Undisputed]

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



US 20070021677A1

(19) United States
(12) Patent Application Publication
Markel

(10) Pub. No.: US 2007/0021677 A1
(43) Pub. Date: Jan. 25, 2007

(54) MOBILE COMMUNICATION DEVICE AND OTHER DEVICES WITH CARDIOVASCULAR MONITORING CAPABILITY

(76) Inventor: Gal Markel, Haifa (IL)

Correspondence Address:
MCANDREWS HELD & MALLOY, LTD
500 WEST MADISON STREET
SUITE 3400
CHICAGO, IL 60661

(21) Appl. No.: 11/492,278

(22) Filed: Jul. 25, 2006

Related U.S. Application Data

(60) Provisional application No. 60/702,148, filed on Jul. 25, 2005.

Publication Classification

(51) Int. Cl.
A61B 5/04 (2006.01)

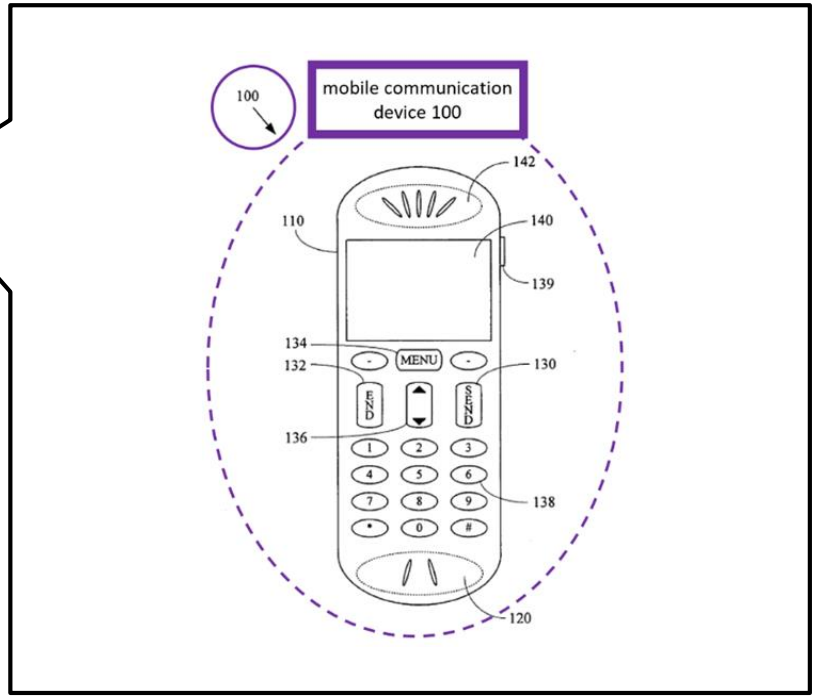
(52) U.S. Cl. 600/509

(57) ABSTRACT

A general-purpose mobile communication device, general-purpose computer user-interface device, and other non-health-related electronic devices with cardiovascular monitoring capability. Various aspects of the present invention may comprise a general-purpose mobile communication device (e.g., a cellular telephone, portable email device, personal digital assistant, etc.) comprising a communication interface module adapted to communicate with a general-purpose communication network, and at least one module operational to acquire cardiac information from a user of the general-purpose mobile communication device. The general-purpose communication device may, for example, comprise a cardiac sensor (e.g., electrodes) disposed on the mobile communication device, which may be utilized to acquire cardiac information during use of the mobile communication device. Various aspects of the present invention may also comprise a non-health related electronic device (e.g., a general-purpose mobile communication device, general-purpose user-interface device for a general-purpose computer, gaming controller, etc.) that, during normal non-health-related utilization, acquire, analyze and/or communicate user health-related information.

AliveCor Exhibit 1005
AliveCor, Inc. v. Apple Inc.
IPR2023-00950, U.S. Patent No. 10,076,257
1 of 42

Markel

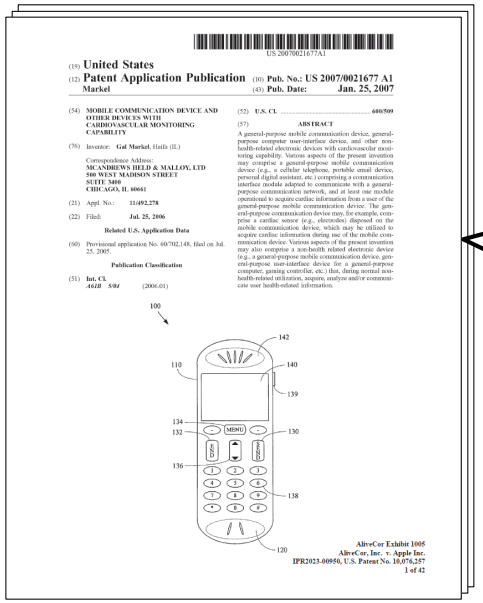


Ex. 1005, Fig. 1 (annotated) (Paper 2, 8)

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE – 28

Ground 1 – Claim 1, [1.a]

[Undisputed] ***[1.a] an enclosure;***



(19) United States
(12) Patent Application Publication
Markel
(10) Pub. No.: US 2007/0021677 A1
(43) Pub. Date: Jan. 25, 2007

(54) MOBILE COMMUNICATION DEVICE AND OTHER DEVICES WITH CARDIOVASCULAR MONITORING CAPABILITY

(76) Inventor: Gal Markel, Haifa (IL)

Correspondence Address:
MCANDREWS HELD & MALLOY, LTD
500 WEST MADISON STREET
SUITE 3400
CHICAGO, IL 60661

(21) Appl. No.: 11/492,278

(22) Filed: Jul. 25, 2006

Related U.S. Application Data

(60) Provisional application No. 60/702,148, filed on Jul. 25, 2005.

Publication Classification

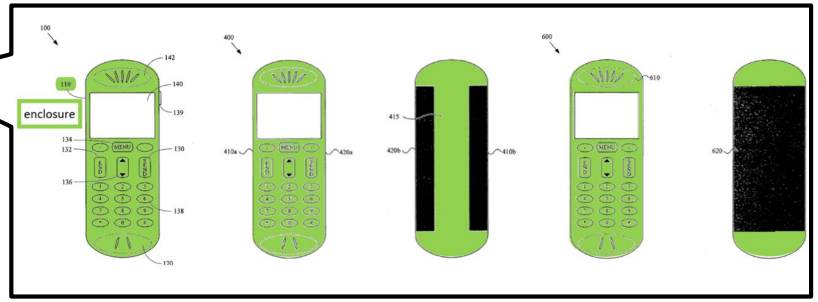
(51) Int. Cl.
A61B 5/04 (2006.01)

(52) U.S. Cl. 600/509

(57) ABSTRACT

A general-purpose mobile communication device, general-purpose computer user-interface device, and other non-health-related electronic devices with cardiovascular monitoring capability. Various aspects of the present invention may comprise a general-purpose mobile communication device (e.g., a cellular telephone, portable email device, personal digital assistant, etc.) comprising a communication interface module adapted to communicate with a general-purpose communication network, and at least one module operational to acquire cardiac information from a user of the general-purpose mobile communication device. The general-purpose communication device may, for example, comprise a cardiac sensor (e.g., electrodes) disposed on the mobile communication device, which may be utilized to acquire cardiac information during use of the mobile communication device. Various aspects of the present invention may also comprise a non-health related electronic device (e.g., a general-purpose mobile communication device, general-purpose user-interface device for a general-purpose computer, gaming controller, etc.) that, during normal non-health-related utilization, acquires, analyzes and/or communicates user health-related information.

AliveCor Exhibit 1005
AliveCor, Inc. v. Apple Inc.
IPR2023-00950, U.S. Patent No. 10,076,257
1 of 42



Markel

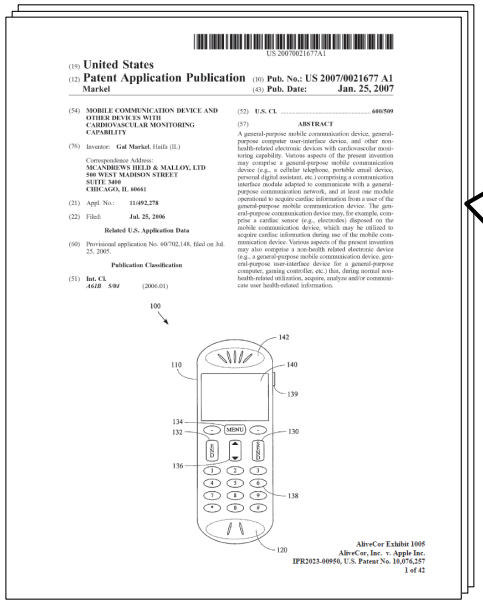
Ex. 1005, Figs. 1, 4, 6 (annotated) (Paper 2, 8)

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE – 29

Ground 1 – Claim 1, [1.b]

[Undisputed]

[1.b] a heart sensor configured to detect the user's cardiac signal, the heart sensor comprising



(19) United States
(12) Patent Application Publication
Markel
(10) Pub. No.: US 2007/0021677 A1
(43) Pub. Date: Jan. 25, 2007

(54) MOBILE COMMUNICATION DEVICE AND OTHER DEVICES WITH CARDIOVASCULAR MONITORING CAPABILITY

(76) Inventor: Gal Markel, Haifa (IL)

Correspondence Address:
MCANDREWS HELD & MALLOY, LTD
500 WEST MADISON STREET
SUITE 3400
CHICAGO, IL 60661

(21) Appl. No.: 11/492,278

(22) Filed: Jul. 25, 2006

Related U.S. Application Data

(60) Provisional application No. 60/702,148, filed on Jul. 25, 2005.

Publication Classification

(51) Int. Cl.
A61B 5/04 (2006.01)

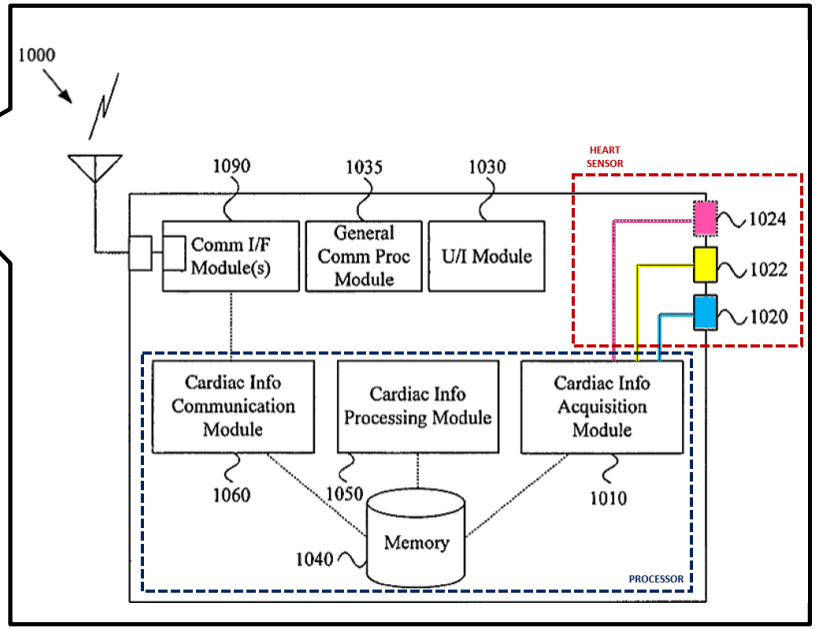
(52) U.S. Cl. 600/509

(57) ABSTRACT

A general-purpose mobile communication device, general-purpose computer user-interface device, and other non-health-related electronic devices with cardiovascular monitoring capability. Various aspects of the present invention may comprise a general-purpose mobile communication device (e.g., a cellular telephone, portable email device, personal digital assistant, etc.) comprising a communication interface module adapted to communicate with a general-purpose communication network, and at least one module operational to acquire cardiac information from a user of the general-purpose mobile communication device. The general-purpose communication device may, for example, comprise a cardiac sensor (e.g., electrodes) disposed on the mobile communication device, which may be utilized to acquire cardiac information during use of the mobile communication device. Various aspects of the present invention may also comprise a non-health related electronic device (e.g., a general-purpose mobile communication device, general-purpose user-interface device for a general-purpose computer, gaming controller, etc.) that, during normal non-health-related utilization, acquire, analyze and/or communicate user health-related information.

AliveCor Exhibit 1005
AliveCor, Inc. v. Apple Inc.
IPR2023-00950, U.S. Patent No. 10,076,257
1 of 42

Markel

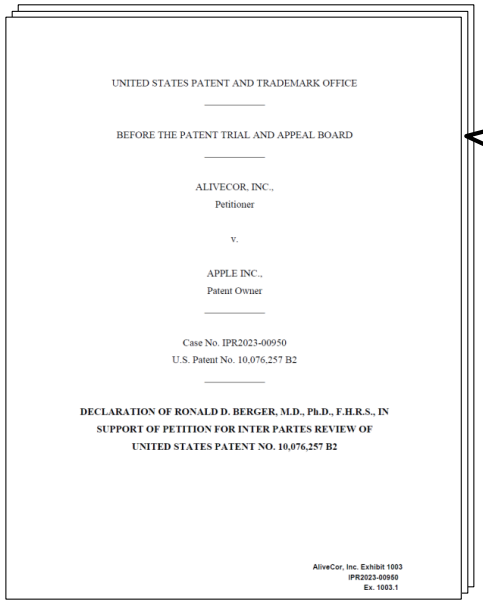


Ex. 1005, Fig. 10 (annotated) (Paper 2, 9)

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE – 30

Ground 1 – Claim 1, [1.c.i]

[1.c.i] a first lead comprising a first pad that is embedded in a first portion of the enclosure,



UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ALIVECOR, INC.,
Petitioner

v.

APPLE INC.,
Patent Owner

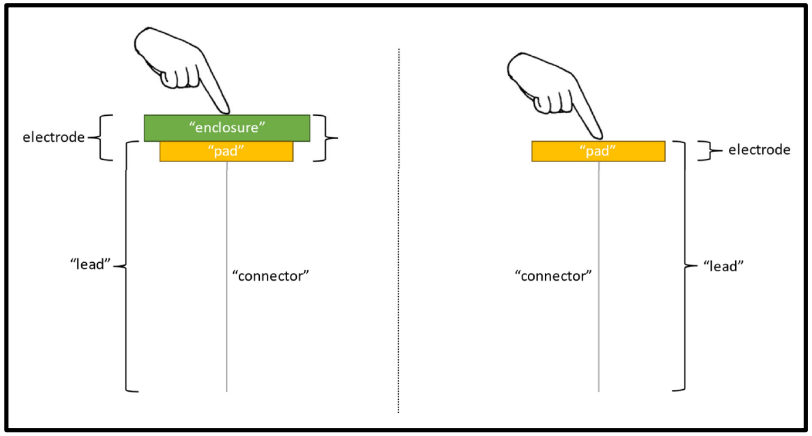
Case No. IPR2023-00950
U.S. Patent No. 10,076,257 B2

DECLARATION OF RONALD D. BERGER, M.D., Ph.D., F.H.R.S., IN SUPPORT OF PETITION FOR INTER PARTES REVIEW OF UNITED STATES PATENT NO. 10,076,257 B2

AliveCor, Inc. Exhibit 1003
IPR2023-00950
Ex. 1003.1

Berger Decl.

116. In the context of the '257 patent and the claim language, a person of ordinary skill in the art would have understood the plain and ordinary meaning of "lead" to include (1) an electrode that comes into contact with a user and (2) the electrical connection (*e.g.*, wires) that connects the electrode to additional electronics that implement that ECG signal acquisition. A person of ordinary skill in

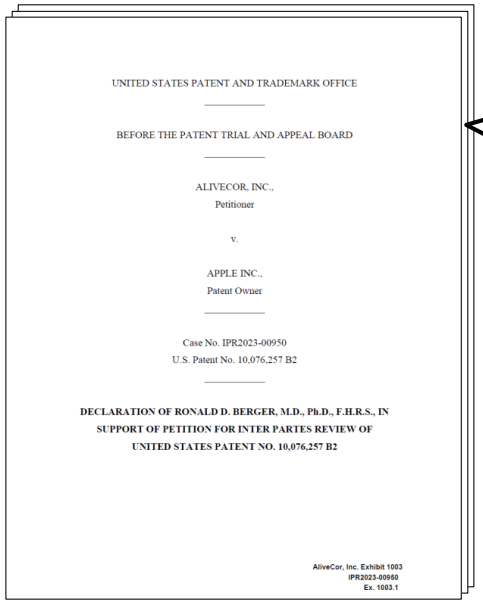


Ex. 1003, ¶ 116 (annotated) (Paper 2, 35); Paper 25, 10

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE – 31

Ground 1 – Claim 1, [1.c.i]

[1.c.i] a first lead comprising a first pad that is embedded in a first portion of the enclosure,



UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ALIVECOR, INC.,
Petitioner

v.

APPLE INC.,
Patent Owner

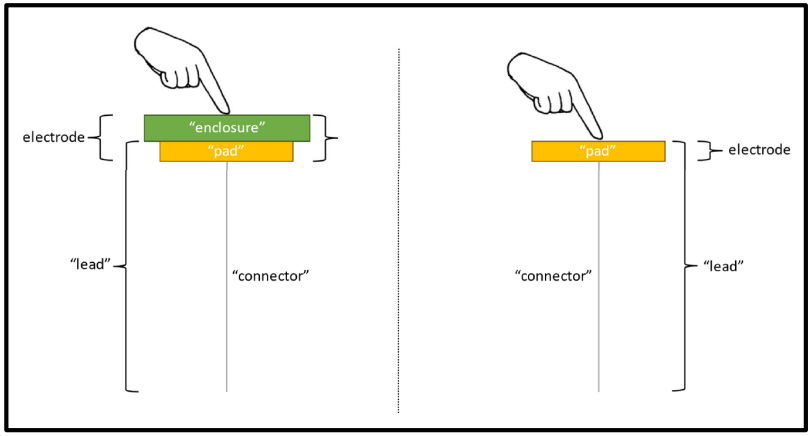
Case No. IPR2023-00950
U.S. Patent No. 10,076,257 B2

DECLARATION OF RONALD D. BERGER, M.D., Ph.D., F.H.R.S., IN SUPPORT OF PETITION FOR INTER PARTES REVIEW OF UNITED STATES PATENT NO. 10,076,257 B2

AliveCor, Inc. Exhibit 1003
IPR2023-00950
Ex. 1003.1

Berger Decl.

electronics that implement that ECG signal acquisition. A person of ordinary skill in the art would also have understood that a "pad" is a component of the electrode. This is because the claim language requires that each "lead" comprises a "pad" and "connector" that can "detect" an "electrical signal." Furthermore, the specification discloses that "***each lead can include a pad or extended area*** placed on the outer or inner surface of an electronic device bezel or housing. The pad or extended area can

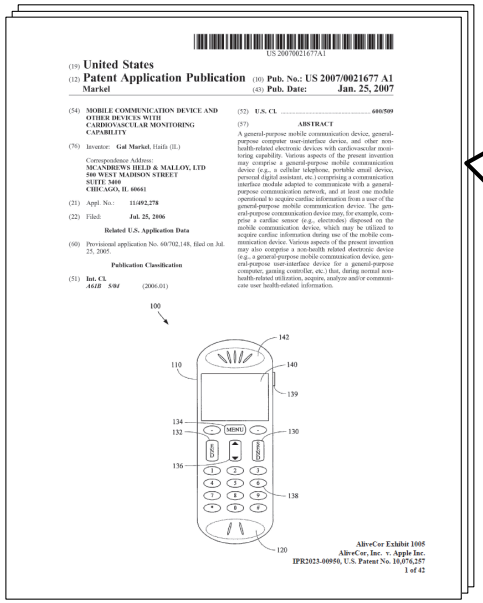


Ex. 1003, ¶ 116 (annotated) (Paper 2, 35); Paper 25, 10

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE – 32

Ground 1 – Claim 1, [1.c.i]

[1.c.i] a first lead comprising a first pad that is embedded in a first portion of the enclosure,



US 20070021677A1

(19) United States
(12) Patent Application Publication
Markel

(10) Pub. No.: US 2007/0021677 A1
(43) Pub. Date: Jan. 25, 2007

(54) MOBILE COMMUNICATION DEVICE AND OTHER DEVICES WITH CARDIOVASCULAR MONITORING CAPABILITY

(76) Inventor: Gal Markel, Haifa (IL)

Correspondence Address:
MCANDREWS HELD & MALLOY, LTD
500 WEST MADISON STREET
SUITE 3400
CHICAGO, IL 60661

(21) Appl. No.: 11/492,278

(22) Filed: Jul. 25, 2006

Related U.S. Application Data

(60) Provisional application No. 60/702,148, filed on Jul. 25, 2005.

Publication Classification

(51) Int. Cl.
A61B 5/04 (2006.01)

(52) U.S. Cl. 600/509

(57) ABSTRACT

A general-purpose mobile communication device, general-purpose computer user-interface device, and other non-health-related electronic devices with cardiovascular monitoring capability. Various aspects of the present invention may comprise a general-purpose mobile communication device (e.g., a cellular telephone, portable email device, personal digital assistant, etc.) comprising a communication interface module adapted to communicate with a general-purpose communication network, and at least one module operational to acquire cardiac information from a user of the general-purpose mobile communication device. The general-purpose communication device may, for example, comprise a cardiac sensor (e.g., electrodes) disposed on the mobile communication device, which may be utilized to acquire cardiac information during use of the mobile communication device. Various aspects of the present invention may also comprise a non-health related electronic device (e.g., a general-purpose mobile communication device, general-purpose user-interface device for a general-purpose computer, gaming controller, etc.) that, during normal non-health-related utilization, acquire, analyze and/or communicate user health-related information.

AliveCor Exhibit 1005
AliveCor, Inc. v. Apple Inc.
IPR2023-00950, U.S. Patent No. 10,076,257
1 of 42

Markel



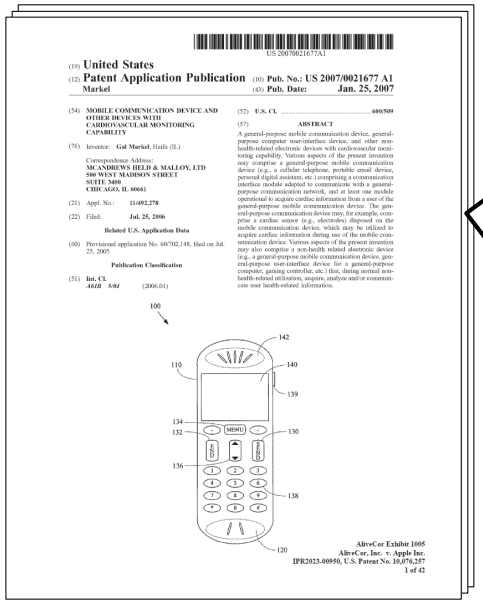
[0050] In a further non-limiting exemplary configuration, a first electrode may be disposed on a handheld portion of the MCD **100**, and a second electrode may be disposed on (or proximate) an earpiece of the MCD **100**. FIG. **6** provides a non-limiting illustration of such placement. For example,

Ex. 1005, Fig. 6, [0050] (annotated) (Paper 2, 11-13)

AliveCor Exhibit 1024
AliveCor, Inc. v. Apple Inc.
IPR2023-00950, U.S. Patent No. 10,076,257
33 of 249

Ground 1 – Claim 1, [1.c.i]

[1.c.i] a first lead comprising a first pad that is embedded in a first portion of the enclosure,



US 20070021677A1

(19) United States
(12) Patent Application Publication
Markel

(10) Pub. No.: US 2007/0021677 A1
(43) Pub. Date: Jan. 25, 2007

(54) MOBILE COMMUNICATION DEVICE AND OTHER DEVICES WITH CARDIOVASCULAR MONITORING CAPABILITY

(76) Inventor: Gal Markel, Haifa (IL)

Correspondence Address:
MCANDREWS HELD & MALLOY, LTD
500 WEST MADISON STREET
SUITE 3400
CHICAGO, IL 60661

(21) Appl. No.: 11/492,278

(22) Filed: Jul. 25, 2006

Related U.S. Application Data

(60) Provisional application No. 60/702,148, filed on Jul. 25, 2005.

Publication Classification

(51) Int. Cl.
A61B 5/04 (2006.01)

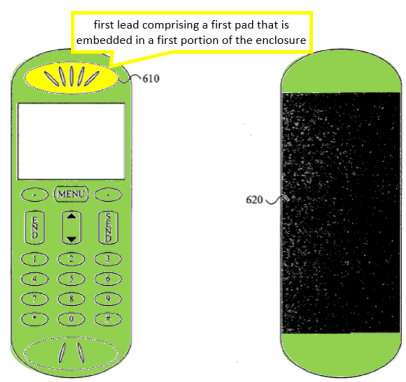
(52) U.S. Cl. 600/509

(57) ABSTRACT

A general-purpose mobile communication device, general-purpose computer user-interface device, and other non-health-related electronic devices with cardiovascular monitoring capability. Various aspects of the present invention may comprise a general-purpose mobile communication device (e.g., a cellular telephone, portable email device, personal digital assistant, etc.) comprising a communication interface module adapted to communicate with a general-purpose communication network, and at least one module operational to acquire cardiac information from a user of the general-purpose mobile communication device. The general-purpose communication device may, for example, comprise a cardiac sensor (e.g., electrodes) disposed on the mobile communication device, which may be utilized to acquire cardiac information during use of the mobile communication device. Various aspects of the present invention may also comprise a non-health related electronic device (e.g., a general-purpose mobile communication device, general-purpose user-interface device for a general-purpose computer, gaming controller, etc.) that, during normal non-health-related utilization, acquire, analyze and/or communicate user health-related information.

AliveCor Exhibit 1005
AliveCor, Inc. v. Apple Inc.
IPR2023-00950, U.S. Patent No. 10,076,257
1 of 42

Markel

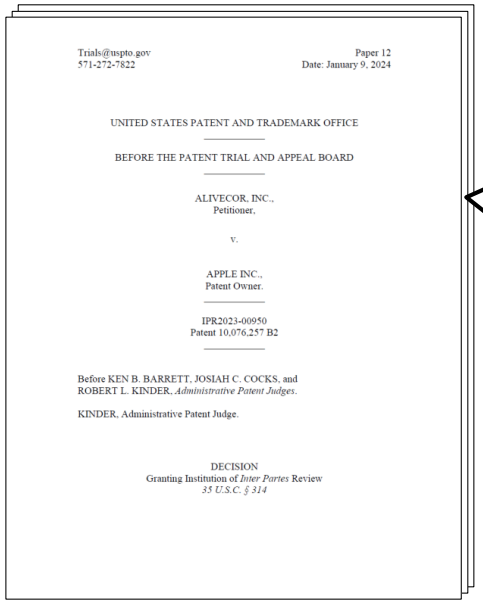


a non-limiting illustration of such placement. For example, the mobile communication device **600** may comprise a main body portion **620** and an audio output portion **610** (e.g., an earpiece). A first electrode may be disposed on the main body portion **620** (e.g., molded into the main body portion **620** or positioned on the main body portion **620**). A second electrode may be disposed on the audio output portion **610** (e.g., molded into the audio output portion **610** or positioned on the audio output portion **610**). Such electrode placement may, for example, provide for user contact with both electrodes during the process of listening to the MCD **100**.

Ex. 1005, Fig. 6, [0050] (annotated) (Paper 2, 11-13)

AliveCor Exhibit 1024
AliveCor, Inc. v. Apple Inc.
IPR2023-00950, U.S. Patent No. 10,076,257
34 of 249

Ground 1 – Claim 1, [1.c.i]



Trials@uspto.gov
571-272-7822

Paper 12
Date: January 9, 2024

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ALIVECOR, INC.,
Petitioner,

v.

APPLE INC.,
Patent Owner.

IPR2023-00950
Patent 10,076,257 B2

Before KEN B. BARRETT, JOSIAH C. COCKS, and ROBERT L. KINDER, *Administrative Patent Judges*.

KINDER, Administrative Patent Judge.

DECISION
Granting Institution of *Inter Partes* Review
35 U.S.C. § 314

Institution Decision

[1.c.i] "the heart sensor comprising: a first lead comprising a first pad that is embedded in a first portion of the enclosure,"

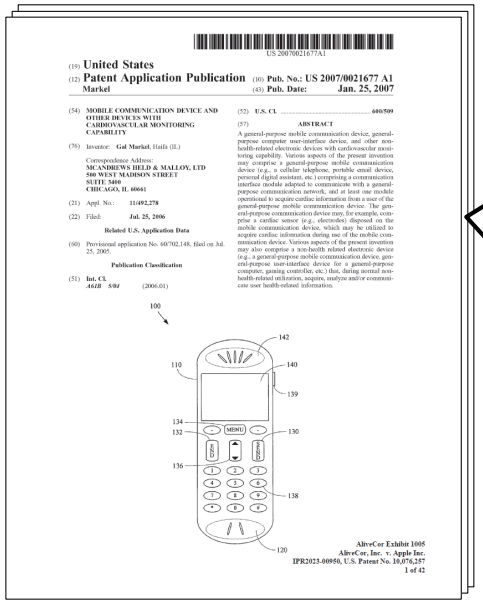
. . . .

Ex. 1003 ¶ 116). Petitioner argues Markel discloses such a first lead because Markel's second electrode 22 and associated wiring "is 'coupled' to the cardiac information acquisition module" and "is '***molded into the audio output portion 610*** or positioned on the main body portion 610' of the electronic device." *Id*. at 11–13 (citing Ex. 1003 ¶¶ 118–119; Ex. 1005 ¶¶ 50, 5859, Fig. 10). Petitioner argues that "[a] POSITA would have understood that a 'pad' is a component of the electrode." Pet. 11 (citing Ex. 1003 ¶ 116).

AliveCor Exhibit 1024
AliveCor, Inc. v. Apple Inc.
IPR2023-00950, U.S. Patent No. 10,076,257
35 of 249

Ground 1 – Claim 1, [1.c.i]

[1.c.i] a first lead comprising a first pad that is embedded in a first portion of the enclosure,



US 20070021677A1

(19) **United States**

(12) **Patent Application Publication** (10) **Pub. No.: US 2007/0021677 A1**

Markel (43) **Pub. Date: Jan. 25, 2007**

(54) **MOBILE COMMUNICATION DEVICE AND OTHER DEVICES WITH CARDIOVASCULAR MONITORING CAPABILITY**

(76) Inventor: **Gal Markel**, Haifa (IL)

Correspondence Address:
MCANDREWS HELD & MALLOY, LTD
500 WEST MADISON STREET
SUITE 3400
CHICAGO, IL 60661

(21) Appl. No.: **11/492,278**

(22) Filed: **Jul. 25, 2006**

Related U.S. Application Data

(60) Provisional application No. 60/702,148, filed on Jul. 25, 2005.

Publication Classification

(51) **Int. Cl.**
A61B 5/04 (2006.01)

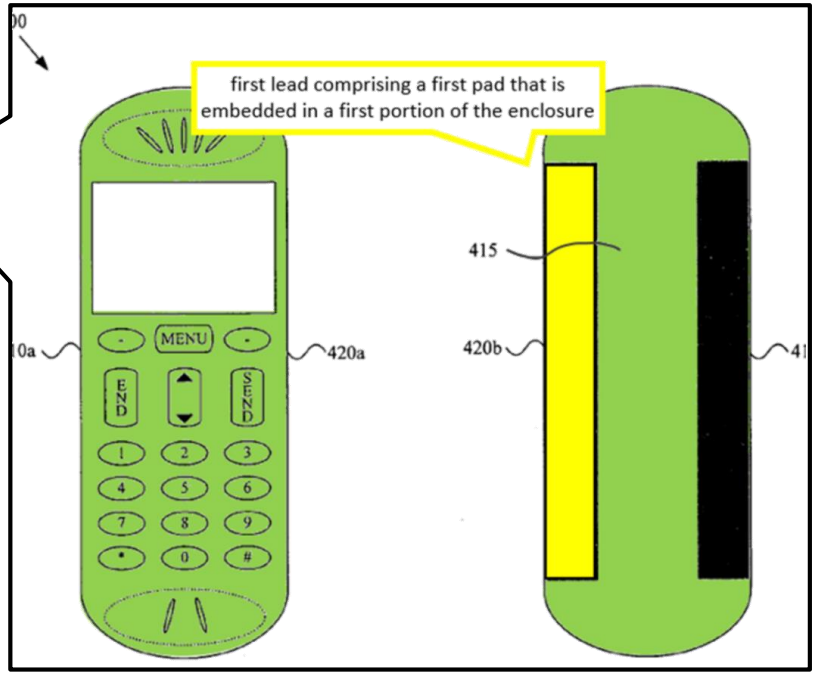
(52) **U.S. Cl.** **600/509**

(57) **ABSTRACT**

A general-purpose mobile communication device, general-purpose computer user-interface device, and other non-health-related electronic devices with cardiovascular monitoring capability. Various aspects of the present invention may comprise a general-purpose mobile communication device (e.g., a cellular telephone, portable email device, personal digital assistant, etc.) comprising a communication interface module adapted to communicate with a general-purpose communication network, and at least one module operational to acquire cardiac information from a user of the general-purpose mobile communication device. The general-purpose communication device may, for example, comprise a cardiac sensor (e.g., electrodes) disposed on the mobile communication device, which may be utilized to acquire cardiac information during use of the mobile communication device. Various aspects of the present invention may also comprise a non-health related electronic device (e.g., a general-purpose mobile communication device, general-purpose user-interface device for a general-purpose computer, gaming controller, etc.) that, during normal non-health-related utilization, acquire, analyze and/or communicate user health-related information.

AliveCor Exhibit 1005
AliveCor, Inc. v. Apple Inc.
IPR2023-00950, U.S. Patent No. 10,076,257
1 of 42

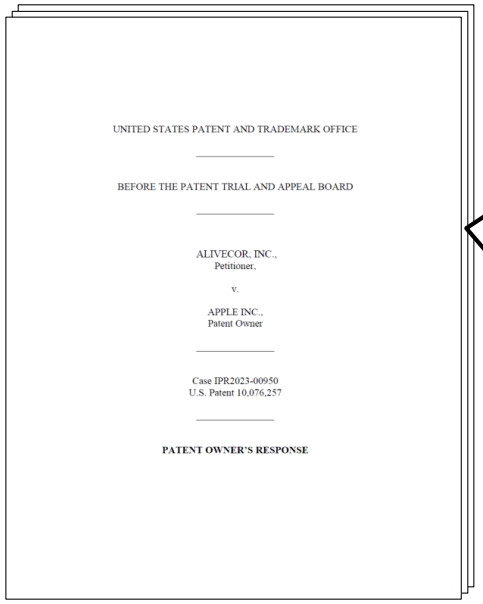
Markel



Ex. 1005, Fig. 4 (annotated) (Paper 2, 14)

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE – 36

Ground 1 – Claim 1, [1.c.i] – Apple's Arg.



UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ALIVECOR, INC.,
Petitioner,

v.

APPLE INC.,
Patent Owner

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

PATENT OWNER'S RESPONSE

Patent Owner's Response

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

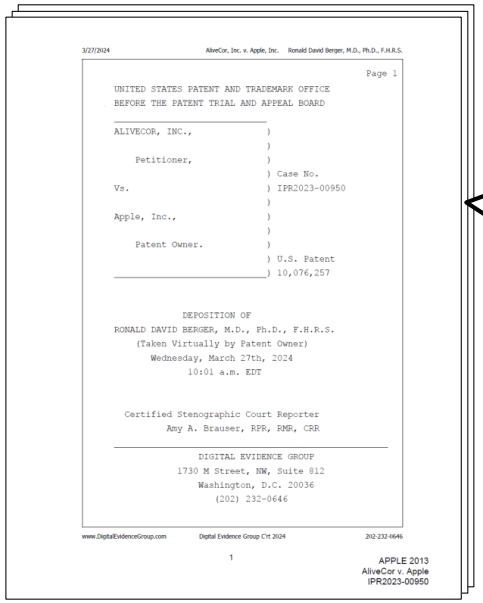
As addressed in Section IV, *supra*, the proper construction of the term "embedded in" requires more than two materials or substrates that are merely positioned adjacent to, parallel, or against each other but rather, the plain and ordinary meaning of the term "embedded in" means "at least partially set in or partially surrounded by a material." APPLE-2004, ¶¶27-35, 95. And the claims

. . . .

signal. Even if Markel were modified to add a second intermediate conductive layer under the electrodes of Markel's device, AliveCor makes no attempt to demonstrate why such an intermediate layer would have been "embedded in" the external electrode rather than the two layers being merely in parallel contact with no portion of the outer electrode at least partially surrounding the lower electrode/pad. APPLE-2004, ¶¶96-97. AliveCor's expert agreed that he would not

AliveCor Exhibit 1024
AliveCor, Inc. v. Apple Inc.
IPR2023-00950, U.S. Patent No. 10,076,257
37 of 249

Ground 1 – Claim 1, [1.c.i] – Apple's Arg. - Reply



3/27/2024 AliveCor, Inc. v. Apple, Inc. Ronald David Berger, M.D., Ph.D., F.H.R.S.

Page 1

UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE PATENT TRIAL AND APPEAL BOARD

ALIVECOR, INC.,
Petitioner,
Vs.
Apple, Inc.,
Patent Owner.

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

DEPOSITION OF
RONALD DAVID BERGER, M.D., Ph.D., F.H.R.S.
(Taken Virtually by Patent Owner)
Wednesday, March 27th, 2024
10:01 a.m. EDT

Certified Stenographic Court Reporter
Amy A. Brauser, RPR, RMR, CRR

DIGITAL EVIDENCE GROUP
1730 M Street, NW, Suite 812
Washington, D.C. 20036
(202) 232-0646

www.DigitalEvidenceGroup.com Digital Evidence Group C'rt 2024 202-232-0646

1

APPLE 2013
AliveCor v. Apple
IPR2023-00950

Berger Tr.

Q. So going back to my earlier question, is there any description in Markel of the audio output portion 610 being made of conductive material?

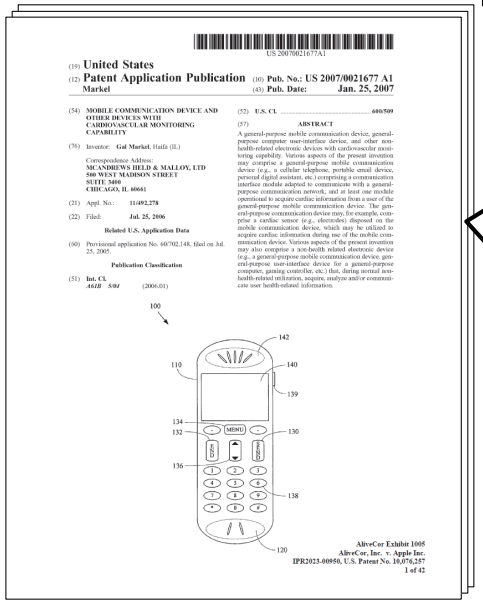
A. Again, I think a POSITA would understand that you need a highly conductive material, whether on the surface or molded into and embedded under the surface, in order to make adequate electrical connectivity to the user.

AliveCor Exhibit 1024
AliveCor, Inc. v. Apple Inc.
IPR2023-00950, U.S. Patent No. 10,076,257
38 of 249

Ground 1 – Claim 1, [1.c.ii]

[Undisputed]

[1.c.ii] wherein an exterior surface of the enclosure comprises an exterior surface of the first portion,



US 20070021677A1

(19) United States
(12) Patent Application Publication
Markel

(10) Pub. No.: US 2007/0021677 A1
(43) Pub. Date: Jan. 25, 2007

(54) MOBILE COMMUNICATION DEVICE AND OTHER DEVICES WITH CARDIOVASCULAR MONITORING CAPABILITY

(76) Inventor: Gal Markel, Haifa (IL)

Correspondence Address:
MCANDREWS HELD & MALLOY, LTD
500 WEST MADISON STREET
SUITE 3400
CHICAGO, IL 60661

(21) Appl. No.: 11/492,278

(22) Filed: Jul. 25, 2006

Related U.S. Application Data

(60) Provisional application No. 60/702,148, filed on Jul. 25, 2005.

Publication Classification

(51) Int. Cl.
A61B 5/04 (2006.01)

(52) U.S. Cl. 600/509

(57) ABSTRACT

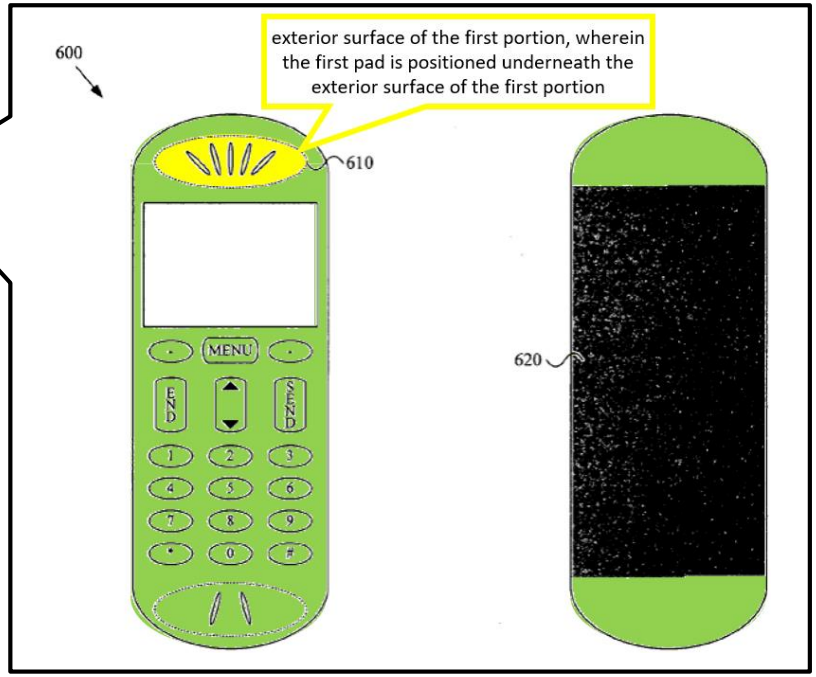
A general-purpose mobile communication device, general-purpose computer user-interface device, and other non-health-related electronic devices with cardiovascular monitoring capability. Various aspects of the present invention may comprise a general-purpose mobile communication device (e.g., a cellular telephone, portable email device, personal digital assistant, etc.) comprising a communication interface module adapted to communicate with a general-purpose communication network, and at least one module operational to acquire cardiac information from a user of the general-purpose mobile communication device. The general-purpose communication device may, for example, comprise a cardiac sensor (e.g., electrodes) disposed on the mobile communication device, which may be utilized to acquire cardiac information during use of the mobile communication device. Various aspects of the present invention may also comprise a non-health related electronic device (e.g., a general-purpose mobile communication device, general-purpose user-interface device for a general-purpose computer, gaming controller, etc.) that, during normal non-health-related utilization, acquire, analyze and/or communicate user health-related information.

100

110 140 142 139 134 132 130 136 138 120

AliveCor Exhibit 1005
AliveCor, Inc. v. Apple Inc.
IPR2023-00950, U.S. Patent No. 10,076,257
1 of 42

Markel

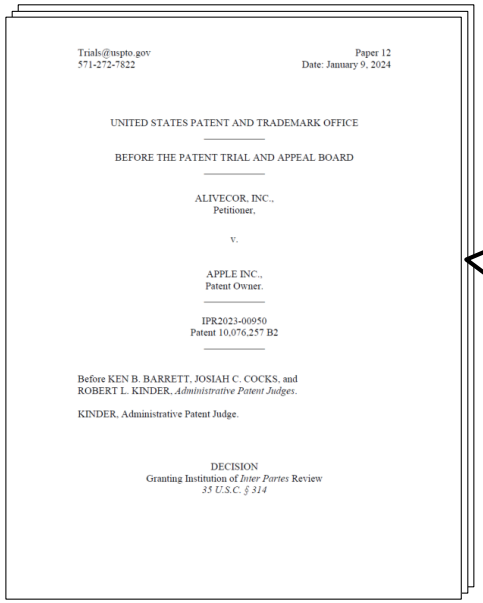


Ex. 1005, Fig. 6 (annotated) (Paper 2, 15)

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE – 39

Ground 1 – Claim 1, [1.c.iii]

[1.c.iii] wherein the first pad is positioned underneath the exterior surface of the first portion, and wherein the first pad is configured to detect a first electrical signal of the user's cardiac signal via the user's skin's contact with the exterior surface of the first portion of the enclosure; and



Trials@uspto.gov
571-272-7822

Paper 12
Date: January 9, 2024

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ALIVECOR, INC.,
Petitioner,

v.

APPLE INC.,
Patent Owner.

IPR2023-00950
Patent 10,076,257 B2

Before KEN B. BARRETT, JOSIAH C. COCKS, and ROBERT L. KINDER, *Administrative Patent Judges*.

KINDER, Administrative Patent Judge.

DECISION
Granting Institution of *Inter Partes* Review
35 U.S.C. § 314

Institution Decision

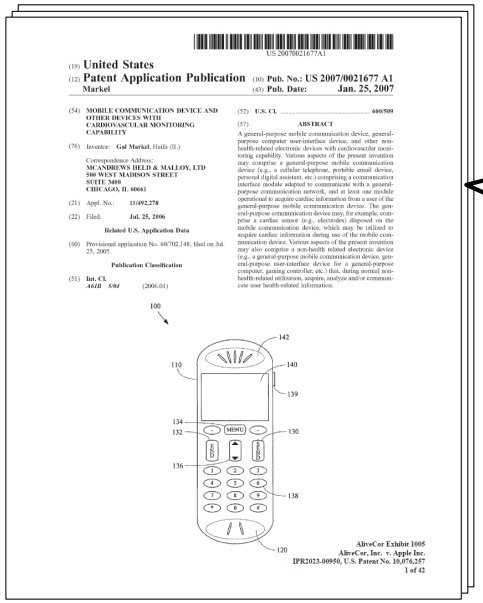
We are not fully convinced that Markel's disclosure that an electrode may be substantially concealed from a user with no visible indication suggests Petitioner's proposed modification to place the pad of an electrode underneath the conductive plastic. Whether an electrode may be considered underneath the conductive material when the electrode itself is made of that same conductive material is an issue we will decide upon the final record.

We also question whether Petitioner's motivation for placing the pad of the electrode underneath the conductive plastic – "to increase the device's aesthetics while protecting the electrode" – is a sufficient basis or reason to modify Markel. For example, Markel's teaching of concealing electrodes

AliveCor Exhibit 1024
AliveCor, Inc. v. Apple Inc.
IPR2023-00950, U.S. Patent No. 10,076,257
40 of 249

Ground 1 – Claim 1, [1.c.iii]

[1.c.iii] wherein the first pad is positioned underneath the exterior surface of the first portion, and wherein the first pad is configured to detect a first electrical signal of the user's cardiac signal via the user's skin's contact with the exterior surface of the first portion of the enclosure; and



(19) United States
(12) Patent Application Publication
Markel
(10) Pub. No.: US 2007/0021677 A1
(43) Pub. Date: Jan. 25, 2007

(54) MOBILE COMMUNICATION DEVICE AND OTHER DEVICES WITH CARDIOVASCULAR MONITORING CAPABILITY

(76) Inventor: Gal Markel, Haifa (IL)

Correspondence Address:
MCANDREWS HELD & MALLOY, LTD
500 WEST MADISON STREET
SUITE 3400
CHICAGO, IL 60661

(21) Appl. No.: 11/492,278

(22) Filed: Jul. 25, 2006

Related U.S. Application Data

(60) Provisional application No. 60/702,148, filed on Jul. 25, 2005.

Publication Classification

(51) Int. Cl.
A61B 5/04 (2006.01)

(52) U.S. Cl. 600/509

(57) ABSTRACT

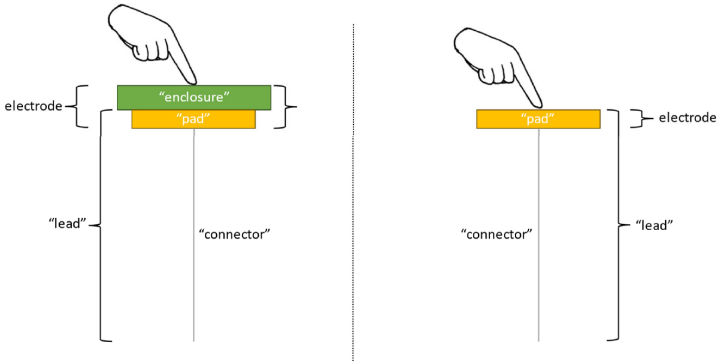
A general-purpose mobile communication device, general-purpose computer user-interface device, and other non-health-related electronic devices with cardiovascular monitoring capability. Various aspects of the present invention may comprise a general-purpose mobile communication device (e.g., a cellular telephone, portable email device, personal digital assistant, etc.) comprising a communication interface module adapted to communicate with a general-purpose communication network, and at least one module operational to acquire cardiac information from a user of the general-purpose mobile communication device. The general-purpose communication device may, for example, comprise a cardiac sensor (e.g., electrodes) disposed on the mobile communication device, which may be utilized to acquire cardiac information during use of the mobile communication device. Various aspects of the present invention may also comprise a non-health related electronic device (e.g., a general-purpose mobile communication device, general-purpose user-interface device for a general-purpose computer, gaming controller, etc.) that, during normal non-health-related utilization, acquire, analyze and/or communicate user health-related information.

100
110
142
140
139
134
132
130
136
138
120
MENU
CLEAR
ENTER

AliveCor Exhibit 1005
AliveCor, Inc. v. Apple Inc.
IPR2023-00950, U.S. Patent No. 10,076,257
1 of 42

Markel

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

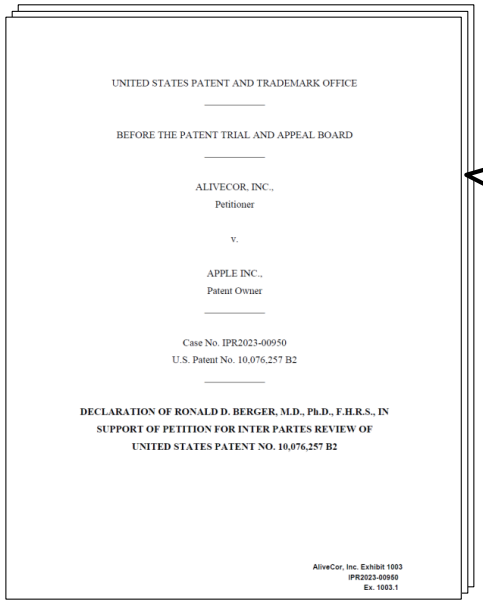


Ex. 1005, [0040] (annotated) (Paper 2, 20)

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE – 41

Ground 1 – Claim 1, [1.c.iii]

[1.c.iii] wherein the first pad is positioned underneath the exterior surface of the first portion, and wherein the first pad is configured to detect a first electrical signal of the user's cardiac signal via the user's skin's contact with the exterior surface of the first portion of the enclosure; and



UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ALIVECOR, INC.,
Petitioner

v.

APPLE INC.,
Patent Owner

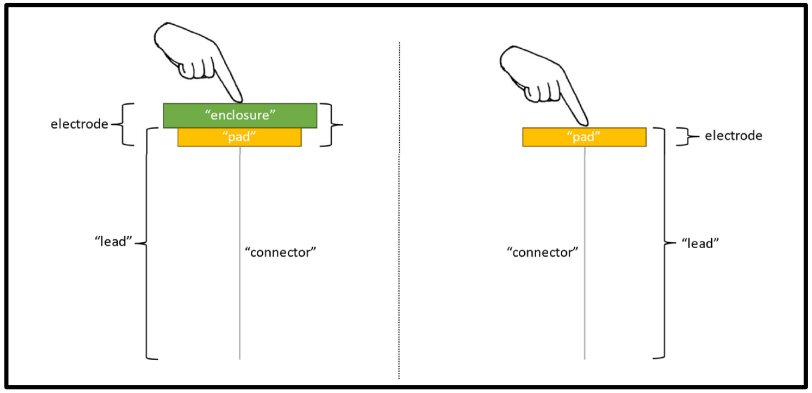
Case No. IPR2023-00950
U.S. Patent No. 10,076,257 B2

DECLARATION OF RONALD D. BERGER, M.D., Ph.D., F.H.R.S., IN SUPPORT OF PETITION FOR INTER PARTES REVIEW OF UNITED STATES PATENT NO. 10,076,257 B2

AliveCor, Inc. Exhibit 1003
IPR2023-00950
Ex. 1003.1

Berger Decl.

another material)" (Ex-1005, [0037] (emphasis added)). From this, a person of ordinary skill in the art would have been motivated to place the pad of the "second electrode" *underneath* the conductive plastic of the "audio output portion." This would have "substantially concealed (or hidden)" the pad of the electrode from the user, which would have been desirable to increase aesthetics of the device while protecting the electrode.

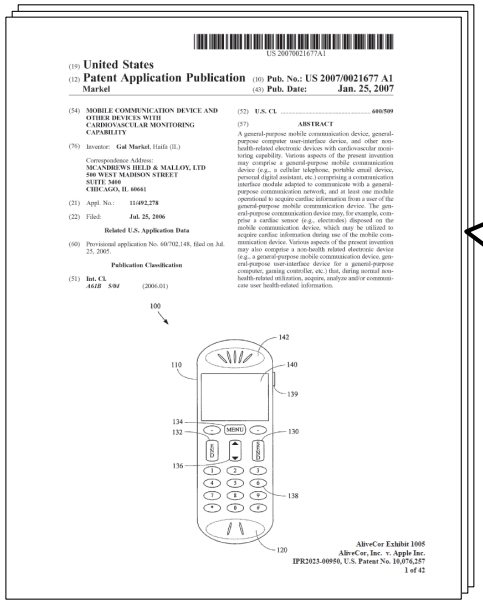


Ex. 1003, ¶ 116 (annotated) (Paper 2, 35); Paper 25, 10

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE – 42

Ground 1 – Claim 1, [1.c.iii]

[1.c.iii] wherein the first pad is positioned underneath the exterior surface of the first portion, and wherein the first pad is configured to detect a first electrical signal of the user's cardiac signal via the user's skin's contact with the exterior surface of the first portion of the enclosure; and



US 20070021677A1

(19) United States
(12) Patent Application Publication
Markel

(10) Pub. No.: US 2007/0021677 A1
(43) Pub. Date: Jan. 25, 2007

(54) MOBILE COMMUNICATION DEVICE AND OTHER DEVICES WITH CARDIOVASCULAR MONITORING CAPABILITY

(76) Inventor: Gal Markel, Haifa (IL)

Correspondence Address:
MCANDREWS HELD & MALLOY, LTD
500 WEST MADISON STREET
SUITE 3400
CHICAGO, IL 60661

(21) Appl. No.: 11/492,278

(22) Filed: Jul. 25, 2006

Related U.S. Application Data

(60) Provisional application No. 60/702,148, filed on Jul. 25, 2005.

Publication Classification

(51) Int. Cl.
A61B 5/04 (2006.01)

(52) U.S. Cl. 600/509

(57) ABSTRACT

A general-purpose mobile communication device, general-purpose computer user-interface device, and other non-health-related electronic devices with cardiovascular monitoring capability. Various aspects of the present invention may comprise a general-purpose mobile communication device (e.g., a cellular telephone, portable email device, personal digital assistant, etc.) comprising a communication interface module adapted to communicate with a general-purpose communication network, and at least one module operational to acquire cardiac information from a user of the general-purpose mobile communication device. The general-purpose communication device may, for example, comprise a cardiac sensor (e.g., electrodes) disposed on the mobile communication device, which may be utilized to acquire cardiac information during use of the mobile communication device. Various aspects of the present invention may also comprise a non-health related electronic device (e.g., a general-purpose mobile communication device, general-purpose user-interface device for a general-purpose computer, gaming controller, etc.) that, during normal non-health-related utilization, acquire, analyze and/or communicate user health-related information.

AliveCor Exhibit 1005
AliveCor, Inc. v. Apple Inc.
IPR2023-00950, U.S. Patent No. 10,076,257
1 of 42

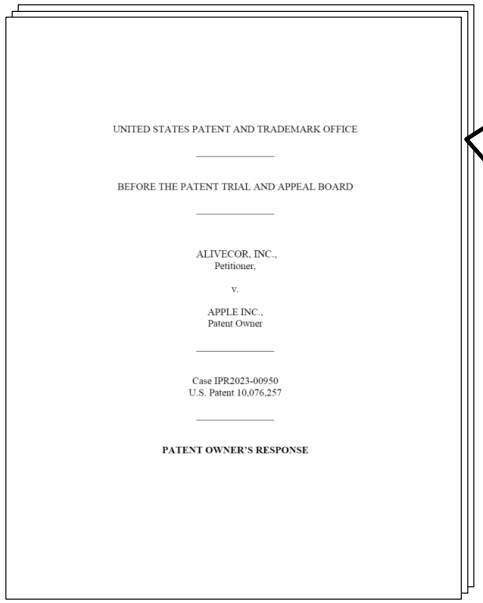
Markel

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

Ex. 1005, [0037] (annotated) (Paper 2, 20)

AliveCor Exhibit 1024
AliveCor, Inc. v. Apple Inc.
IPR2023-00950, U.S. Patent No. 10,076,257
43 of 249

Ground 1 – Claim 1, [1.c.iii] – Apple's Arg. 1



UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ALIVECOR, INC.,
Petitioner,

v.

APPLE INC.,
Patent Owner

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

PATENT OWNER'S RESPONSE

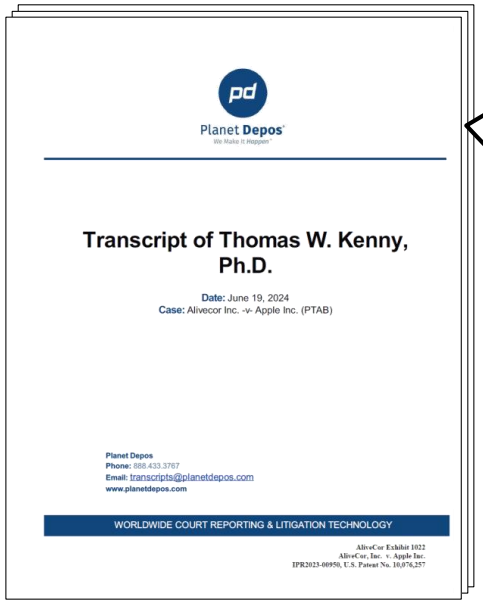
Patent Owner's Response

There is simply no disclosure in Markel of concealing the presence of electrodes by positioning them under the exterior surface of the device.

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

AliveCor Exhibit 1024
AliveCor, Inc. v. Apple Inc.
IPR2023-00950, U.S. Patent No. 10,076,257
44 of 249

Ground 1 – Claim 1, [1.c.iii] – Apple's Arg. 1 – Reply



Planet Depos
We Make It Happen

Transcript of Thomas W. Kenny, Ph.D.

Date: June 19, 2024
Case: Alivecor Inc. -v- Apple Inc. (PTAB)

Planet Depos
Phone: 888.433.3767
Email: transcripts@planetdepos.com
www.planetdepos.com

WORLDWIDE COURT REPORTING & LITIGATION TECHNOLOGY

AliveCor Exhibit 1022
AliveCor, Inc. v. Apple Inc.
IPR2023-00950, U.S. Patent No. 10,076,257

Kenny Tr.

A. . . . [O]ne of ordinary skill in the art can look at things that are called electrodes in the prior art references and make a judgment as to whether those are equivalent to or whether those anticipate the terms of the '257 patent. . . .

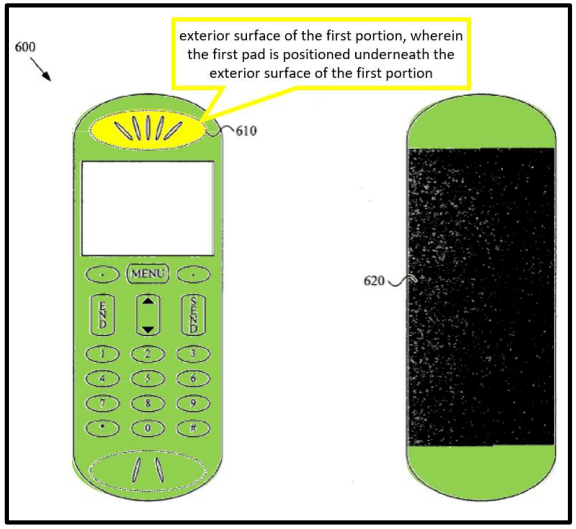
Q. So when you performed your analysis in this proceeding, was it your understanding that the word "electrode" is not enough by itself to tell you whether a prior art reference has a pad or not?

A. Well in reading the requirements of Claim 1, . . . an electrode might or might not meet those limitations.

Ex. 1022, 71:22-72:9, 72:22-73:2 (Paper 25, 11)

AliveCor Exhibit 1024
AliveCor, Inc. v. Apple Inc.
IPR2023-00950, U.S. Patent No. 10,076,257
45 of 249

Ground 1 – Claim 1, [1.c.iii] – Apple's Arg. 1 – Reply



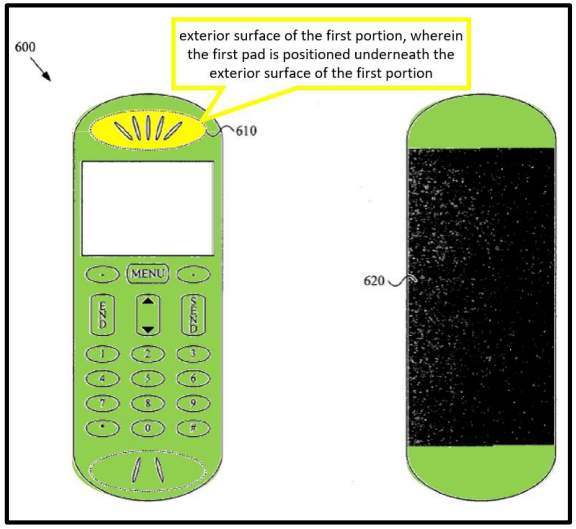
Q. When you formed your opinions, did you identify any disclosure in Markel suggesting that the audio output portion, 610, should be made out of a different material from the area outside of 610?

A. . . . There's no explicit disclosure of the material that surrounds 610 in figure 6. I would expect one of ordinary skill in the art to imagine or assume that that material is a similar insulating material to what one has on figure 4 labeled item 415.

Ex. 1022, 96:5-11 (Paper 25, 12)

AliveCor Exhibit 1024
AliveCor, Inc. v. Apple Inc.
IPR2023-00950, U.S. Patent No. 10,076,257
46 of 249

Ground 1 – Claim 1, [1.c.iii] – Apple's Arg. 1 – Reply

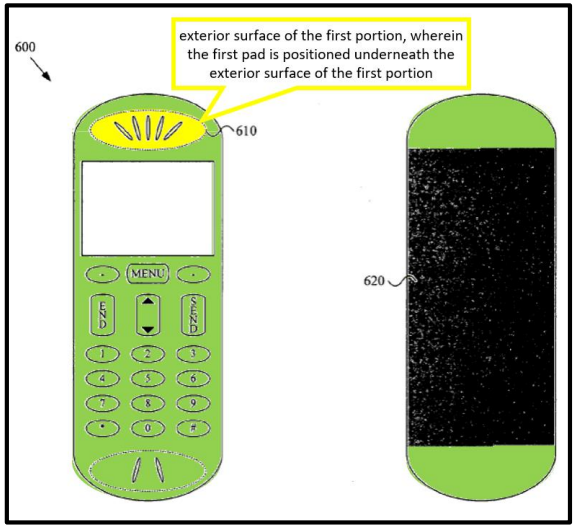


[Q.] In the context of the '257 patent, can a pad be made of the same material as the enclosure or bezel?

A. So column 6, around line 17, . . . this is, again, narrative describing the design space, that the heart sensor leads can be constructed from materials that have superior conductivity relative to the other elements of the system, and that makes the design relatively easy. I think, as the conductivities approach each other in value, then the geometry becomes more important.

AliveCor Exhibit 1024
AliveCor, Inc. v. Apple Inc.
IPR2023-00950, U.S. Patent No. 10,076,257
47 of 249

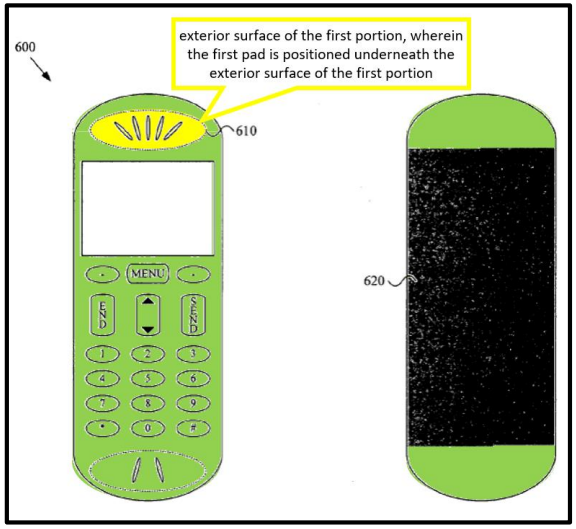
Ground 1 – Claim 1, [1.c.iii] – Apple's Arg. 1 – Reply



[A.] I think it's a -- this is in this kind of design space where there's tradeoffs and not absolute . . . it's a combination of the materials choice and other elements of the design and, frankly, the specifications and parameters that one is applying . . . .

As an engineer one knows that you can often combine things in ways that are inoptimal and they still can be made to work, but for systems like this, particularly if you're attempting to extract medical information, physiological information about the user, I think there's a motivation to design systems where you have a high margin for success and that, therefore, you'd be motivated to follow this advice in column 6, that the leads, the pads should be constructed from materials that have superior conductivity where possible.

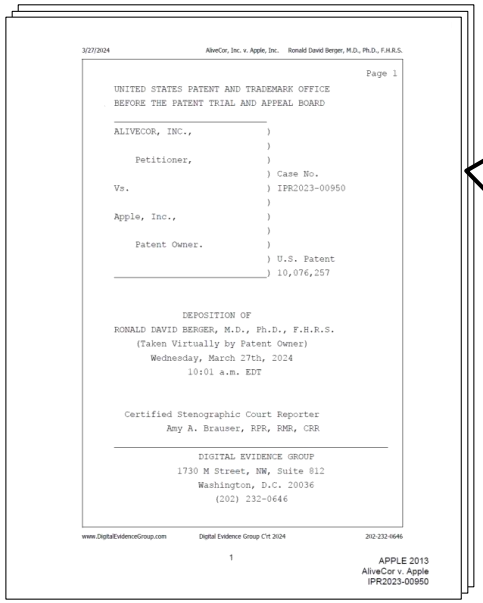
Ground 1 – Claim 1, [1.c.iii] – Apple's Arg. 1 – Reply



Q. If you have a conductive enclosure, in what situations would you need a conductive pad underneath it?

A. . . . If the enclosure was made of stainless steel and it was thin and the underlying pad was made of a silver-based compound and it was perhaps thicker, then the pad would be the element that is configured to capture and detect that electrical signal. I think one of ordinary skill in the art would understand that the thin steel enclosure is a pathway for the signal but that the detection takes place at the element which has the superior electrical conductivity.

Ground 1 – Claim 1, [1.c.iii] – Apple's Arg. 1 – Reply



3/27/2024 AliveCor, Inc. v. Apple, Inc. Ronald David Berger, M.D., Ph.D., F.H.R.S.

Page 1

UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE PATENT TRIAL AND APPEAL BOARD

ALIVECOR, INC.,
Petitioner,
Vs.
Apple, Inc.,
Patent Owner.

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

DEPOSITION OF
RONALD DAVID BERGER, M.D., Ph.D., F.H.R.S.
(Taken Virtually by Patent Owner)
Wednesday, March 27th, 2024
10:01 a.m. EDT

Certified Stenographic Court Reporter
Amy A. Brauser, RPR, RMR, CRR

DIGITAL EVIDENCE GROUP
1730 M Street, NW, Suite 812
Washington, D.C. 20036
(202) 232-0646

www.DigitalEvidenceGroup.com Digital Evidence Group C'rt 2024 202-232-0646

1

APPLE 2013
AliveCor v. Apple
IPR2023-00950

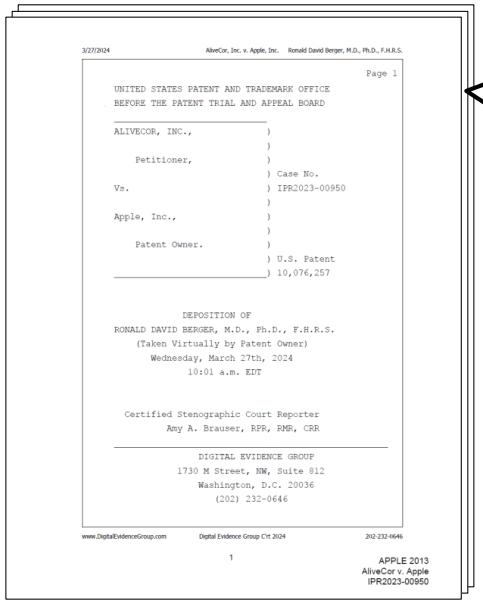
Berger Tr.

Q. So in Paragraph 131, you're describing, though, that the electrode is in direct contact with the user's skin; is that correct?

A. And again, electrode can refer to the -- would refer to the combination of the outer surface and the metal that resides underneath. Or put another way, you're not going to have a solder joint or connector directly to the plastic, you would have metal, something -- highly conductive metal, that's going to be part of the electrode that's underneath a layer of conductive plastic if the metal itself is not exposed.

AliveCor Exhibit 1024
AliveCor, Inc. v. Apple Inc.
IPR2023-00950, U.S. Patent No. 10,076,257
50 of 249

Ground 1 – Claim 1, [1.c.iii] – Apple's Arg. 1 – Reply



3/27/2024 AliveCor, Inc. v. Apple, Inc. Ronald David Berger, M.D., Ph.D., F.H.R.S.

Page 1

UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE PATENT TRIAL AND APPEAL BOARD

ALIVECOR, INC.,
Petitioner,
Vs.
Apple, Inc.,
Patent Owner.
) Case No. IPR2023-00950
) U.S. Patent 10,076,257

DEPOSITION OF
RONALD DAVID BERGER, M.D., Ph.D., F.H.R.S.
(Taken Virtually by Patent Owner)
Wednesday, March 27th, 2024
10:01 a.m. EDT

Certified Stenographic Court Reporter
Amy A. Brauser, RPR, RMR, CRR

DIGITAL EVIDENCE GROUP
1730 M Street, NW, Suite 812
Washington, D.C. 20036
(202) 232-0646

www.DigitalEvidenceGroup.com Digital Evidence Group C'rt 2024 202-232-0646

1

APPLE 2013
AliveCor v. Apple
IPR2023-00950

Berger Tr.

Q. So going back to my earlier question, is there any description in Markel of the audio output portion 610 being made of conductive material?

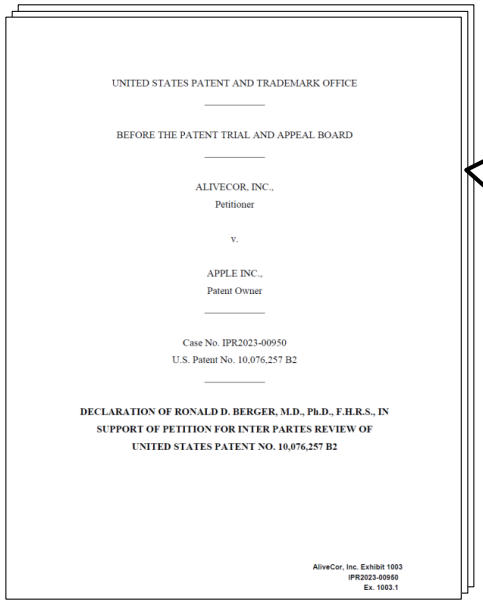
A. Again, I think a POSITA would understand that you need a highly conductive material, whether on the surface or molded into and embedded under the surface, in order to make adequate electrical connectivity to the user.

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

APPLE-2013, 30:18-22 (Paper 20, 34), Ex. 1005, [0040] (Paper 25, 14) (annotated)

AliveCor Exhibit 1024
AliveCor, Inc. v. Apple Inc.
IPR2023-00950, U.S. Patent No. 10,076,257
51 of 249

Ground 1 – Claim 1, [1.c.iii] – Apple's Arg. 1 – Reply



UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ALIVECOR, INC.,
Petitioner

v.

APPLE INC.,
Patent Owner

Case No. IPR2023-00950
U.S. Patent No. 10,076,257 B2

DECLARATION OF RONALD D. BERGER, M.D., Ph.D., F.H.R.S., IN SUPPORT OF PETITION FOR INTER PARTES REVIEW OF UNITED STATES PATENT NO. 10,076,257 B2

AliveCor, Inc. Exhibit 1003
IPR2023-00950
Ex. 1003.1

Berger Decl.

137. Moreover, a person of ordinary skill in the art would have had a reasonable expectation of success in placing the pad of the electrode underneath and detecting the user's cardiac signal via the conductive plastic of the "audio output portion" because *Markel* discloses that (1) "electrodes may be ***incorporated into the [electronic device] in any of a variety of manners***" and "in any of a ***variety of locations***" (Ex-1005, [0035], [0045] (emphasis added)), and (2) electrodes "may, for example, be adapted to detect cardiac activity of a user that is ***conductively coupled*** to the electrodes" and "various conductive plastics . . . may provide ***sufficient conductivity*** for an electrode to perform adequately" (Ex-1005, [0037] (emphasis added)).

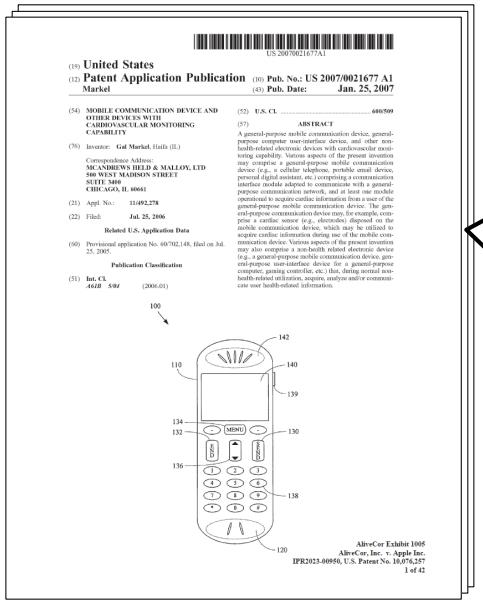
Ex. 1003, ¶ 137 (annotated) (Paper 2, 21)

AliveCor Exhibit 1024
AliveCor, Inc. v. Apple Inc.
IPR2023-00950, U.S. Patent No. 10,076,257
52 of 249

Ground 1 – Claim 1, [1.d.i]

[Undisputed]

[1.d.i] a second lead comprising a second pad that is embedded in a second portion of the enclosure,



(19) United States
(12) Patent Application Publication
Markel

(10) Pub. No.: US 2007/0021677 A1
(43) Pub. Date: Jan. 25, 2007

(54) MOBILE COMMUNICATION DEVICE AND OTHER DEVICES WITH CARDIOVASCULAR MONITORING CAPABILITY

(76) Inventor: Gal Markel, Haifa (IL)

Correspondence Address:
MCANDREWS HELD & MALLOY, LTD
500 WEST MADISON STREET
SUITE 3400
CHICAGO, IL 60661

(21) Appl. No.: 11/492,278

(22) Filed: Jul. 25, 2006

Related U.S. Application Data

(60) Provisional application No. 60/702,148, filed on Jul. 25, 2005.

Publication Classification

(51) Int. Cl.
A61B 5/04 (2006.01)

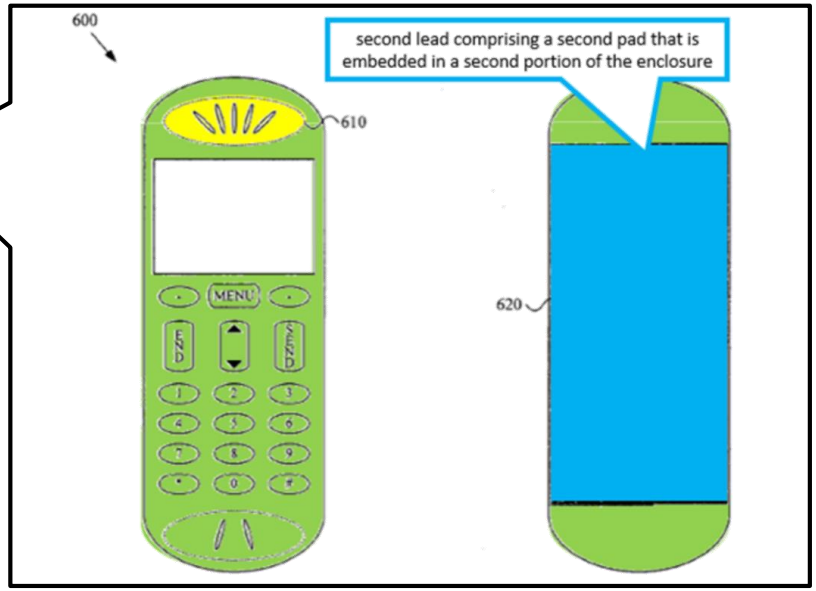
(52) U.S. Cl. 600/509

(57) ABSTRACT

A general-purpose mobile communication device, general-purpose computer user-interface device, and other non-health-related electronic devices with cardiovascular monitoring capability. Various aspects of the present invention may comprise a general-purpose mobile communication device (e.g., a cellular telephone, portable email device, personal digital assistant, etc.) comprising a communication interface module adapted to communicate with a general-purpose communication network, and at least one module operational to acquire cardiac information from a user of the general-purpose mobile communication device. The general-purpose communication device may, for example, comprise a cardiac sensor (e.g., electrodes) disposed on the mobile communication device, which may be utilized to acquire cardiac information during use of the mobile communication device. Various aspects of the present invention may also comprise a non-health related electronic device (e.g., a general-purpose mobile communication device, general-purpose user-interface device for a general-purpose computer, gaming controller, etc.) that, during normal non-health-related utilization, acquire, analyze and/or communicate user health-related information.

AliveCor Exhibit 1005
AliveCor, Inc. v. Apple Inc.
IPR2023-00950, U.S. Patent No. 10,076,257
1 of 42

Markel



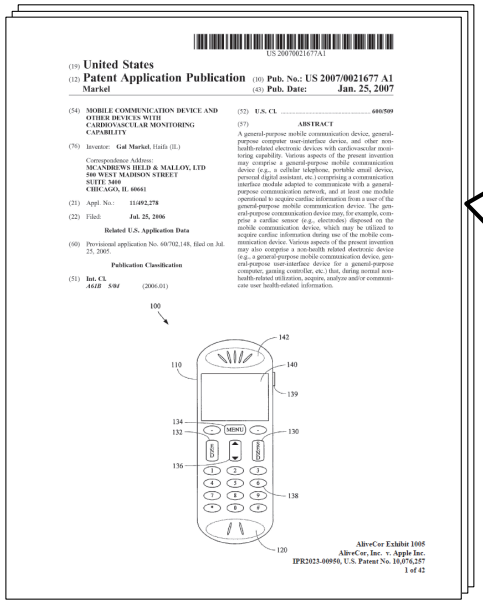
Ex. 1005, Fig. 6 (annotated) (Paper 2, 22)

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE – 53

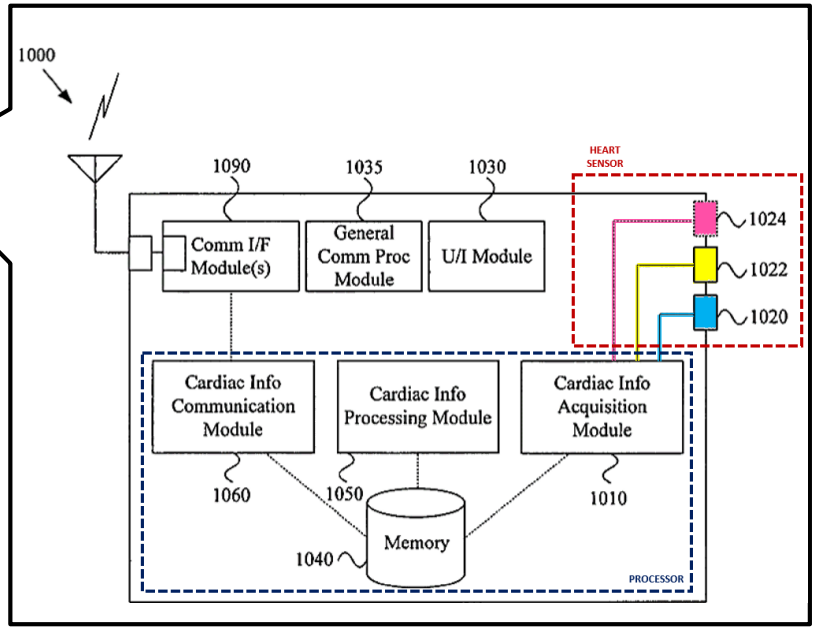
Ground 1 – Claim 1, [1.d.i]

[Undisputed]

[1.d.i] a second lead comprising a second pad that is embedded in a second portion of the enclosure,



Markel



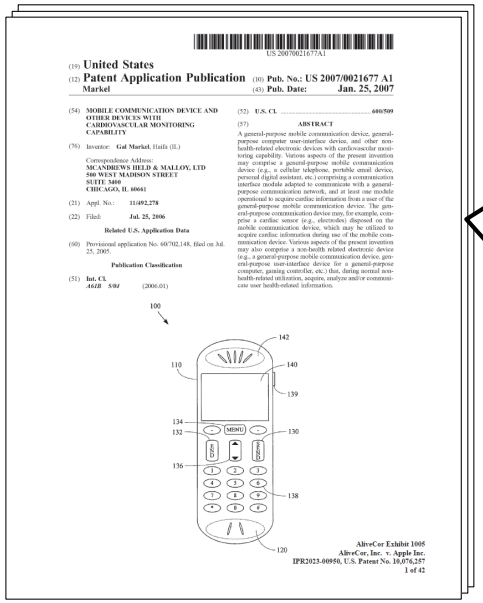
Ex. 1005, Fig. 10 (annotated) (Paper 2, 23)

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE – 54

Ground 1 – Claim 1, [1.d.i]

[Undisputed]

[1.d.i] a second lead comprising a second pad that is embedded in a second portion of the enclosure,



(19) United States
(12) Patent Application Publication
Markel
(10) Pub. No.: US 2007/0021677 A1
(43) Pub. Date: Jan. 25, 2007

(54) MOBILE COMMUNICATION DEVICE AND OTHER DEVICES WITH CARDIOVASCULAR MONITORING CAPABILITY

(76) Inventor: Gal Markel, Haifa (IL)

Correspondence Address:
MCANDREWS HELD & MALLOY, LTD
500 WEST MADISON STREET
SUITE 3400
CHICAGO, IL 60661

(21) Appl. No.: 11/492,278

(22) Filed: Jul. 25, 2006

Related U.S. Application Data

(60) Provisional application No. 60/702,148, filed on Jul. 25, 2005.

Publication Classification

(51) Int. Cl.
A61B 5/04 (2006.01)

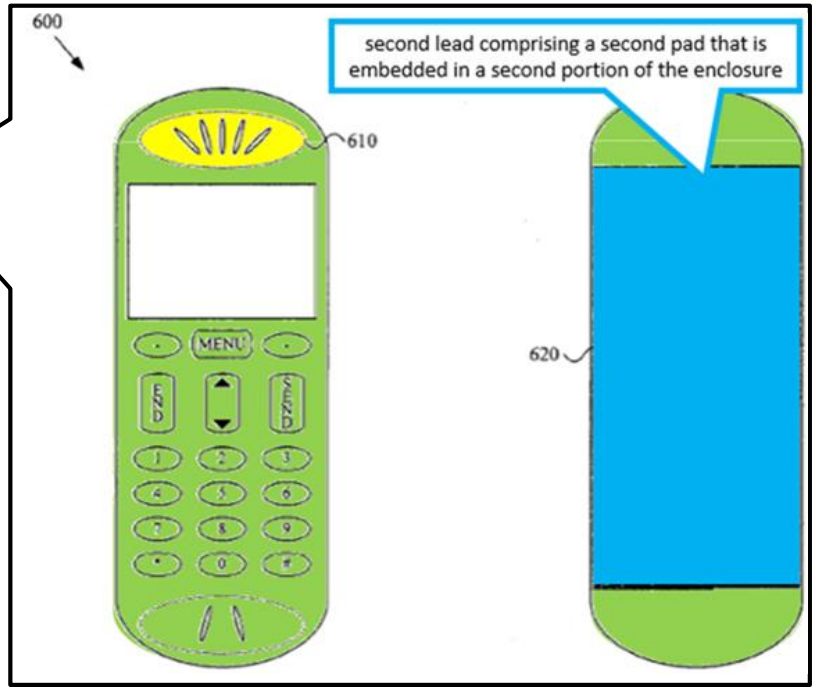
(52) U.S. Cl. 600/509

(57) ABSTRACT

A general-purpose mobile communication device, general-purpose computer user-interface device, and other non-health-related electronic devices with cardiovascular monitoring capability. Various aspects of the present invention may comprise a general-purpose mobile communication device (e.g., a cellular telephone, portable email device, personal digital assistant, etc.) comprising a communication interface module adapted to communicate with a general-purpose communication network, and at least one module operational to acquire cardiac information from a user of the general-purpose mobile communication device. The general-purpose communication device may, for example, comprise a cardiac sensor (e.g., electrodes) disposed on the mobile communication device, which may be utilized to acquire cardiac information during use of the mobile communication device. Various aspects of the present invention may also comprise a non-health related electronic device (e.g., a general-purpose mobile communication device, general-purpose user-interface device for a general-purpose computer, gaming controller, etc.) that, during normal non-health-related utilization, acquire, analyze and/or communicate user health-related information.

AliveCor Exhibit 1005
AliveCor, Inc. v. Apple Inc.
IPR2023-00950, U.S. Patent No. 10,076,257
1 of 42

Markel



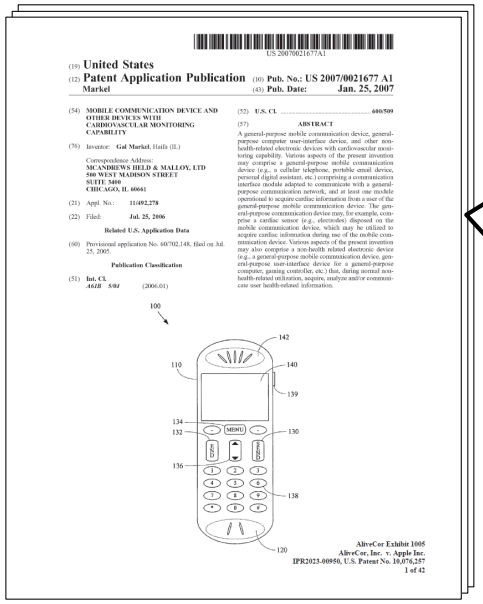
Ex. 1005, Fig. 6 (annotated) (Paper 2, 24)

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE – 55

Ground 1 – Claim 1, [1.d.i]

[Undisputed]

[1.d.i] a second lead comprising a second pad that is embedded in a second portion of the enclosure,



(19) United States
(12) Patent Application Publication
Markel
(10) Pub. No.: US 2007/0021677 A1
(43) Pub. Date: Jan. 25, 2007

(54) MOBILE COMMUNICATION DEVICE AND OTHER DEVICES WITH CARDIOVASCULAR MONITORING CAPABILITY

(76) Inventor: Gal Markel, Haifa (IL)

Correspondence Address:
MCANDREWS HELD & MALLOY, LTD
500 WEST MADISON STREET
SUITE 3400
CHICAGO, IL 60661

(21) Appl. No.: 11/492,278

(22) Filed: Jul. 25, 2006

Related U.S. Application Data

(60) Provisional application No. 60/702,148, filed on Jul. 25, 2005.

Publication Classification

(51) Int. Cl.
A61B 5/04 (2006.01)

(52) U.S. Cl. 600/509

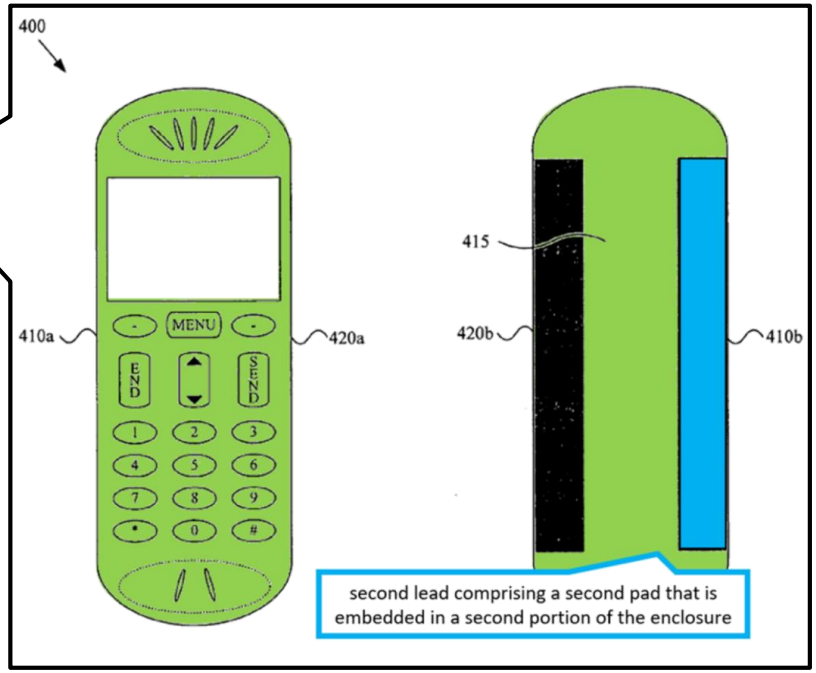
(57) ABSTRACT

A general-purpose mobile communication device, general-purpose computer user-interface device, and other non-health-related electronic devices with cardiovascular monitoring capability. Various aspects of the present invention may comprise a general-purpose mobile communication device (e.g., a cellular telephone, portable email device, personal digital assistant, etc.) comprising a communication interface module adapted to communicate with a general-purpose communication network, and at least one module operational to acquire cardiac information from a user of the general-purpose mobile communication device. The general-purpose communication device may, for example, comprise a cardiac sensor (e.g., electrodes) disposed on the mobile communication device, which may be utilized to acquire cardiac information during use of the mobile communication device. Various aspects of the present invention may also comprise a non-health related electronic device (e.g., a general-purpose mobile communication device, general-purpose user-interface device for a general-purpose computer, gaming controller, etc.) that, during normal non-health-related utilization, acquire, analyze and/or communicate user health-related information.

100, 110, 120, 130, 132, 134, 136, 138, 139, 140, 142, MENU, CONTACTS, SEARCH

AliveCor Exhibit 1005
AliveCor, Inc. v. Apple Inc.
IPR2023-00950, U.S. Patent No. 10,076,257
1 of 42

Markel



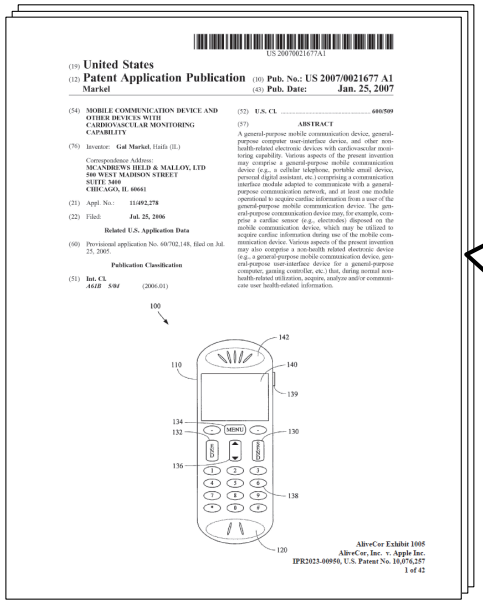
Ex. 1005, Fig. 4 (annotated) (Paper 2, 25)

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE – 56

Ground 1 – Claim 1, [1.d.ii]

[Undisputed]

[1.d.ii] wherein the second pad is configured to detect a second electrical signal of the user's cardiac signal via the user's skin's contact with at least one of the second pad and the second portion of the enclosure; and



(19) United States
(12) Patent Application Publication
Markel

(10) Pub. No.: US 2007/0021677 A1
(43) Pub. Date: Jan. 25, 2007

(54) MOBILE COMMUNICATION DEVICE AND OTHER DEVICES WITH CARDIOVASCULAR MONITORING CAPABILITY

(76) Inventor: Gal Markel, Haifa (IL)

Correspondence Address:
MCANDREWS HELD & MALLOY, LTD
500 WEST MADISON STREET
SUITE 3400
CHICAGO, IL 60661

(21) Appl. No.: 11/492,278

(22) Filed: Jul. 25, 2006

Related U.S. Application Data

(60) Provisional application No. 60/702,148, filed on Jul. 25, 2005.

Publication Classification

(51) Int. Cl.
A61B 5/04 (2006.01)

(52) U.S. Cl. 600/509

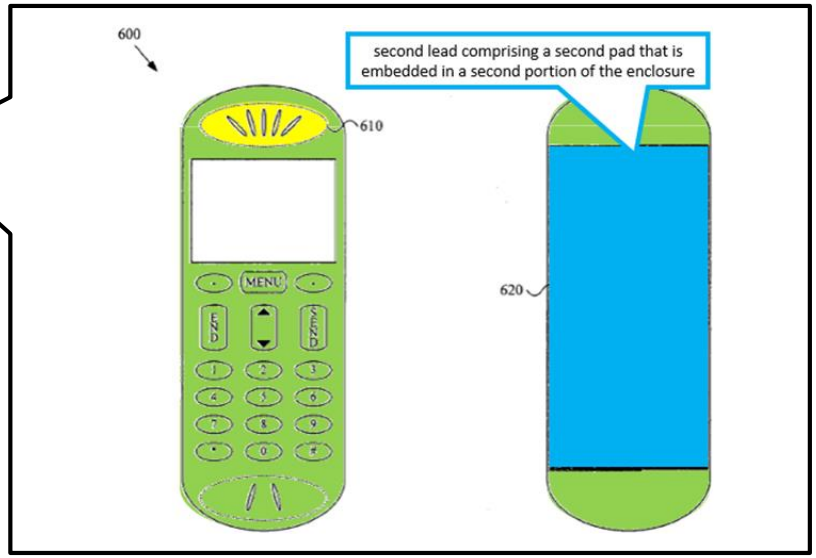
(57) ABSTRACT

A general-purpose mobile communication device, general-purpose computer user-interface device, and other non-health-related electronic devices with cardiovascular monitoring capability. Various aspects of the present invention may comprise a general-purpose mobile communication device (e.g., a cellular telephone, portable email device, personal digital assistant, etc.) comprising a communication interface module adapted to communicate with a general-purpose communication network, and at least one module operational to acquire cardiac information from a user of the general-purpose mobile communication device. The general-purpose communication device may, for example, comprise a cardiac sensor (e.g., electrodes) disposed on the mobile communication device, which may be utilized to acquire cardiac information during use of the mobile communication device. Various aspects of the present invention may also comprise a non-health related electronic device (e.g., a general-purpose mobile communication device, general-purpose user-interface device for a general-purpose computer, gaming controller, etc.) that, during normal non-health-related utilization, acquire, analyze and/or communicate user health-related information.

100, 110, 120, 130, 132, 134, 136, 138, 139, 140, 142, MENU, SEND, END

AliveCor Exhibit 1005
AliveCor, Inc. v. Apple Inc.
IPR2023-00950, U.S. Patent No. 10,076,257
1 of 42

Markel



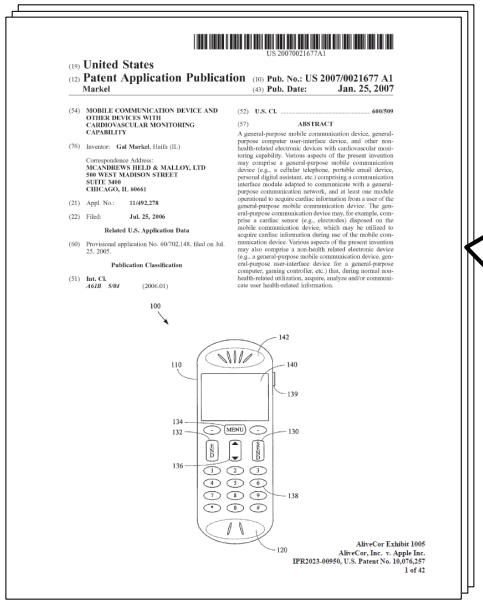
Ex. 1005, Fig. 6 (annotated) (Paper 2, 26)

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE – 57

Ground 1 – Claim 1, [1.e]

[Undisputed]

[1.e] a processor coupled to the heart sensor and configured to receive and process the detected cardiac signal, . . .



(19) United States
(12) Patent Application Publication
Markel
(10) Pub. No.: US 2007/0021677 A1
(43) Pub. Date: Jan. 25, 2007

(54) MOBILE COMMUNICATION DEVICE AND OTHER DEVICES WITH CARDIOVASCULAR MONITORING CAPABILITY

(76) Inventor: Gal Markel, Haifa (IL)

Correspondence Address:
MCANDREWS HELD & MALLOY, LTD
500 WEST MADISON STREET
SUITE 3400
CHICAGO, IL 60661

(21) Appl. No.: 11/492,278

(22) Filed: Jul. 25, 2006

Related U.S. Application Data

(60) Provisional application No. 60/702,148, filed on Jul. 25, 2005.

Publication Classification

(51) Int. Cl.
A61B 5/04 (2006.01)

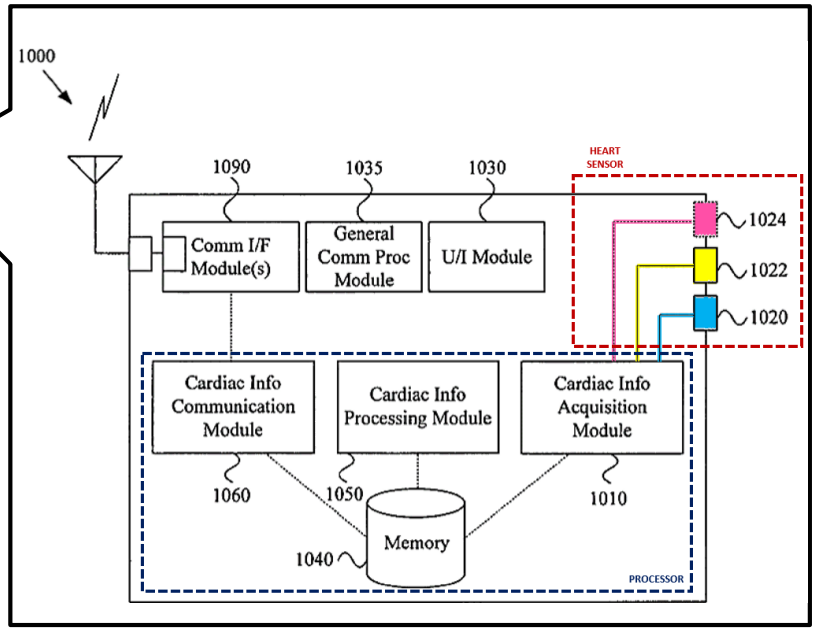
(52) U.S. Cl. 600/509

(57) ABSTRACT

A general-purpose mobile communication device, general-purpose computer user-interface device, and other non-health-related electronic devices with cardiovascular monitoring capability. Various aspects of the present invention may comprise a general-purpose mobile communication device (e.g., a cellular telephone, portable email device, personal digital assistant, etc.) comprising a communication interface module adapted to communicate with a general-purpose communication network, and at least one module operational to acquire cardiac information from a user of the general-purpose mobile communication device. The general-purpose communication device may, for example, comprise a cardiac sensor (e.g., electrodes) disposed on the mobile communication device, which may be utilized to acquire cardiac information during use of the mobile communication device. Various aspects of the present invention may also comprise a non-health related electronic device (e.g., a general-purpose mobile communication device, general-purpose user-interface device for a general-purpose computer, gaming controller, etc.) that, during normal non-health-related utilization, acquire, analyze and/or communicate user health-related information.

AliveCor Exhibit 1005
AliveCor, Inc. v. Apple Inc.
IPR2023-00950, U.S. Patent No. 10,076,257
1 of 42

Markel



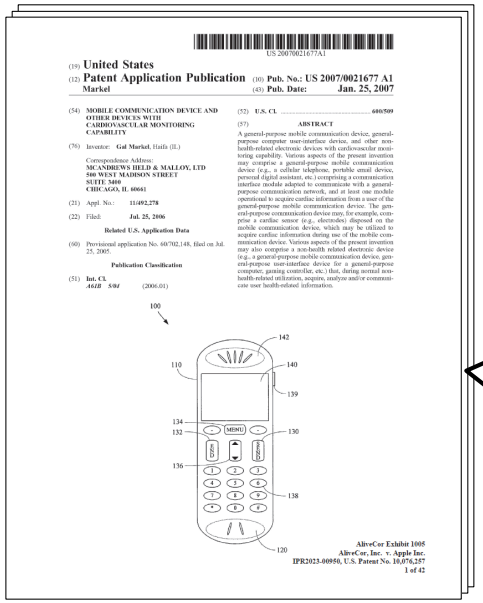
Ex. 1005, Fig. 10 (annotated) (Paper 2, 28)

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE – 58

Ground 1 – Claim 4

[Undisputed]

[4.a]: wherein the first portion is separated from the second portion by a third portion of the enclosure;
[4.b]: at least the third portion is constructed from a material having a first conductivity; and
[4.c]: the first conductivity is insufficient to transmit the first electrical signal from the first pad to the second pad via the third portion.



(19) United States
(12) Patent Application Publication
Markel

(10) Pub. No.: US 2007/0021677 A1
(43) Pub. Date: Jan. 25, 2007

(54) MOBILE COMMUNICATION DEVICE AND OTHER DEVICES WITH CARDIOVASCULAR MONITORING CAPABILITY

(76) Inventor: Gal Markel, Haifa (IL)

Correspondence Address:
MCANDREWS HELD & MALLOY, LTD
500 WEST MADISON STREET
SUITE 3400
CHICAGO, IL 60661

(21) Appl. No.: 11/492,278

(22) Filed: Jul. 25, 2006

Related U.S. Application Data

(60) Provisional application No. 60/702,148, filed on Jul. 25, 2005.

Publication Classification

(51) Int. Cl.
A61B 5/04 (2006.01)

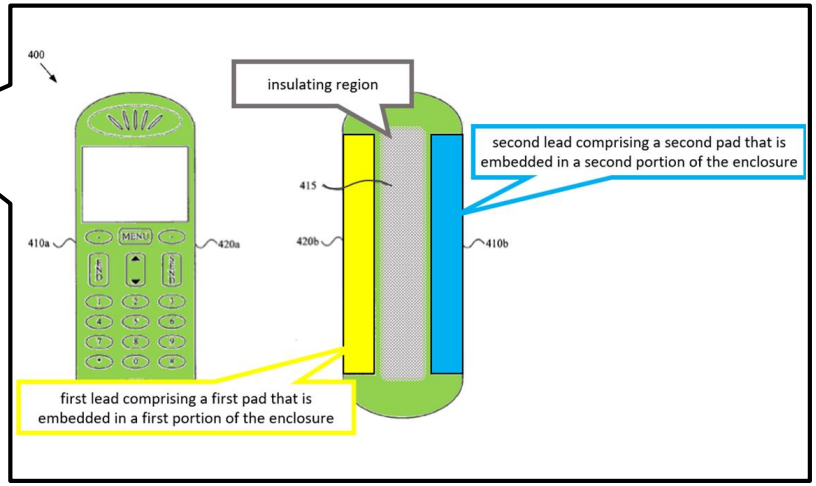
(52) U.S. Cl. 600/509

(57) ABSTRACT

A general-purpose mobile communication device, general-purpose computer user-interface device, and other health-related electronic devices with cardiovascular monitoring capability. Various aspects of the present invention may comprise a general-purpose mobile communication device (e.g., a cellular telephone, portable email device, personal digital assistant, etc.) comprising a communication interface module adapted to communicate with a general-purpose communication network, and at least one module operational to acquire cardiac information from a user of the general-purpose mobile communication device. The general-purpose communication device may, for example, comprise a cardiac sensor (e.g., electrodes) disposed on the mobile communication device, which may be utilized to acquire cardiac information during use of the mobile communication device. Various aspects of the present invention may also comprise a non-health related electronic device (e.g., a general-purpose mobile communication device, general-purpose user-interface device for a general-purpose computer, gaming controller, etc.) that, during normal non-health-related utilization, acquire, analyze and/or communicate user health-related information.

AliveCor Exhibit 1005
AliveCor, Inc. v. Apple Inc.
IPR2023-00950, U.S. Patent No. 10,076,257
1 of 42

Markel

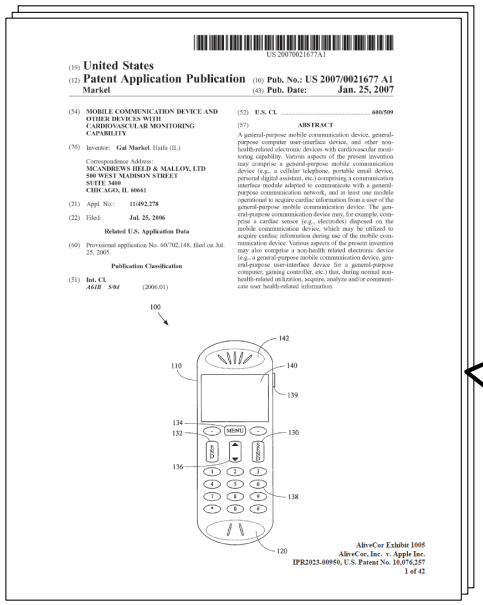


Ex. 1005, Fig. 4 (annotated) (Paper 2, 34)

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE – 59

Ground 1 – Claim 5

[5.pre]: The electronic device of claim 4, wherein:
[5.a]: the material having the first conductivity comprises one of aluminum or steel; and
[5.b]: the second pad is constructed from a silver base compound.



(19) United States
(12) Patent Application Publication
Markel

(10) Pub. No.: US 2007/0021677 A1
(43) Pub. Date: Jan. 25, 2007

(54) MOBILE COMMUNICATION DEVICE AND OTHER DEVICES WITH CARDIOVASCULAR MONITORING CAPABILITY

(76) Inventor: Gal Markel, Haifa (IL)

Correspondence Address:
MCANDREWS HELD & MALLOY, LTD
500 WEST MADISON STREET
SUITE 3400
CHICAGO, IL 60661

(21) Appl. No.: 11/492,278

(22) Filed: Jul. 25, 2006

Related U.S. Application Data

(60) Provisional application No. 60/702,148, filed on Jul. 25, 2005.

Publication Classification

(51) Int. Cl.
A61B 5/04 (2006.01)

(52) U.S. Cl. 600/509

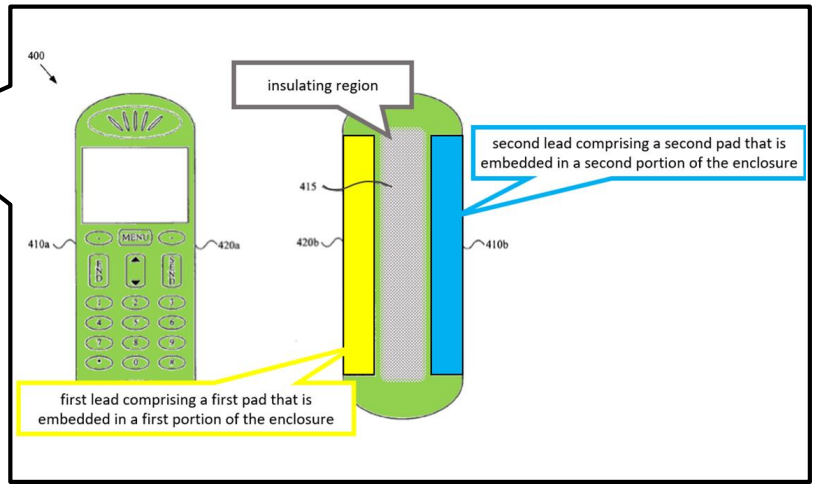
(57) ABSTRACT

A general-purpose mobile communication device, general-purpose computer user-interface device, and other non-health-related electronic devices with cardiovascular monitoring capability. Various aspects of the present invention may comprise a general-purpose mobile communication device (e.g., a cellular telephone, portable email device, personal digital assistant, etc.) comprising a communication interface module adapted to communicate with a general-purpose communication network, and at least one module operational to acquire cardiac information from a user of the general-purpose mobile communication device. The general-purpose communication device may, for example, comprise a cardiac sensor (e.g., electrodes) disposed on the mobile communication device, which may be utilized to acquire cardiac information during use of the mobile communication device. Various aspects of the present invention may also comprise a non-health related electronic device (e.g., a general-purpose mobile communication device, general-purpose user-interface device for a general-purpose computer, gaming controller, etc.) that, during normal non-health-related utilization, acquire, analyze and/or communicate user health-related information.

100
142
110
140
139
134
132
MENU
130
136
138
120

AliveCor Exhibit 1005
AliveCor, Inc. v. Apple Inc.
IPR2023-00950, U.S. Patent No. 10,076,257
1 of 42

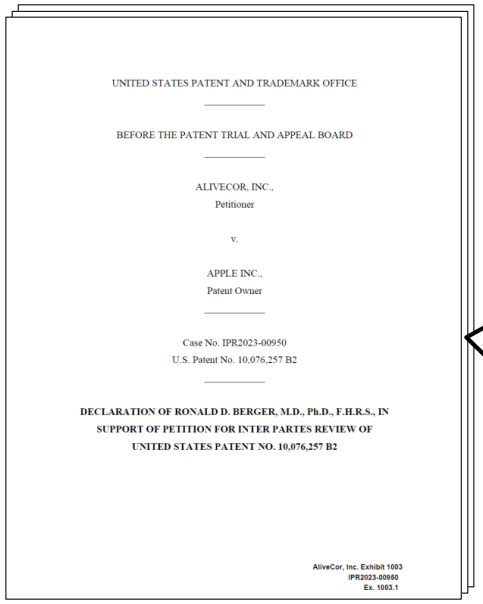
Markel



Ex. 1005, Fig. 4 (annotated) (Paper 2, 34)

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE – 60

Ground 1 – Claim 5



UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ALIVECOR, INC.,
Petitioner

v.

APPLE INC.,
Patent Owner

Case No. IPR2023-00950
U.S. Patent No. 10,076,257 B2

DECLARATION OF RONALD D. BERGER, M.D., Ph.D., F.H.R.S., IN SUPPORT OF PETITION FOR INTER PARTES REVIEW OF UNITED STATES PATENT NO. 10,076,257 B2

AliveCor, Inc. Exhibit 1003
IPR2023-00950
Ex. 1003.1

Berger Decl.

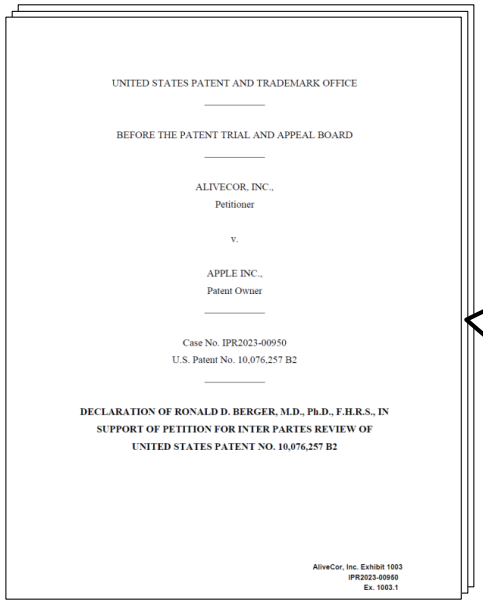
[5.pre]: The electronic device of claim 4, wherein:
[5.a]: the material having the first conductivity comprises one of aluminum or steel; and
[5.b]: the second pad is constructed from a silver base compound.

189. A person of ordinary skill in the art would further have known that aluminum and steel were used in the construction of mobile devices and were examples of materials having relatively less conductivity (*see, e.g.*, Ex-1017 ("Hobson"), 6:55–60 ("Housing 12 or portions of housing 12 may also be formed from conductive materials such as metal. An illustrative housing material that may be used is anodized aluminum. ***Aluminum*** is relatively light in weight and, when anodized, has an attractive ***insulating*** and scratch-resistant surface. If desired, other metals can be used for the housing of device 10, such as ***stainless steel*** . . . ." (emphasis added))). A person of ordinary skill in the art would also have known that stainless steel and aluminum have relatively lower conductivity than silver base compounds (*see* claim element [5.b] below).

Ex. 1003, ¶ 189 (annotated) (Paper 2, 35)

AliveCor Exhibit 1024
AliveCor, Inc. v. Apple Inc.
IPR2023-00950, U.S. Patent No. 10,076,257
61 of 249

Ground 1 – Claim 5



UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ALIVECOR, INC.,
Petitioner

v.

APPLE INC.,
Patent Owner

Case No. IPR2023-00950
U.S. Patent No. 10,076,257 B2

DECLARATION OF RONALD D. BERGER, M.D., Ph.D., F.H.R.S., IN SUPPORT OF PETITION FOR INTER PARTES REVIEW OF UNITED STATES PATENT NO. 10,076,257 B2

AliveCor, Inc. Exhibit 1003
IPR2023-00950
Ex. 1003.1

Berger Decl.

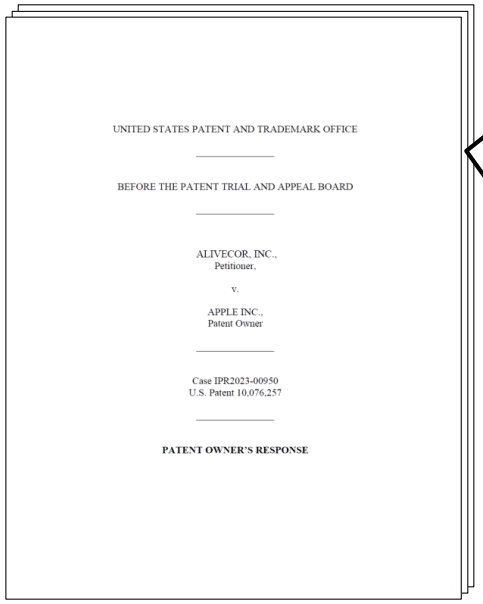
[5.pre]: The electronic device of claim 4, wherein:
[5.a]: the material having the first conductivity comprises one of aluminum or steel; and
[5.b]: the second pad is constructed from a silver base compound.

192. As explained earlier with respect to claim element [1.d.ii] (the discussion of which is incorporated herein), *Markel* discloses a "first electrode" comprising a second pad, which corresponds to the claimed "second pad" of claim 1. As I explained earlier in Section VI.C, a person of ordinary skill in the art would have known electrodes "generally [comprise] pads containing conductive material, such as VI.C chloride" (Ex-1011 1:30–31). Further, electrodes "are preferably silver or silver chloride although conductive plastic and other metals are also suitable . . ." (Ex-1012 3:34–38). Consequently, a person of ordinary skill in the art would have at once envisaged that the second pad would have been comprised of a silver base compound.

Ex. 1003, ¶ 189 (annotated) (Paper 2, 35)

AliveCor Exhibit 1024
AliveCor, Inc. v. Apple Inc.
IPR2023-00950, U.S. Patent No. 10,076,257
62 of 249

Ground 1 – Claim 5 – Apple's Arg.



UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ALIVECOR, INC.,
Petitioner,

v.

APPLE INC.,
Patent Owner

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

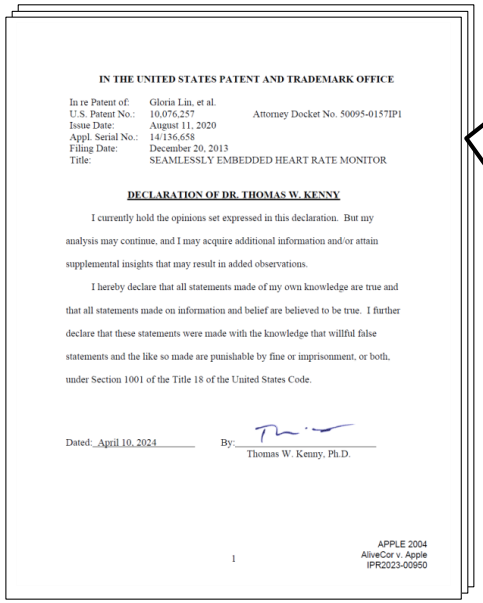
PATENT OWNER'S RESPONSE

Patent Owner's Response

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

AliveCor Exhibit 1024
AliveCor, Inc. v. Apple Inc.
IPR2023-00950, U.S. Patent No. 10,076,257
63 of 249

Ground 1 – Claim 5 – Apple's Arg. – Reply



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent of: Gloria Lin, et al.
U.S. Patent No.: 10,076,257 Attorney Docket No. 50095-0157IP1
Issue Date: August 11, 2020
Appl. Serial No.: 14/136,658
Filing Date: December 20, 2013
Title: SEAMLESSLY EMBEDDED HEART RATE MONITOR

DECLARATION OF DR. THOMAS W. KENNY

I currently hold the opinions set expressed in this declaration. But my analysis may continue, and I may acquire additional information and/or attain supplemental insights that may result in added observations.

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

Dated: April 10, 2024 By: Thomas W. Kenny, Ph.D.

1

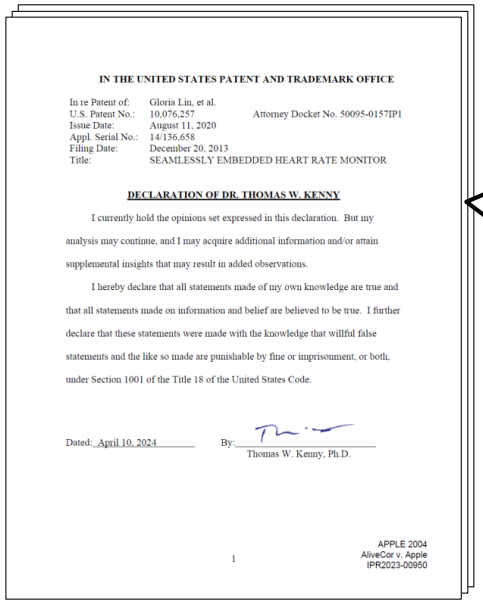
APPLE 2004
AliveCor v. Apple
IPR2023-00950

Kenny Decl.

147. Markel only discusses the insulating region 415, with no disclosure of a material used for the insulating region 415. Specifically, Markel's single reference to insulating region 415 states "an insulating region 415 may separate regions 410b and 420b." EX1005, [0045]. Dr. Berger asserts that "person of ordinary skill in the art would have known that one of the simplest ways to implement an "insulating region" would be to use a material having relatively less conductivity" and that "[a] person of ordinary skill in the art would further have known that aluminum and steel were used in the construction of mobile devices and were examples of materials having relatively less conductivity." EX1003, ¶¶188-189. However, Dr. Berger does not support his assertions with any disclosures of Markel (or Nissilä or Righter) but rather adds in additional references to support this alleged knowledge. Dr. Berger presents no analysis as to why a POSITA would have selected aluminum or steel for the insulating region 415 and makes no effort to demonstrate that such an implementation of Markel would have been successful. I therefore find Dr. Berger's analysis insufficient to demonstrate that it would have been obvious to implement Markel's insulating region 415 using aluminum or silver, especially considering the lack of disclosure in Markel itself.

AliveCor Exhibit 1024
AliveCor, Inc. v. Apple Inc.
IPR2023-00950, U.S. Patent No. 10,076,257
64 of 249

Ground 1 – Claim 5 – Apple's Arg. – Reply



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent of: Gloria Lin, et al.
U.S. Patent No.: 10,076,257
Issue Date: August 11, 2020
Appl. Serial No.: 14/136,658
Filing Date: December 20, 2013
Title: SEAMLESSLY EMBEDDED HEART RATE MONITOR

Attorney Docket No. 50095-0157IP1

DECLARATION OF DR. THOMAS W. KENNY

I currently hold the opinions set expressed in this declaration. But my analysis may continue, and I may acquire additional information and/or attain supplemental insights that may result in added observations.

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

Dated: April 10, 2024 By: Thomas W. Kenny, Ph.D.

1

APPLE 2004
AliveCor v. Apple
IPR2023-00950

Kenny Decl.

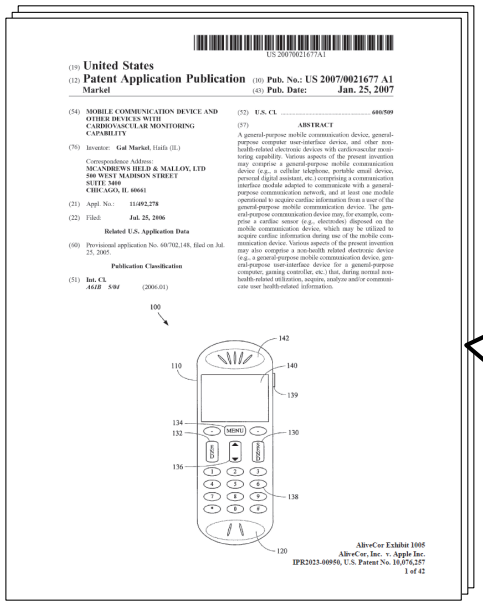
148. Similarly, Markel includes no disclosure of any of the electrodes being formed from a silver based compound. Dr. Berger once again turns to other references as allegedly disclosing use of silver or silver chloride for the electrodes. EX1003, ¶192. As with his analysis of the insulating region 415 of Markel, Dr. Berger presents no analysis as to why a POSITA would have selected silver or silver chloride for implementing the electrodes of Markel and makes no effort to demonstrate that such an implementation of Markel would have been successful. Dr. Berger's analysis with respect to element [5.b] is therefore similarly deficient.

AliveCor Exhibit 1024
AliveCor, Inc. v. Apple Inc.
IPR2023-00950, U.S. Patent No. 10,076,257
65 of 249

Ground 1 – Claim 6

[Undisputed]

[6.a]: the exterior surface of the enclosure further comprises an exterior surface of the second portion; [6.b]: the second pad is configured to detect the second electrical signal of the user's cardiac signal via the user's contact with the exterior surface of the second portion;



(19) United States
(12) Patent Application Publication
Markel
(10) Pub. No.: US 2007/0021677 A1
(43) Pub. Date: Jan. 25, 2007

(54) MOBILE COMMUNICATION DEVICE AND OTHER DEVICES WITH CARDIOVASCULAR MONITORING CAPABILITY

(76) Inventor: Gal Markel, Haifa (IL)

Correspondence Address:
MCANDREWS HELD & MALLOY, LTD
500 WEST MADISON STREET
SUITE 3400
CHICAGO, IL 60661

(21) Appl. No.: 11/492,278

(22) Filed: Jul. 25, 2006

Related U.S. Application Data

(60) Provisional application No. 60/702,148, filed on Jul. 25, 2005.

Publication Classification

(51) Int. Cl.
A61B 5/04 (2006.01)

(52) U.S. Cl. 600/509

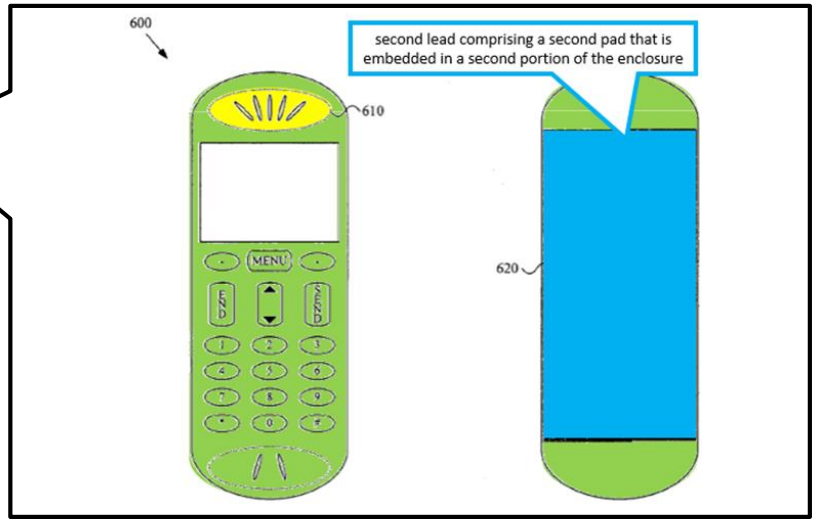
(57) ABSTRACT

A general-purpose mobile communication device, general-purpose computer user-interface device, and other non-health-related electronic devices with cardiovascular monitoring capability. Various aspects of the present invention may comprise a general-purpose mobile communication device (e.g., a cellular telephone, portable email device, personal digital assistant, etc.) comprising a communication interface module adapted to communicate with a general-purpose communication network, and at least one module operational to acquire cardiac information from a user of the general-purpose mobile communication device. The general-purpose communication device may, for example, comprise a cardiac sensor (e.g., electrodes) disposed on the mobile communication device, which may be utilized to acquire cardiac information during use of the mobile communication device. Various aspects of the present invention may also comprise a non-health related electronic device (e.g., a general-purpose mobile communication device, general-purpose user-interface device for a general-purpose computer, gaming controller, etc.) that, during normal non-health-related utilization, acquire, analyze and/or communicate user health-related information.

100, 110, 120, 130, 132, 134, 136, 138, 139, 140, 142, MENU, SEND, CLEAR

AliveCor Exhibit 1005
AliveCor, Inc. v. Apple Inc.
IPR2023-00950, U.S. Patent No. 10,076,257
1 of 42

Markel



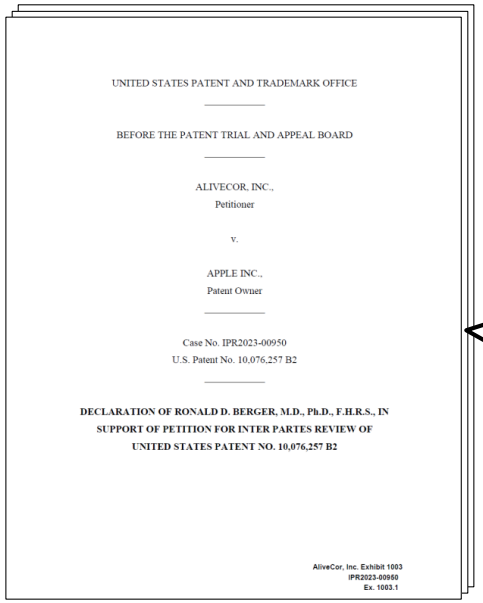
Ex. 1005, Fig. 6 (annotated) (Paper 2, 36)

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE – 66

Ground 1 – Claim 6

[Undisputed]

[6.c]: the second pad is positioned from the exterior surface of the second portion by a thickness of the second portion;
[6.d]: at least the thickness of the second portion is constructed from material having a second conductivity; and



UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ALIVECOR, INC.,
Petitioner

v.

APPLE INC.,
Patent Owner

Case No. IPR2023-00950
U.S. Patent No. 10,076,257 B2

DECLARATION OF RONALD D. BERGER, M.D., Ph.D., F.H.R.S., IN SUPPORT OF PETITION FOR INTER PARTES REVIEW OF UNITED STATES PATENT NO. 10,076,257 B2

AliveCor, Inc. Exhibit 1003
IPR2023-00950
Ex. 1003.1

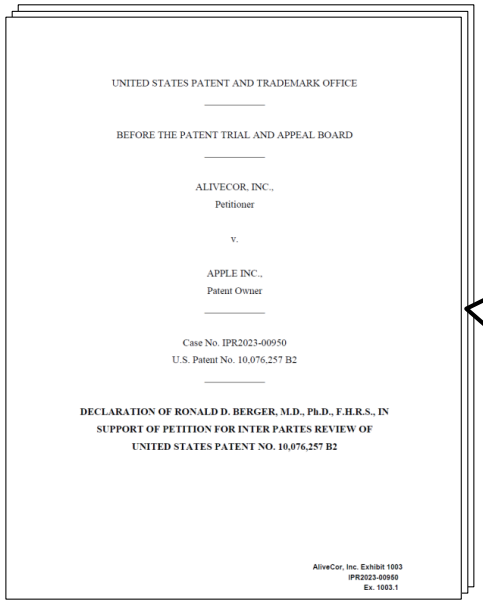
Berger Decl.

206. As explained with respect to claim element [6.b], a person of ordinary skill in the art would have been motivated to place the pad of the electrode *underneath* the conductive plastic of the "main body portion 620" positioned from the exterior surface of the "main body portion 620" by a thickness of the "main body portion 620" so that the electrode pad is conductively coupled to the user via the conductive plastic of the "main body portion 620."

Ex. 1003, ¶ 206 (annotated) (Paper 2, 35)

AliveCor Exhibit 1024
AliveCor, Inc. v. Apple Inc.
IPR2023-00950, U.S. Patent No. 10,076,257
67 of 249

Ground 1 – Claim 6



UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ALIVECOR, INC.,
Petitioner

v.

APPLE INC.,
Patent Owner

Case No. IPR2023-00950
U.S. Patent No. 10,076,257 B2

DECLARATION OF RONALD D. BERGER, M.D., Ph.D., F.H.R.S., IN SUPPORT OF PETITION FOR INTER PARTES REVIEW OF UNITED STATES PATENT NO. 10,076,257 B2

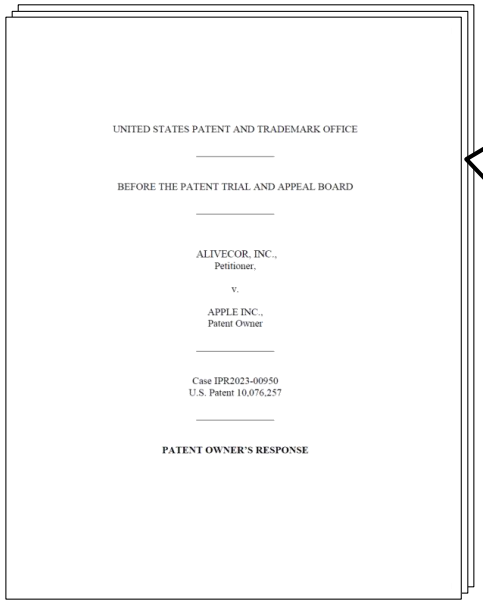
AliveCor, Inc. Exhibit 1003
IPR2023-00950
Ex. 1003.1

Berger Decl.

[6.e]: the second conductivity is defined such that the second electrical signal is not able to be transmitted through material having the second conductivity over a distance larger than the thickness of the second portion.

herein), a person of ordinary skill in the art would have known that an ECG is a measure of the electrical activity of the heart based on an electrical potential difference. A person of ordinary skill in the art would also have known that in order to measure the potential difference, *Markel*'s electrodes should be electrically isolated as taught in *Markel*'s Figure 4. Consequently, a person of ordinary skill in the art would have been motivated to construct the thickness of the "main body portion 620" from a material with a conductivity sufficient to transmit a signal over a distance of the thickness of the second portion to the second pad but insufficient to transmit the second electrical signal a distance larger than the thickness of the second portion.

Ground 1 – Claim 6 – Apple's Arg.



UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ALIVECOR, INC.,
Petitioner,

v.

APPLE INC.,
Patent Owner

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

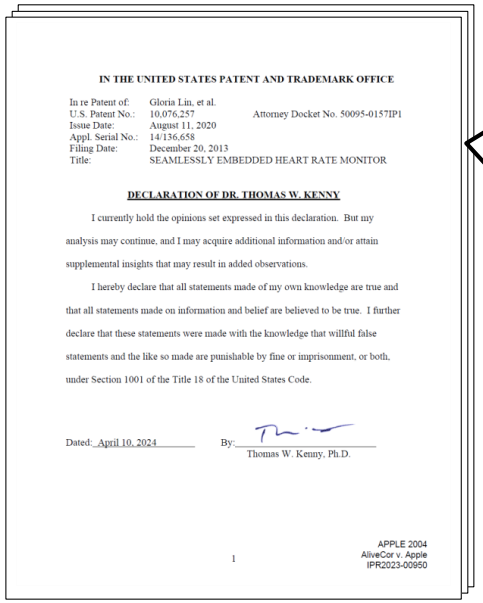
PATENT OWNER'S RESPONSE

Patent Owner's Response

Claim 6 requires "the second conductivity is defined such that the second electrical signal is not able to be transmitted through material having the second conductivity over a distance larger than the thickness of the second portion." The Petition does not even attempt to demonstrate that Markel discloses this limitation of claim 6. There is simply no analysis as to the conductivity of the insulating region 415 of Markel and certainly not in comparison to the thickness of the second portion of the enclosure of Markel's device. APPLE-2004, ¶¶150-151; APPLE-2013, 162:2-164:21. Rather, AliveCor merely points to Markel's disclosure that the electrodes "provide sufficient conductivity for an electrode to perform adequately." Pet., 38 (quoting EX1005, [0037]). AliveCor provides no actual analysis to demonstrate that Markel discloses or suggests element [6.e]. Pet., 38-39; APPLE-2004, ¶¶150-151.

AliveCor Exhibit 1024
AliveCor, Inc. v. Apple Inc.
IPR2023-00950, U.S. Patent No. 10,076,257
69 of 249

Ground 1 – Claim 6 – Apple's Arg. – Reply



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent of: Gloria Lin, et al.
U.S. Patent No.: 10,076,257 Attorney Docket No. 50095-0157IP1
Issue Date: August 11, 2020
Appl. Serial No.: 14/136,658
Filing Date: December 20, 2013
Title: SEAMLESSLY EMBEDDED HEART RATE MONITOR

DECLARATION OF DR. THOMAS W. KENNY

I currently hold the opinions set expressed in this declaration. But my analysis may continue, and I may acquire additional information and/or attain supplemental insights that may result in added observations.

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

Dated: April 10, 2024 By: Thomas W. Kenny, Ph.D.

1

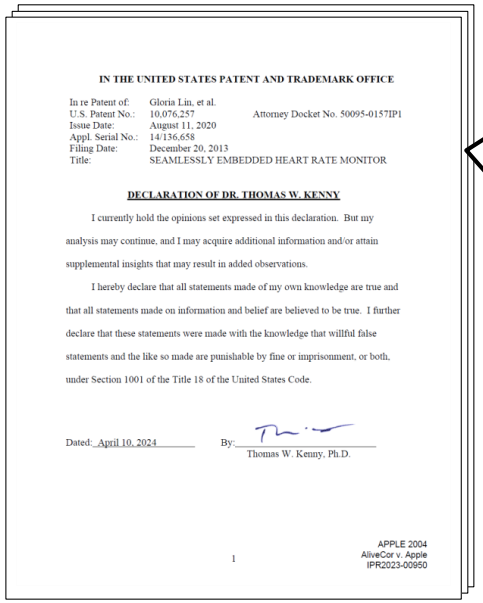
APPLE 2004
AliveCor v. Apple
IPR2023-00950

Kenny Decl.

150. Claim 6 recites, in part, "the second pad is positioned from the exterior surface of the second portion by a thickness of the second portion; at least the thickness of the second portion is constructed from material having a second conductivity; and the second conductivity is defined such that the second electrical signal is not able to be transmitted through material having the second conductivity over a distance larger than the thickness of the second portion." As discussed above, there is no disclosure in Markel of an electrode or pad positioned underneath the exterior surface of a device. Furthermore, in his proposed modification to Markel, Dr. Berger does not identify any teaching that would dictate "a thickness of the second portion" separating the second pad from the exterior of the device or compare that thickness to the electrical transmission properties of the second portion. EX1003, ¶¶205-211.

AliveCor Exhibit 1024
AliveCor, Inc. v. Apple Inc.
IPR2023-00950, U.S. Patent No. 10,076,257
70 of 249

Ground 1 – Claim 6 – Apple's Arg. – Reply



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent of: Gloria Lin, et al.
U.S. Patent No.: 10,076,257 Attorney Docket No. 50095-0157IP1
Issue Date: August 11, 2020
Appl. Serial No.: 14/136,658
Filing Date: December 20, 2013
Title: SEAMLESSLY EMBEDDED HEART RATE MONITOR

DECLARATION OF DR. THOMAS W. KENNY

I currently hold the opinions set expressed in this declaration. But my analysis may continue, and I may acquire additional information and/or attain supplemental insights that may result in added observations.

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

Dated: April 10, 2024 By: Thomas W. Kenny, Ph.D.

1

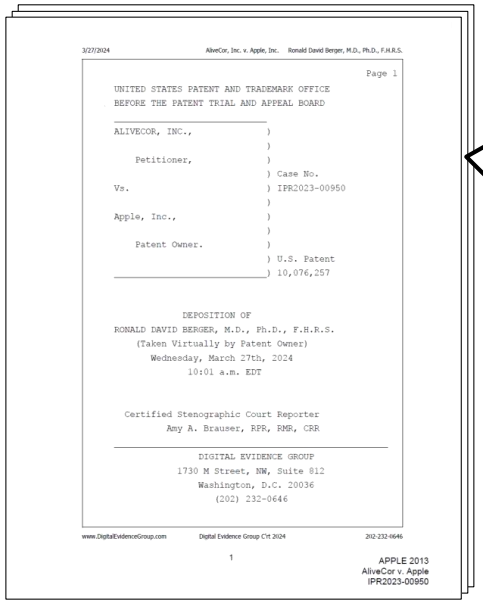
APPLE 2004
AliveCor v. Apple
IPR2023-00950

Kenny Decl.

151. Dr. Berger does not provide any analysis as to the conductivity of the insulating region 415 of Markel or the second portion of the enclosure based on any actual teachings of Markel. EX1003, ¶¶205-211. Dr. Berger merely identifies Markel's disclosure that the electrodes "provide sufficient conductivity for an electrode to perform adequately." EX1003, ¶209 (quoting EX1005, [0037]). The analysis of Dr. Berger and AliveCor with respect to elements [6.c]-[6.e] is purely conclusory and is not supported by any teachings of Markel. Rather, the analysis of Dr. Berger and AliveCor appears to rely entirely on hindsight reconstruction of the recitations of claim 6. Pet., 38-39; EX1003, ¶¶205-211. The analysis provided with respect to claim 6 in Ground 2 does not correct for these deficiencies in that Dr. Berger relies on Nissilä only for the (incorrect) premise that a second electrode can allegedly be positioned underneath the exterior of the device. EX1003, ¶¶368-373.

AliveCor Exhibit 1024
AliveCor, Inc. v. Apple Inc.
IPR2023-00950, U.S. Patent No. 10,076,257
71 of 249

Ground 1 – Claim 6 – Apple's Arg. – Reply



3/27/2024 AliveCor, Inc. v. Apple, Inc. Ronald David Berger, M.D., Ph.D., F.H.R.S.

Page 1

UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE PATENT TRIAL AND APPEAL BOARD

ALIVECOR, INC.,
Petitioner,
Vs.
Apple, Inc.,
Patent Owner.

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

DEPOSITION OF
RONALD DAVID BERGER, M.D., Ph.D., F.H.R.S.
(Taken Virtually by Patent Owner)
Wednesday, March 27th, 2024
10:01 a.m. EDT

Certified Stenographic Court Reporter
Amy A. Brauser, RPR, RMR, CRR

DIGITAL EVIDENCE GROUP
1730 M Street, NW, Suite 812
Washington, D.C. 20036
(202) 232-0646

www.DigitalEvidenceGroup.com Digital Evidence Group C'rt 2024 202-232-0646

1

APPLE 2013
AliveCor v. Apple
IPR2023-00950

Berger Tr.

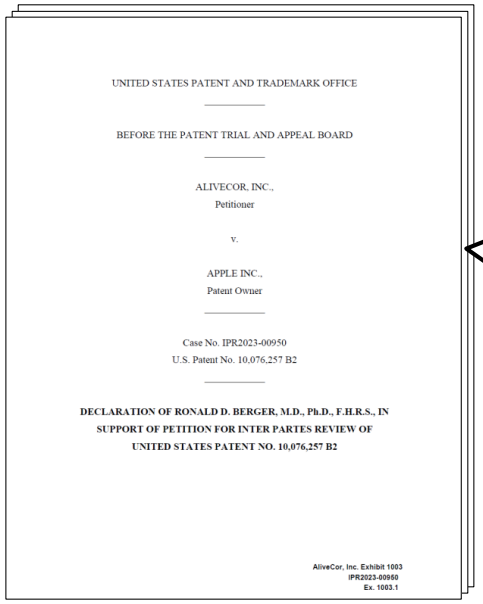
10 So my question is, have you provided
11 any opinions comparing transmission distance to the
12 thickness of the second portion of Markel's
13 enclosure?
14 MR. FERNANDO: Same objection.
15 THE WITNESS: Not quantitatively, just
16 as in the '257, it's not quantitative, it's
17 qualitative, that if you have a conductor
18 that's a poorer conductor than metal, it's
19 going to have electrical transmission
20 properties that depend on distance. And I
21 think that's obvious.

APPLE-2013, 162:2-164:21 (Paper 20, 69)

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE – 72

Ground 1 – Claim 7

[7.a]: wherein the first pad and the second pad are positioned apart from one another at a distance larger than the thickness of the second portion by material having the second conductivity.



UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ALIVECOR, INC.,
Petitioner

v.

APPLE INC.,
Patent Owner

Case No. IPR2023-00950
U.S. Patent No. 10,076,257 B2

DECLARATION OF RONALD D. BERGER, M.D., Ph.D., F.H.R.S., IN SUPPORT OF PETITION FOR INTER PARTES REVIEW OF UNITED STATES PATENT NO. 10,076,257 B2

AliveCor, Inc. Exhibit 1003
IPR2023-00950
Ex. 1003.1

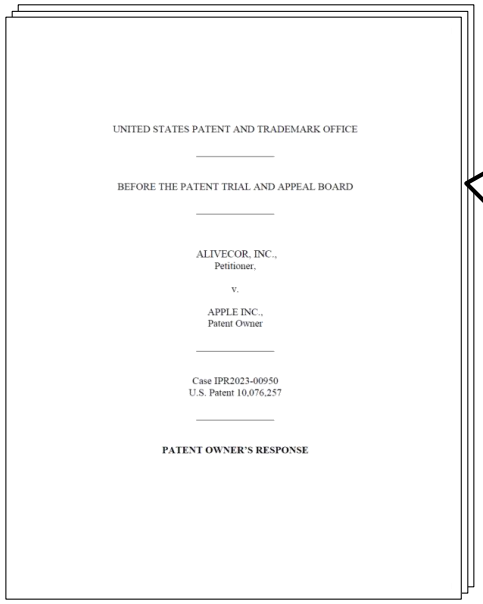
Berger Decl.

217. As explained in Section VI.B (the discussion of which is incorporated herein), a person of ordinary skill in the art would have known that an ECG is a measure of the electrical activity of the heart based on an electrical potential difference. A person of ordinary skill in the art would also have known that in order to measure the potential difference, *Markel*'s electrodes should be electrically one another at a distance larger than the thickness of the second portion by material having the second conductivity. I incorporate herein my earlier discussion of claim 6.

Ex. 1003, ¶ 217 (annotated) (Paper 2, 39-40)

AliveCor Exhibit 1024
AliveCor, Inc. v. Apple Inc.
IPR2023-00950, U.S. Patent No. 10,076,257

Ground 1 – Claim 7 – Apple's Arg.



UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ALIVECOR, INC.,
Petitioner,

v.

APPLE INC.,
Patent Owner

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

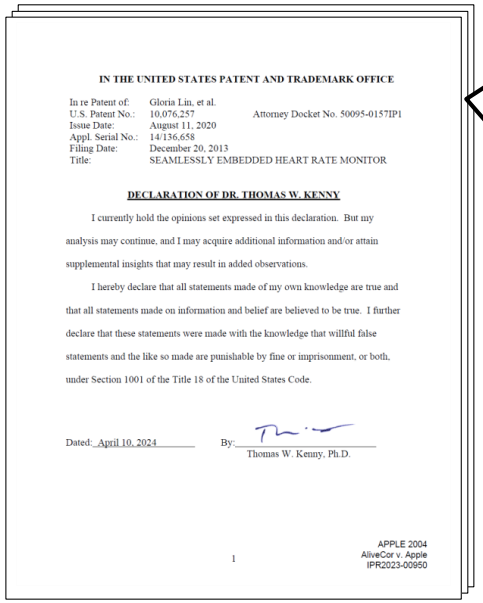
PATENT OWNER'S RESPONSE

Patent Owner's Response

Markel includes no disclosure regarding the configuration or dimensions of the internal components of its device, nor does Markel include any discussion of the thickness of the disclosed electrodes. Because there is no disclosure of the thickness of Markel's electrodes, it is impossible for Markel to disclose "the first pad and the second pad are positioned apart from one another at ***a distance larger than the thickness of the second portion***" as required by claim 7. APPLE-2004, ¶152. Furthermore, the Petition makes no attempt to demonstrate that the alleged first and second pads of Markel are positioned apart a distance larger than the thickness of the second portion. Pet., 39-40. AliveCor does not present any additional arguments based on Nissilä with respect to claim 7 in Ground 2. As such, AliveCor has failed to meet its burden with respect to claim 7.

AliveCor Exhibit 1024
AliveCor, Inc. v. Apple Inc.
IPR2023-00950, U.S. Patent No. 10,076,257
74 of 249

Ground 1 – Claim 7 – Apple's Arg. – Reply



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent of: Gloria Lin, et al.
U.S. Patent No.: 10,076,257 Attorney Docket No. 50095-0157IP1
Issue Date: August 11, 2020
Appl. Serial No.: 14/136,658
Filing Date: December 20, 2013
Title: SEAMLESSLY EMBEDDED HEART RATE MONITOR

DECLARATION OF DR. THOMAS W. KENNY

I currently hold the opinions set expressed in this declaration. But my analysis may continue, and I may acquire additional information and/or attain supplemental insights that may result in added observations.

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

Dated: April 10, 2024 By: Thomas W. Kenny, Ph.D.

1

APPLE 2004
AliveCor v. Apple
IPR2023-00950

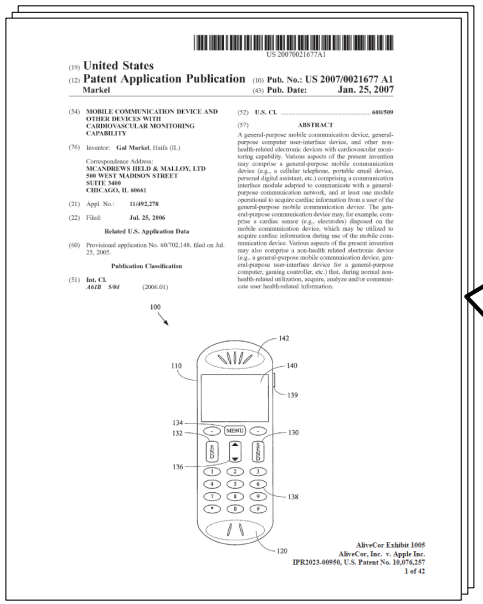
Kenny Decl.

152. Claim 7 recites that "the first pad and the second pad are positioned apart from one another at a distance larger than the thickness of the second portion by material having the second conductivity." As I discussed above with respect to claim 6, because Dr. Berger has included no discussion or indication of the thickness of Markel's electrodes, he has failed to demonstrate that Markel discloses "the first pad and the second pad are positioned apart from one another at a distance larger than the thickness of the second portion" as required by claim 7. EX1003, ¶¶214-217. Dr. Berger also makes no attempt to demonstrate that the alleged first and second pads of Markel are positioned apart a distance larger than the thickness of the second portion. EX1003, ¶¶214-217. AliveCor does not present any additional arguments based on Nissilä with respect to claim 7 in Ground 2 and therefore AliveCor has failed to meet its burden with respect to claim 7.

AliveCor Exhibit 1024
AliveCor, Inc. v. Apple Inc.
IPR2023-00950, U.S. Patent No. 10,076,257
75 of 249

Ground 1 – Claim 8

[8.a]: the enclosure further comprises at least one pocket underneath the exterior surface of the enclosure; and [8.b]: at least one of the first pad and the second pad is placed within the at least one pocket.



(19) United States
(12) Patent Application Publication
Markel

(10) Pub. No.: US 2007/0021677 A1
(43) Pub. Date: Jan. 25, 2007

(54) MOBILE COMMUNICATION DEVICE AND OTHER DEVICES WITH CARDIOVASCULAR MONITORING CAPABILITY

(76) Inventor: Gal Markel, Haifa (IL)

Correspondence Address:
MCANDREWS HELD & MALLOY, LTD
500 WEST MADISON STREET
SUITE 3400
CHICAGO, IL 60661

(21) Appl. No.: 11/492,278

(22) Filed: Jul. 25, 2006

Related U.S. Application Data

(60) Provisional application No. 60/702,148, filed on Jul. 25, 2005.

Publication Classification

(51) Int. Cl.
A61B 5/04 (2006.01)

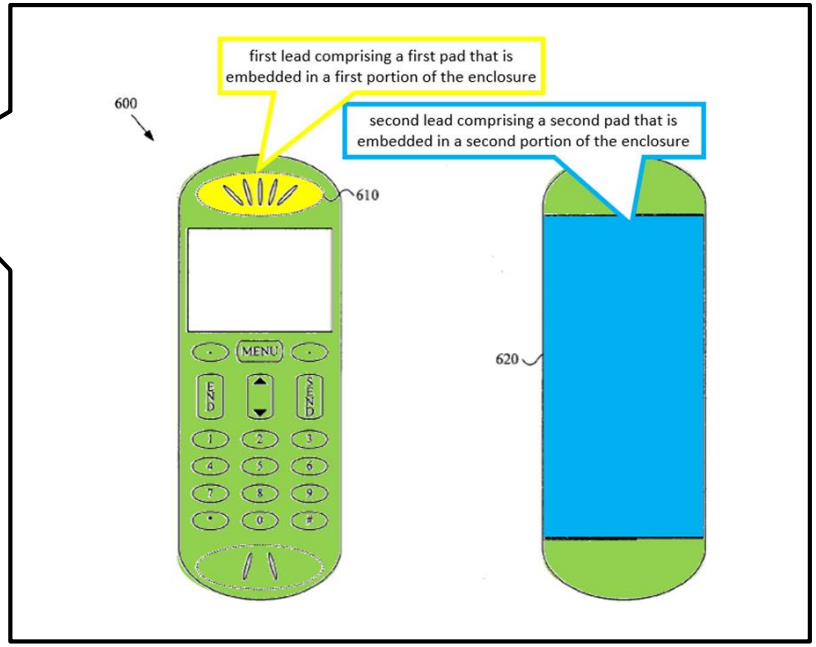
(52) U.S. Cl. 600/509

(57) ABSTRACT

A general-purpose mobile communication device, general-purpose computer user-interface device, and other non-health-related electronic devices with cardiovascular monitoring capability. Various aspects of the present invention may comprise a general-purpose mobile communication device (e.g., a cellular telephone, portable email device, personal digital assistant, etc.) comprising a communication interface module adapted to communicate with a general-purpose communication network, and at least one module operational to acquire cardiac information from a user of the general-purpose mobile communication device. The general-purpose communication device may, for example, comprise a cardiac sensor (e.g., electrodes) disposed on the mobile communication device, which may be utilized to acquire cardiac information during use of the mobile communication device. Various aspects of the present invention may also comprise a non-health related electronic device (e.g., a general-purpose mobile communication device, general-purpose user-interface device for a general-purpose computer, gaming controller, etc.) that, during normal non-health-related utilization, acquire, analyze and/or communicate user health-related information.

AliveCor Exhibit 1005
AliveCor, Inc. v. Apple Inc.
IPR2023-00950, U.S. Patent No. 10,076,257
1 of 42

Markel

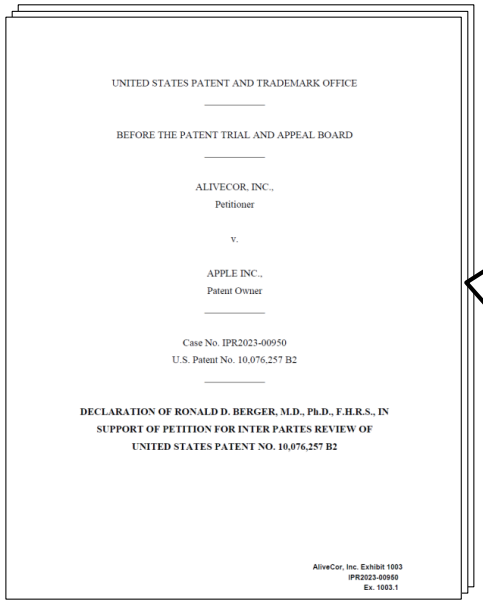


Ex. 1005, Fig. 6 (annotated) (Paper 2, 41)

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE – 76

Ground 1 – Claim 8

[8.a]: the enclosure further comprises at least one pocket underneath the exterior surface of the enclosure; and [8.b]: at least one of the first pad and the second pad is placed within the at least one pocket.



UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ALIVECOR, INC.,
Petitioner

v.

APPLE INC.,
Patent Owner

Case No. IPR2023-00950
U.S. Patent No. 10,076,257 B2

DECLARATION OF RONALD D. BERGER, M.D., Ph.D., F.H.R.S., IN SUPPORT OF PETITION FOR INTER PARTES REVIEW OF UNITED STATES PATENT NO. 10,076,257 B2

AliveCor, Inc. Exhibit 1003
IPR2023-00950
Ex. 1003.1

Berger Decl.

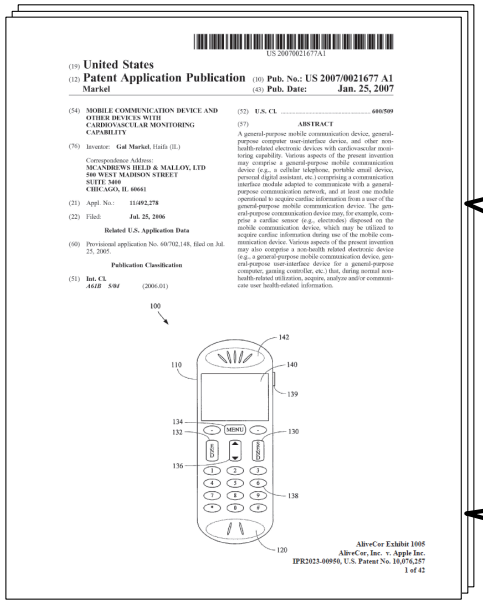
223. *Markel* further renders obvious a pocket underneath the exterior surface of the enclosure. *Markel* further teaches that "an electrode (or all electrodes) . . . may be ***substantially concealed (or hidden) from a user*** . . . with ***little or no visible indication*** of the electrode presence," such that "a user need not be aware of the presence of the electrode" (Ex-1005, [0040] (emphasis added)). A person of ordinary skill in the art would have understood that in order to place a pad under "audio output portion 610," the electronic device would require a pocket underneath the exterior surface of the enclosure. That would allow for placement of the first pad of *Markel*'s "second electrode" within the pocket such that the "first pad" is "conductively coupled" to the user through the exterior surface of the "audio output portion" (*see* Ex-1005, [0035]). The pocket under "audio output portion 610" corresponds to the "at least one pocket underneath the exterior surface of the enclosure" of elements [8.a] and [8.b].

Ex. 1003, ¶ 223 (annotated) (Paper 2, 41-42)

AliveCor Exhibit 1024
AliveCor, Inc. v. Apple Inc.
IPR2023-00950, U.S. Patent No. 10,076,257

Ground 1 – Claim 8

[8.a]: the enclosure further comprises at least one pocket underneath the exterior surface of the enclosure; and [8.b]: at least one of the first pad and the second pad is placed within the at least one pocket.



US 20070021677A1

(19) United States
(12) Patent Application Publication
Markel

(10) Pub. No.: US 2007/0021677 A1
(43) Pub. Date: Jan. 25, 2007

(54) MOBILE COMMUNICATION DEVICE AND OTHER DEVICES WITH CARDIOVASCULAR MONITORING CAPABILITY

(76) Inventor: Gal Markel, Haifa (IL)

Correspondence Address:
MCANDREWS HELD & MALLOY, LTD
500 WEST MADISON STREET
SUITE 3400
CHICAGO, IL 60661

(21) Appl. No.: 11/492,278

(22) Filed: Jul. 25, 2006

Related U.S. Application Data

(60) Provisional application No. 60/702,148, filed on Jul. 25, 2005.

Publication Classification

(51) Int. Cl.
A61B 5/04 (2006.01)

(52) U.S. Cl. 600/509

(57) ABSTRACT

A general-purpose mobile communication device, general-purpose computer user-interface device, and other non-health-related electronic devices with cardiovascular monitoring capability. Various aspects of the present invention may comprise a general-purpose mobile communication device (e.g., a cellular telephone, portable email device, personal digital assistant, etc.) comprising a communication interface module adapted to communicate with a general-purpose communication network, and at least one module operational to acquire cardiac information from a user of the general-purpose mobile communication device. The general-purpose communication device may, for example, comprise a cardiac sensor (e.g., electrodes) disposed on the mobile communication device, which may be utilized to acquire cardiac information during use of the mobile communication device. Various aspects of the present invention may also comprise a non-health related electronic device (e.g., a general-purpose mobile communication device, general-purpose user-interface device for a general-purpose computer, gaming controller, etc.) that, during normal non-health-related utilization, acquire, analyze and/or communicate user health-related information.

AliveCor Exhibit 1005
AliveCor, Inc. v. Apple Inc.
IPR2023-00950, U.S. Patent No. 10,076,257
1 of 42

Markel

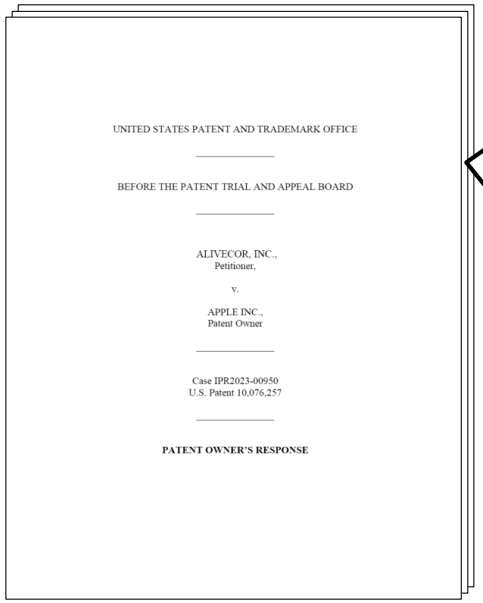
[0040] As mentioned above, in various non-limiting configurations, an electrode (or all electrodes) or other sensor may be substantially concealed (or hidden) from a user. For example and without limitation, an electrode may comprise molded conductive plastic with little or no visible indication of the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

620 or positioned on the main body portion **620**). A second electrode may be disposed on the audio output portion **610** (e.g., molded into the audio output portion **610** or positioned on the audio output portion **610**). Such electrode placement

Ex. 1005, [0040], [0050] (annotated) (Paper 2, 11-13, 41)

AliveCor Exhibit 1024
AliveCor, Inc. v. Apple Inc.
IPR2023-00950, U.S. Patent No. 10,076,257
78 of 249

Ground 1 – Claim 8 – Apple's Arg.



UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ALIVECOR, INC.,
Petitioner,

v.

APPLE INC.,
Patent Owner

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

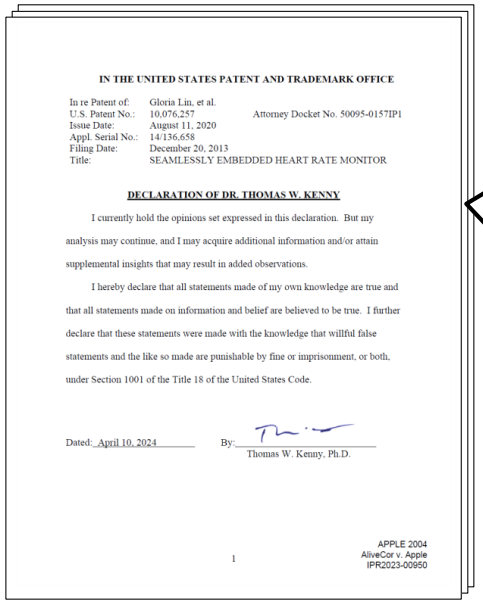
PATENT OWNER'S RESPONSE

Patent Owner's Response

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

AliveCor Exhibit 1024
AliveCor, Inc. v. Apple Inc.
IPR2023-00950, U.S. Patent No. 10,076,257
79 of 249

Ground 1 – Claim 8 – Apple's Arg. – Reply



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent of: Gloria Lin, et al.
U.S. Patent No.: 10,076,257 Attorney Docket No. 50095-0157IP1
Issue Date: August 11, 2020
Appl. Serial No.: 14/136,658
Filing Date: December 20, 2013
Title: SEAMLESSLY EMBEDDED HEART RATE MONITOR

DECLARATION OF DR. THOMAS W. KENNY

I currently hold the opinions set expressed in this declaration. But my analysis may continue, and I may acquire additional information and/or attain supplemental insights that may result in added observations.

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

Dated: April 10, 2024 By: Thomas W. Kenny, Ph.D.

1

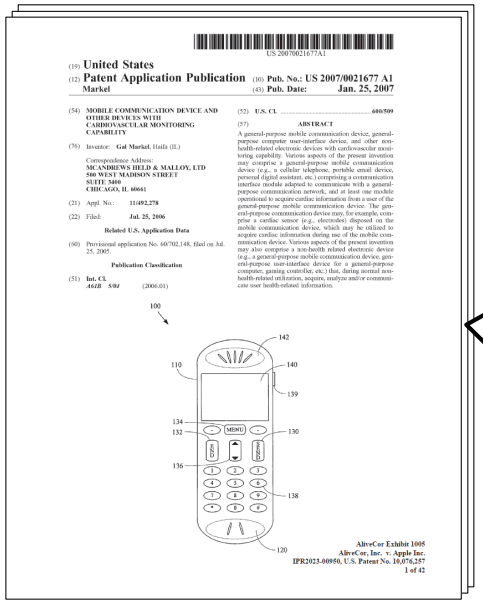
APPLE 2004
AliveCor v. Apple
IPR2023-00950

Kenny Decl.

153. Claim 8 recites "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." As I have previously discussed, there is no disclosure in Markel of the internal configurations of Markel's MCD. There is therefore no disclosure or suggestion in Markel of a "pocket underneath the exterior surface of the enclosure" in which the first or second pad is placed. There is also no indication that Markel's device would "require a pocket underneath the exterior surface of the enclosure" as Dr. Berger asserts. EX1003, ¶223. Dr. Berger provides no reasoning as to why such a pocket would be required in Markel's MCD. Therefore, Grounds 1 and 2 fail to demonstrate the Markel discloses claim 8 either alone or in view of Nissilä.

Ground 1 – Claim 9

[9.a]: 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;



(19) United States
(12) Patent Application Publication
Markel

(10) Pub. No.: US 2007/0021677 A1
(43) Pub. Date: Jan. 25, 2007

(54) MOBILE COMMUNICATION DEVICE AND OTHER DEVICES WITH CARDIOVASCULAR MONITORING CAPABILITY

(76) Inventor: Gal Markel, Haifa (IL)

Correspondence Address:
MCANDREWS HELD & MALLOY, LTD
500 WEST MADISON STREET
SUITE 3400
CHICAGO, IL 60661

(21) Appl. No.: 11/492,278

(22) Filed: Jul. 25, 2006

Related U.S. Application Data

(60) Provisional application No. 60/702,148, filed on Jul. 25, 2005.

Publication Classification

(51) Int. Cl.
A61B 5/04 (2006.01)

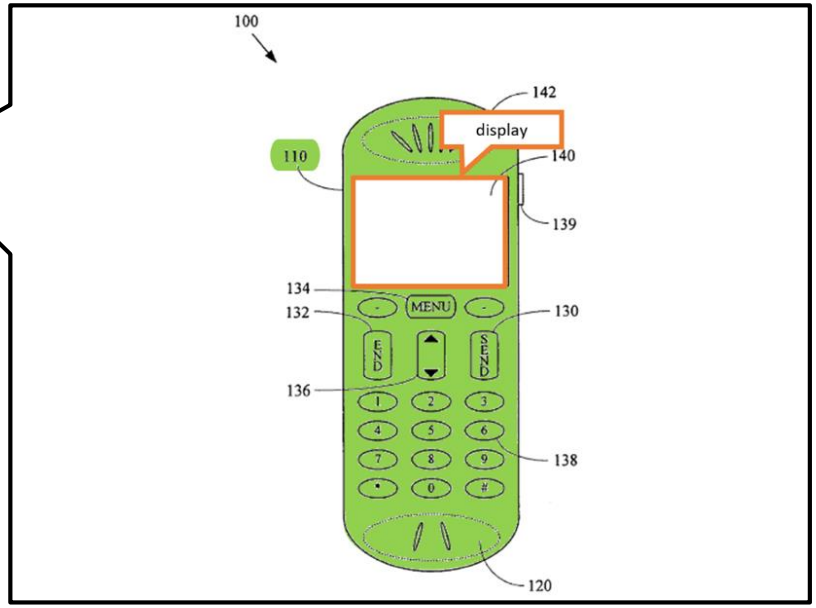
(52) U.S. Cl. 600/509

(57) ABSTRACT

A general-purpose mobile communication device, general-purpose computer user-interface device, and other non-health-related electronic devices with cardiovascular monitoring capability. Various aspects of the present invention may comprise a general-purpose mobile communication device (e.g., a cellular telephone, portable email device, personal digital assistant, etc.) comprising a communication interface module adapted to communicate with a general-purpose communication network, and at least one module operational to acquire cardiac information from a user of the general-purpose mobile communication device. The general-purpose communication device may, for example, comprise a cardiac sensor (e.g., electrodes) disposed on the mobile communication device, which may be utilized to acquire cardiac information during use of the mobile communication device. Various aspects of the present invention may also comprise a non-health related electronic device (e.g., a general-purpose mobile communication device, general-purpose user-interface device for a general-purpose computer, gaming controller, etc.) that, during normal non-health-related utilization, acquire, analyze and/or communicate user health-related information.

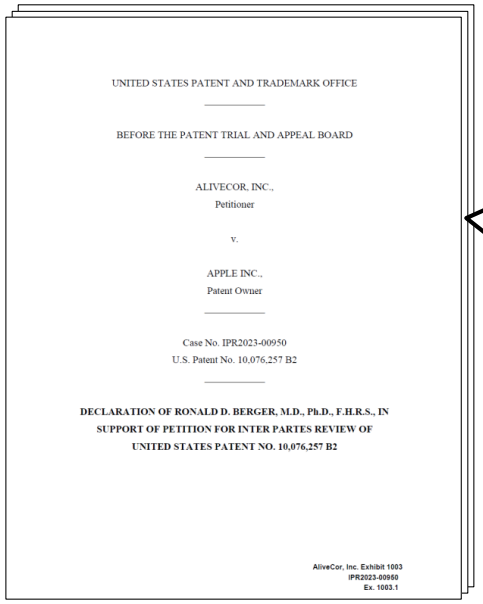
AliveCor Exhibit 1005
AliveCor, Inc. v. Apple Inc.
IPR2023-00950, U.S. Patent No. 10,076,257
1 of 42

Markel



Ex. 1005, Fig. 5 (annotated) (Paper 2, 43)

Ground 1 – Claim 9



UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ALIVECOR, INC.,
Petitioner

v.

APPLE INC.,
Patent Owner

Case No. IPR2023-00950
U.S. Patent No. 10,076,257 B2

DECLARATION OF RONALD D. BERGER, M.D., Ph.D., F.H.R.S., IN SUPPORT OF PETITION FOR INTER PARTES REVIEW OF UNITED STATES PATENT NO. 10,076,257 B2

AliveCor, Inc. Exhibit 1003
IPR2023-00950
Ex. 1003.1

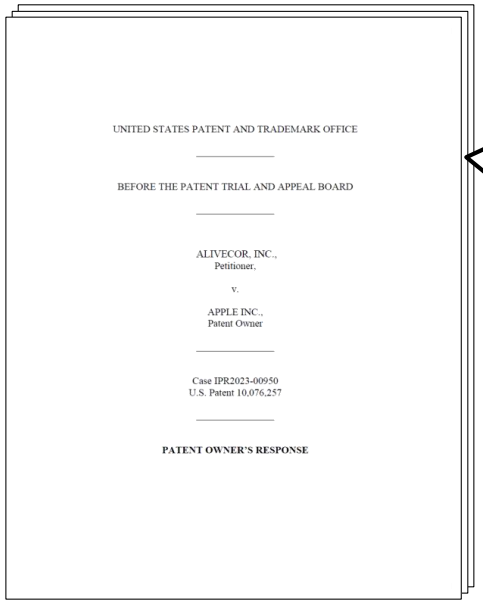
Berger Decl.

228. As explained earlier with respect to claim element [1.a] (the discussion of which is incorporated herein), *Markel* discloses a "main body portion 110" (annotated above in green), which corresponds to the claimed "enclosure" of element [1.a]. Markel discloses that the electronic device "may also comprise various user output features, for example, a ***display 140 (which may also function as a touch screen input feature)*** and a speaker 142" (Ex-1005, [0034] (emphasis added)). Figure 1 of *Markel* discloses a "display 140" (orange, above) wherein the "main body portion 110" (green, above) supports the "display 140," and wherein at least a portion of the exterior surface of the electronic device is behind the "display 140."

Ex. 1003, ¶ 228 (annotated) (Paper 2, 43)

AliveCor Exhibit 1024
AliveCor, Inc. v. Apple Inc.
IPR2023-00950, U.S. Patent No. 10,076,257
82 of 249

Ground 1 – Claim 9 – Apple's Arg.



UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ALIVECOR, INC.,
Petitioner,

v.

APPLE INC.,
Patent Owner

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

PATENT OWNER'S RESPONSE

Patent Owner's Response

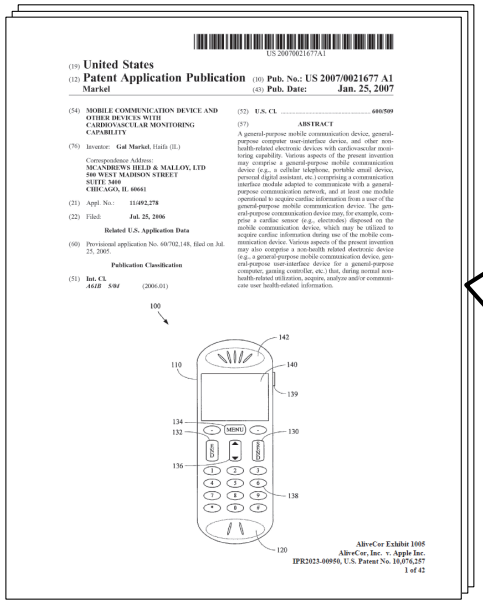
As to Claim 9, AliveCor asserts that "at least a portion of the exterior surface of the electronic device is behind the 'display 140'" of Markel yet cites to no disclosure in Markel to support this assertion. Pet., 43. AliveCor's only support for this assertion is an equally unsupported assertion from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

AliveCor Exhibit 1024
AliveCor, Inc. v. Apple Inc.
IPR2023-00950, U.S. Patent No. 10,076,257
83 of 249

Ground 1 – Claim 9

[Undisputed]

[9.b]: 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.



(19) United States
(12) Patent Application Publication
Markel

(10) Pub. No.: US 2007/0021677 A1
(43) Pub. Date: Jan. 25, 2007

(54) MOBILE COMMUNICATION DEVICE AND OTHER DEVICES WITH CARDIOVASCULAR MONITORING CAPABILITY

(76) Inventor: Gal Markel, Haifa (IL)

Correspondence Address:
MCANDREWS HELD & MALLOY, LTD
500 WEST MADISON STREET
SUITE 3400
CHICAGO, IL 60661

(21) Appl. No.: 11/492,278

(22) Filed: Jul. 25, 2006

Related U.S. Application Data

(60) Provisional application No. 60/702,148, filed on Jul. 25, 2005.

Publication Classification

(51) Int. Cl.
A61B 5/04 (2006.01)

(52) U.S. Cl. 600/509

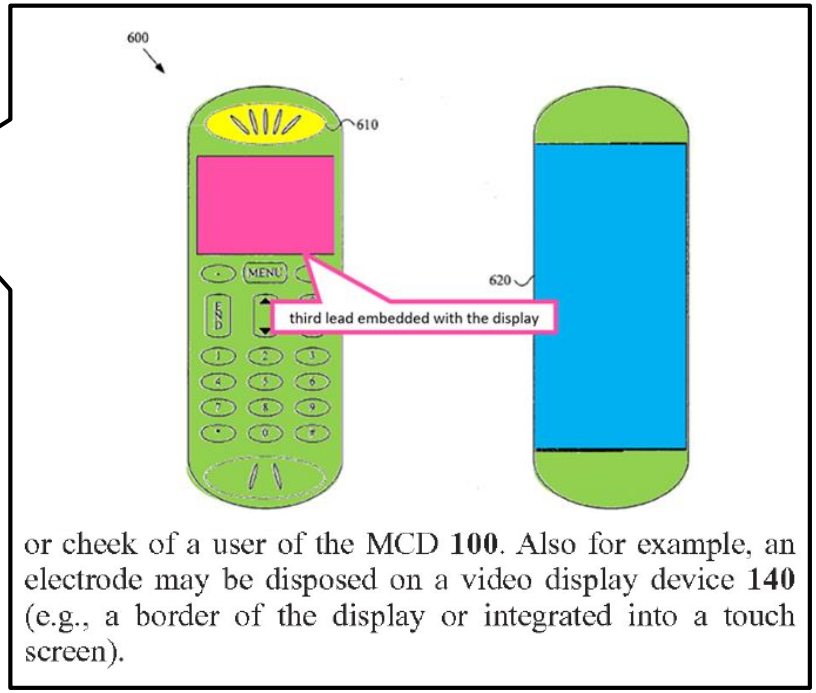
(57) ABSTRACT

A general-purpose mobile communication device, general-purpose computer user-interface device, and other non-health-related electronic devices with cardiovascular monitoring capability. Various aspects of the present invention may comprise a general-purpose mobile communication device (e.g., a cellular telephone, portable email device, personal digital assistant, etc.) comprising a communication interface module adapted to communicate with a general-purpose communication network, and at least one module operational to acquire cardiac information from a user of the general-purpose mobile communication device. The general-purpose communication device may, for example, comprise a cardiac sensor (e.g., electrodes) disposed on the mobile communication device, which may be utilized to acquire cardiac information during use of the mobile communication device. Various aspects of the present invention may also comprise a non-health related electronic device (e.g., a general-purpose mobile communication device, general-purpose user-interface device for a general-purpose computer, gaming controller, etc.) that, during normal non-health-related utilization, acquire, analyze and/or communicate user health-related information.

100, 142, 110, 140, 139, 134, 132, MENU, 130, 136, 138, 120

AliveCor Exhibit 1005
AliveCor, Inc. v. Apple Inc.
IPR2023-00950, U.S. Patent No. 10,076,257
1 of 42

Markel



or cheek of a user of the MCD **100**. Also for example, an electrode may be disposed on a video display device **140** (e.g., a border of the display or integrated into a touch screen).

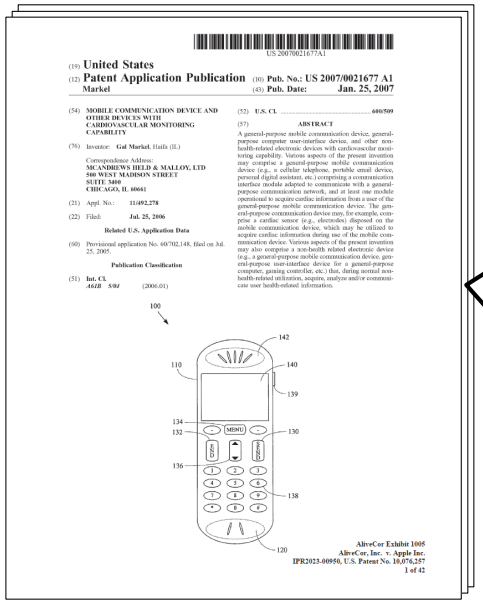
Ex. 1005, Fig. 6, [0044] (annotated) (Paper 2, 43)

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE – 84

Ground 1 – Claim 9

[Undisputed]

[9.b]: 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.



(19) United States
(12) Patent Application Publication
Markel
(10) Pub. No.: US 2007/0021677 A1
(43) Pub. Date: Jan. 25, 2007

(54) MOBILE COMMUNICATION DEVICE AND OTHER DEVICES WITH CARDIOVASCULAR MONITORING CAPABILITY

(76) Inventor: Gal Markel, Haifa (IL)

Correspondence Address:
MCANDREWS HELD & MALLOY, LTD
500 WEST MADISON STREET
SUITE 3400
CHICAGO, IL 60661

(21) Appl. No.: 11/492,278

(22) Filed: Jul. 25, 2006

Related U.S. Application Data

(60) Provisional application No. 60/702,148, filed on Jul. 25, 2005.

Publication Classification

(51) Int. Cl.
A61B 5/04 (2006.01)

(52) U.S. Cl. 600/509

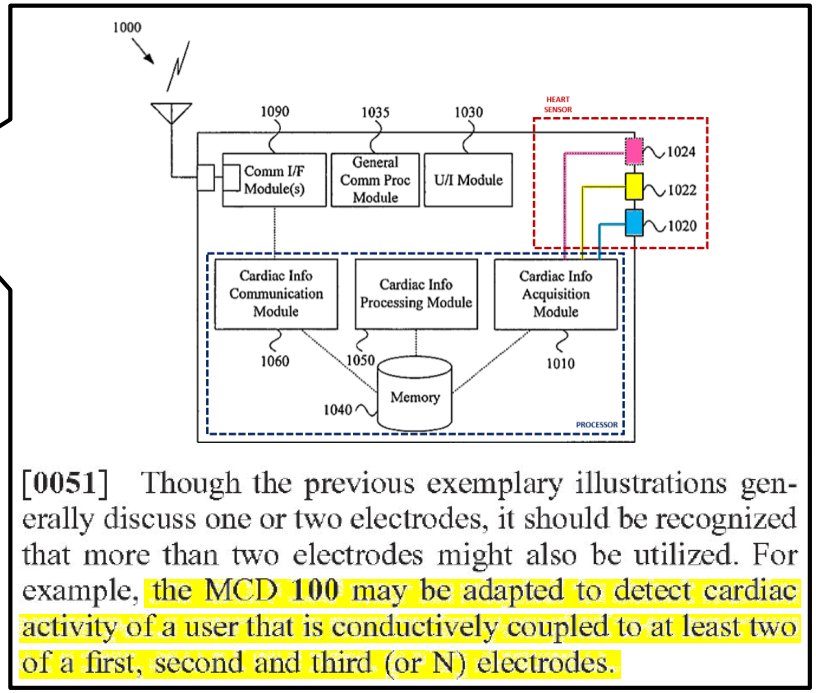
(57) ABSTRACT

A general-purpose mobile communication device, general-purpose computer user-interface device, and other non-health-related electronic devices with cardiovascular monitoring capability. Various aspects of the present invention may comprise a general-purpose mobile communication device (e.g., a cellular telephone, portable email device, personal digital assistant, etc.) comprising a communication interface module adapted to communicate with a general-purpose communication network, and at least one module operational to acquire cardiac information from a user of the general-purpose mobile communication device. The general-purpose communication device may, for example, comprise a cardiac sensor (e.g., electrodes) disposed on the mobile communication device, which may be utilized to acquire cardiac information during use of the mobile communication device. Various aspects of the present invention may also comprise a non-health related electronic device (e.g., a general-purpose mobile communication device, general-purpose user-interface device for a general-purpose computer, gaming controller, etc.) that, during normal non-health-related utilization, acquire, analyze and/or communicate user health-related information.

100
110
142
140
139
134
132
130
136
138
120
MENU

AliveCor Exhibit 1005
AliveCor, Inc. v. Apple Inc.
IPR2023-00950, U.S. Patent No. 10,076,257
1 of 42

Markel

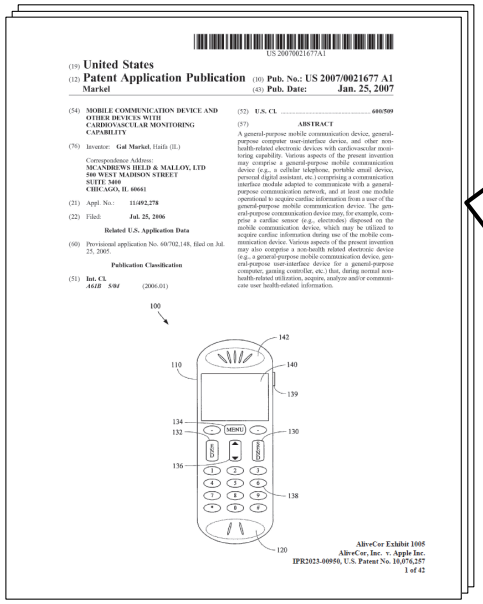


[0051] Though the previous exemplary illustrations generally discuss one or two electrodes, it should be recognized that more than two electrodes might also be utilized. For example, the MCD **100** may be adapted to detect cardiac activity of a user that is conductively coupled to at least two of a first, second and third (or N) electrodes.

Ex. 1005, Fig. 10, [0051] (annotated) (Paper 2, 44-45)

Ground 1 – Claims 12, 13, 19

[12.a]: wherein the first portion of the enclosure is a bezel.



US 20070021677A1

(19) United States
(12) Patent Application Publication
Markel

(10) Pub. No.: US 2007/0021677 A1
(43) Pub. Date: Jan. 25, 2007

(54) MOBILE COMMUNICATION DEVICE AND OTHER DEVICES WITH CARDIOVASCULAR MONITORING CAPABILITY

(76) Inventor: Gal Markel, Haifa (IL)

Correspondence Address:
MCANDREWS HELD & MALLOY, LTD
500 WEST MADISON STREET
SUITE 3400
CHICAGO, IL 60661

(21) Appl. No.: 11/492,278

(22) Filed: Jul. 25, 2006

Related U.S. Application Data

(60) Provisional application No. 60/702,148, filed on Jul. 25, 2005.

Publication Classification

(51) Int. Cl.
A61B 5/04 (2006.01)

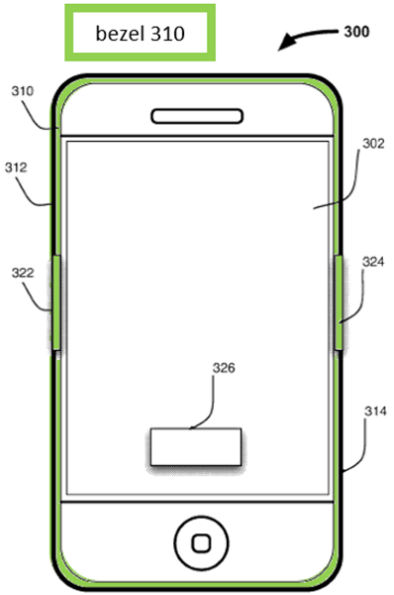
(52) U.S. Cl. 600/509

(57) ABSTRACT

A general-purpose mobile communication device, general-purpose computer user-interface device, and other non-health-related electronic devices with cardiovascular monitoring capability. Various aspects of the present invention may comprise a general-purpose mobile communication device (e.g., a cellular telephone, portable email device, personal digital assistant, etc.) comprising a communication interface module adapted to communicate with a general-purpose communication network, and at least one module operational to acquire cardiac information from a user of the general-purpose mobile communication device. The general-purpose communication device may, for example, comprise a cardiac sensor (e.g., electrodes) disposed on the mobile communication device, which may be utilized to acquire cardiac information during use of the mobile communication device. Various aspects of the present invention may also comprise a non-health related electronic device (e.g., a general-purpose mobile communication device, general-purpose user-interface device for a general-purpose computer, gaming controller, etc.) that, during normal non-health-related utilization, acquire, analyze and/or communicate user health-related information.

AliveCor Exhibit 1005
AliveCor, Inc. v. Apple Inc.
IPR2023-00950, U.S. Patent No. 10,076,257
1 of 42

Markel



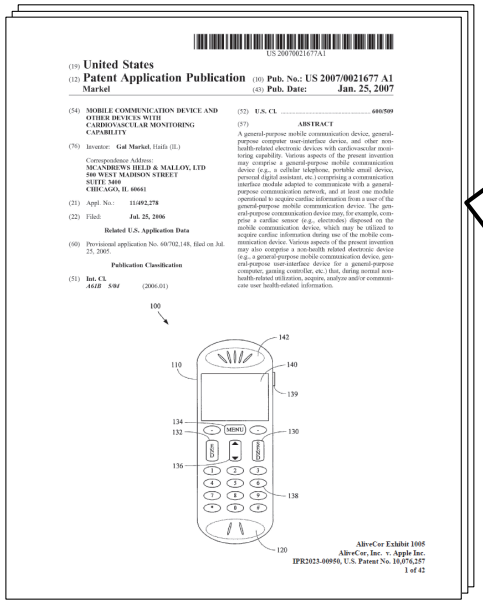
or cheek of a user of the MCD **100**. Also for example, an electrode may be disposed on a video display device **140** (e.g., a border of the display or integrated into a touch screen).

Ex. 1005, Fig. 3, [0044] (annotated) (Paper 2, 47)

AliveCor Exhibit 1024
AliveCor, Inc. v. Apple Inc.
IPR2023-00950, U.S. Patent No. 10,076,257
86 of 249

Ground 1 – Claims 12, 13, 19

[12.a]: wherein the first portion of the enclosure is a bezel.



(19) United States
(12) Patent Application Publication
Markel

(10) Pub. No.: US 2007/0021677 A1
(43) Pub. Date: Jan. 25, 2007

(54) MOBILE COMMUNICATION DEVICE AND OTHER DEVICES WITH CARDIOVASCULAR MONITORING CAPABILITY

(76) Inventor: Gal Markel, Haifa (IL)

Correspondence Address:
MCANDREWS HELD & MALLOY, LTD
500 WEST MADISON STREET
SUITE 3400
CHICAGO, IL 60661

(21) Appl. No.: 11/492,278

(22) Filed: Jul. 25, 2006

Related U.S. Application Data

(60) Provisional application No. 60/702,148, filed on Jul. 25, 2005.

Publication Classification

(51) Int. Cl.
A61B 5/04 (2006.01)

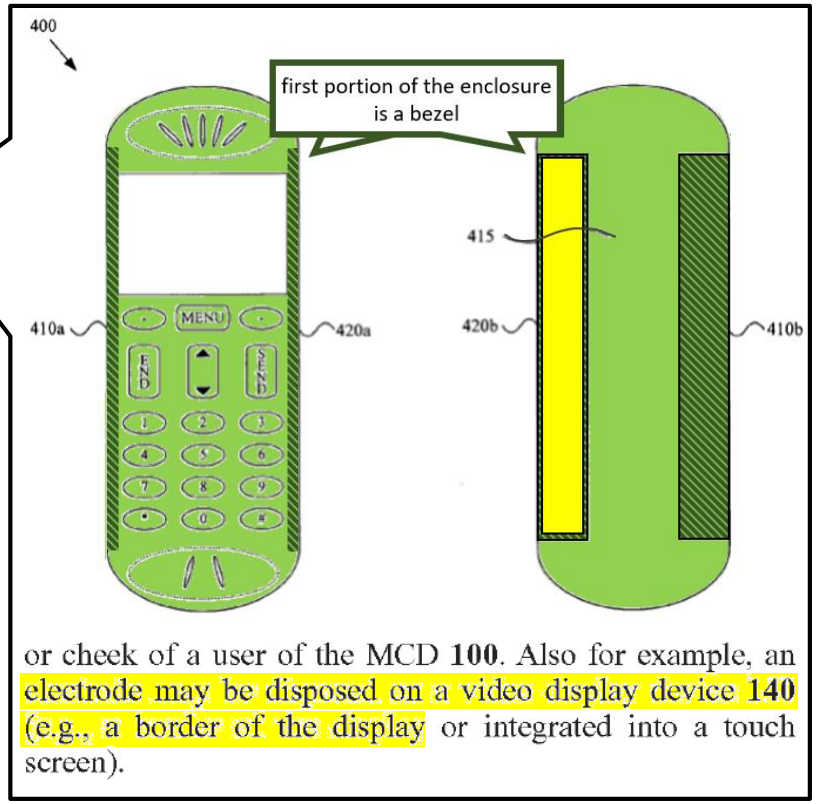
(52) U.S. Cl. 600/509

(57) ABSTRACT

A general-purpose mobile communication device, general-purpose computer user-interface device, and other non-health-related electronic devices with cardiovascular monitoring capability. Various aspects of the present invention may comprise a general-purpose mobile communication device (e.g., a cellular telephone, portable email device, personal digital assistant, etc.) comprising a communication interface module adapted to communicate with a general-purpose communication network, and at least one module operational to acquire cardiac information from a user of the general-purpose mobile communication device. The general-purpose communication device may, for example, comprise a cardiac sensor (e.g., electrodes) disposed on the mobile communication device, which may be utilized to acquire cardiac information during use of the mobile communication device. Various aspects of the present invention may also comprise a non-health related electronic device (e.g., a general-purpose mobile communication device, general-purpose user-interface device for a general-purpose computer, gaming controller, etc.) that, during normal non-health-related utilization, acquire, analyze and/or communicate user health-related information.

AliveCor Exhibit 1005
AliveCor, Inc. v. Apple Inc.
IPR2023-00950, U.S. Patent No. 10,076,257
1 of 42

Markel



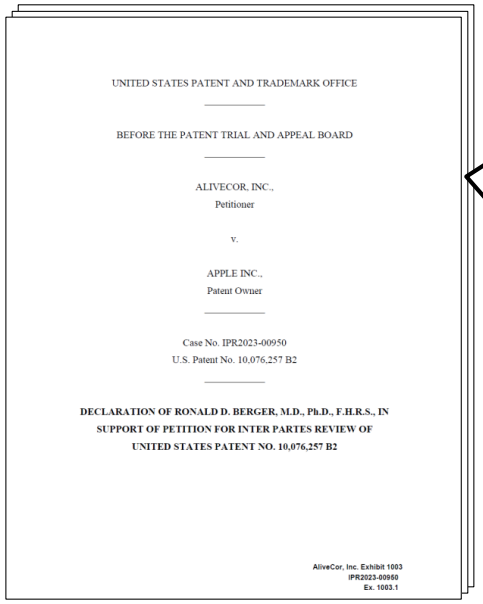
or cheek of a user of the MCD **100**. Also for example, an electrode may be disposed on a video display device **140** (e.g., a border of the display or integrated into a touch screen).

Ex. 1005, Fig. 4B, [0044] (annotated) (Paper 2, 49)

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE – 87

Ground 1 – Claims 12, 13, 19

[12.a]: wherein the first portion of the enclosure is a bezel.



UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ALIVECOR, INC.,
Petitioner

v.

APPLE INC.,
Patent Owner

Case No. IPR2023-00950
U.S. Patent No. 10,076,257 B2

DECLARATION OF RONALD D. BERGER, M.D., Ph.D., F.H.R.S., IN SUPPORT OF PETITION FOR INTER PARTES REVIEW OF UNITED STATES PATENT NO. 10,076,257 B2

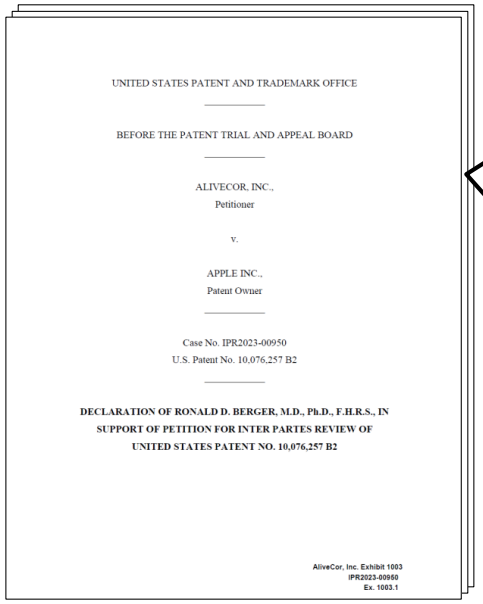
AliveCor, Inc. Exhibit 1003
IPR2023-00950
Ex. 1003.1

Berger Decl.

251. As explained earlier with respect to claim element [1.c.i], a person of ordinary skill in the art would have understood that the "second electrode" in *Markel*'s Figure 4 is embedded in the "right side portion 420" of the electronic device. The "right side portion 420" corresponds to the claimed "first portion of the enclosure." According to Figure 4 of *Markel*, the "side portions" (dark green, below) wrap around the front and back of the device, like a bezel. Both the front and back view of *Markel*'s electronic device have labels corresponding to the "right side portion 420" (Ex-1005, Fig. 4). As illustrated below, furthermore, the second electrode extends to the rim that encircles *Markel*'s electronic device. *Markel* also discloses that an electrode may be disposed in "a ***border*** of the display" (Ex-1005, [0044] (emphasis added)). From this, a person of ordinary skill in the art would have understood that the first pad of *Markel*'s "second electrode" is embedded in 420*b* (i.e., the "first portion of the enclosure") which includes the "bezel."

Ground 1 – Claims 12, 13, 19

[12.a]: wherein the first portion of the enclosure is a bezel.



UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ALIVECOR, INC.,
Petitioner

v.

APPLE INC.,
Patent Owner

Case No. IPR2023-00950
U.S. Patent No. 10,076,257 B2

DECLARATION OF RONALD D. BERGER, M.D., Ph.D., F.H.R.S., IN SUPPORT OF PETITION FOR INTER PARTES REVIEW OF UNITED STATES PATENT NO. 10,076,257 B2

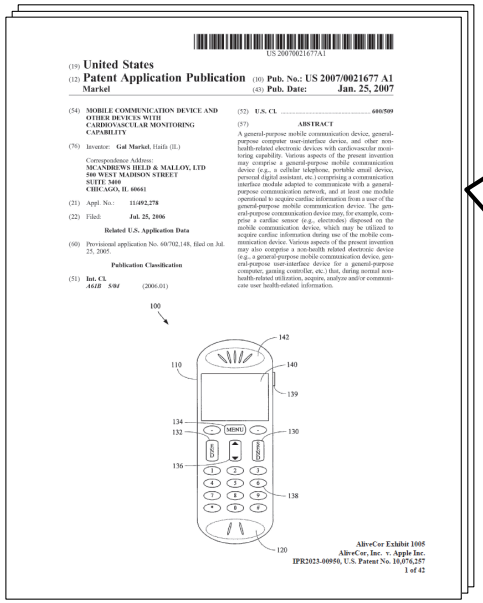
AliveCor, Inc. Exhibit 1003
IPR2023-00950
Ex. 1003.1

Berger Decl.

252. To the extent that *Markel*'s Figure 4 is not found to disclose that the "first portion of the enclosure" includes the "bezel," this would have been a trivial modification that would have been well-within the general knowledge of a person of ordinary skill in the art. *Markel* discloses "a display 140 (which may also function as a touch screen input feature)" and that "an electrode may be disposed on a video display device 140 (e.g., a ***border of the display*** or integrated into a touch screen)" (Ex-1005, [0044] (emphasis added)). A person of ordinary skill in the art would have been motivated to extend the edges of *Markel*'s "second electrode" in 420b so that they reached the border of the "display 140" (i.e., bezel) because this would have created additional contact area. The additional contact area would have enhanced the ability of the "second electrode" to detect a signal from a user's hand and make it more likely that a user would interact with the second electrode so as to have a successful test.

Ground 1 – Claims 12, 13, 19

[13.a]: wherein the second portion of the enclosure is a bezel.



US 20070021677A1

(19) **United States**

(12) **Patent Application Publication** (10) **Pub. No.: US 2007/0021677 A1**

Markel (43) **Pub. Date: Jan. 25, 2007**

(54) **MOBILE COMMUNICATION DEVICE AND OTHER DEVICES WITH CARDIOVASCULAR MONITORING CAPABILITY**

(76) Inventor: **Gal Markel**, Highland Park (IL)

Correspondence Address:
MCANDREWS HELD & MALLOY, LTD
500 WEST MADISON STREET
SUITE 3400
CHICAGO, IL 60661

(21) Appl. No.: **11/492,278**

(22) Filed: **Jul. 25, 2006**

Related U.S. Application Data

(60) Provisional application No. 60/702,148, filed on Jul. 25, 2005.

Publication Classification

(51) **Int. Cl.**
A61B 5/04 (2006.01)

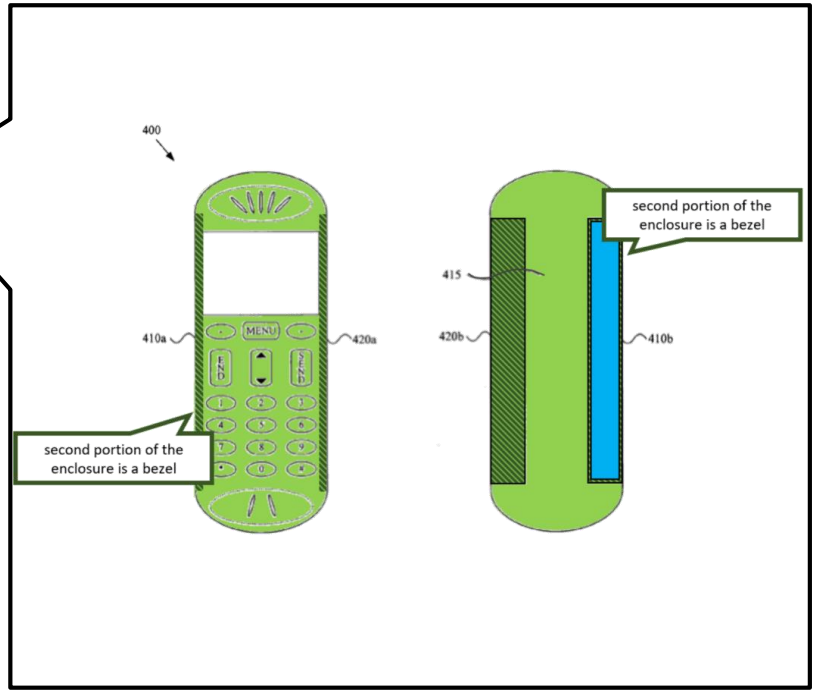
(52) **U.S. Cl.** **600/509**

(57) **ABSTRACT**

A general-purpose mobile communication device, general-purpose computer user-interface device, and other non-health-related electronic devices with cardiovascular monitoring capability. Various aspects of the present invention may comprise a general-purpose mobile communication device (e.g., a cellular telephone, portable email device, personal digital assistant, etc.) comprising a communication interface module adapted to communicate with a general-purpose communication network, and at least one module operational to acquire cardiac information from a user of the general-purpose mobile communication device. The general-purpose communication device may, for example, comprise a cardiac sensor (e.g., electrodes) disposed on the mobile communication device, which may be utilized to acquire cardiac information during use of the mobile communication device. Various aspects of the present invention may also comprise a non-health related electronic device (e.g., a general-purpose mobile communication device, general-purpose user-interface device for a general-purpose computer, gaming controller, etc.) that, during normal non-health-related utilization, acquire, analyze and/or communicate user health-related information.

AliveCor Exhibit 1005
AliveCor, Inc. v. Apple Inc.
IPR2023-00950, U.S. Patent No. 10,076,257
1 of 42

Markel

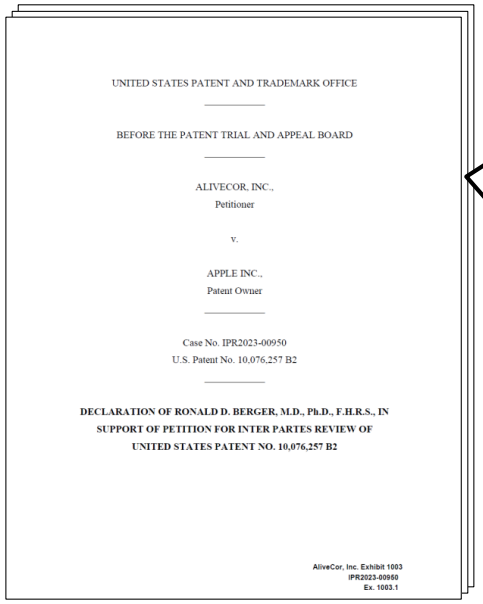


Ex. 1005, Fig. 4 (annotated) (Paper 2, 50)

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE – 90

Ground 1 – Claims 12, 13, 19

[13.a]: wherein the second portion of the enclosure is a bezel.



UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ALIVECOR, INC.,
Petitioner

v.

APPLE INC.,
Patent Owner

Case No. IPR2023-00950
U.S. Patent No. 10,076,257 B2

DECLARATION OF RONALD D. BERGER, M.D., Ph.D., F.H.R.S., IN SUPPORT OF PETITION FOR INTER PARTES REVIEW OF UNITED STATES PATENT NO. 10,076,257 B2

AliveCor, Inc. Exhibit 1003
IPR2023-00950
Ex. 1003.1

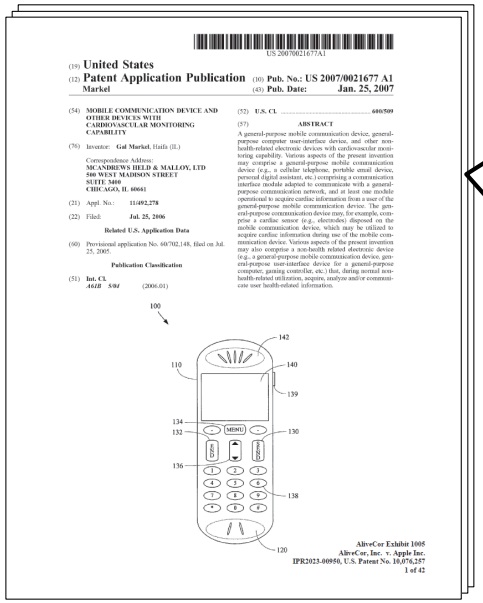
Berger Decl.

259. As explained earlier with respect to claim element [1.d.i], a person of ordinary skill in the art would have understood that the "first electrode" in *Markel*'s Figure 4 is embedded in the "left side portion 410" of the electronic device. The "left side portion 410" corresponds to the claimed "second portion of the enclosure." According to Figure 4 of *Markel*, the "side portions" (dark green, below) wrap around the front and back of the device, like a bezel. Both the front and back view of *Markel*'s electronic device have labels corresponding to the "left side portion 410" (Ex-1005, Fig. 4). As illustrated below, furthermore, the first electrode extends to the rim that encircles *Markel*'s electronic device. *Markel* also discloses that an electrode may be disposed in "a ***border*** of the display" (Ex-1005, [0044] (emphasis added)). From this, a person of ordinary skill in the art would have understood that the second pad of *Markel*'s "first electrode" is embedded in 410*b* (i.e., the "second portion of the enclosure") which includes the "bezel."

Ex. 1003, ¶ 259 (annotated) (Paper 2, 50)

Ground 1 – Claims 12, 13, 19

[19.a]: the first portion of the electronic device comprises a bezel of the enclosure;



US 20070021677A1

(19) **United States**
(12) **Patent Application Publication** (10) **Pub. No.: US 2007/0021677 A1**
Markel (43) **Pub. Date: Jan. 25, 2007**

(54) **MOBILE COMMUNICATION DEVICE AND OTHER DEVICES WITH CARDIOVASCULAR MONITORING CAPABILITY**

(76) Inventor: **Gal Markel**, Haifa (IL)

Correspondence Address:
MCANDREWS HELD & MALLOY, LTD
500 WEST MADISON STREET
SUITE 3400
CHICAGO, IL 60661

(21) Appl. No.: **11/492,278**

(22) Filed: **Jul. 25, 2006**

Related U.S. Application Data

(60) Provisional application No. 60/702,148, filed on Jul. 25, 2005.

Publication Classification

(51) **Int. Cl.**
A61B 5/04 (2006.01)

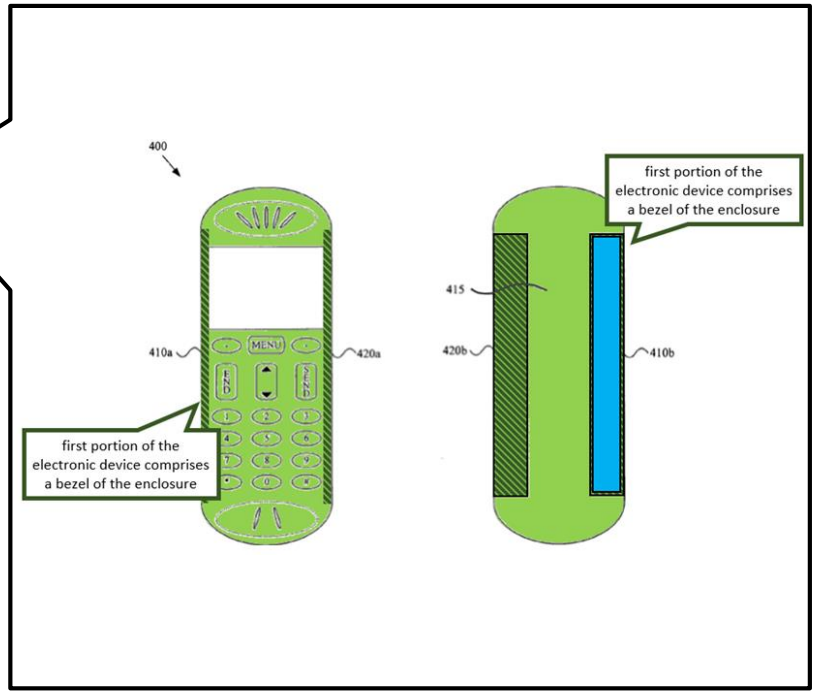
(52) **U.S. Cl.** **600/509**

(57) **ABSTRACT**

A general-purpose mobile communication device, general-purpose computer user-interface device, and other non-health-related electronic devices with cardiovascular monitoring capability. Various aspects of the present invention may comprise a general-purpose mobile communication device (e.g., a cellular telephone, portable email device, personal digital assistant, etc.) comprising a communication interface module adapted to communicate with a general-purpose communication network, and at least one module operational to acquire cardiac information from a user of the general-purpose mobile communication device. The general-purpose communication device may, for example, comprise a cardiac sensor (e.g., electrodes) disposed on the mobile communication device, which may be utilized to acquire cardiac information during use of the mobile communication device. Various aspects of the present invention may also comprise a non-health related electronic device (e.g., a general-purpose mobile communication device, general-purpose user-interface device for a general-purpose computer, gaming controller, etc.) that, during normal non-health-related utilization, acquire, analyze and/or communicate user health-related information.

AliveCor Exhibit 1005
AliveCor, Inc. v. Apple Inc.
IPR2023-00950, U.S. Patent No. 10,076,257
1 of 42

Markel

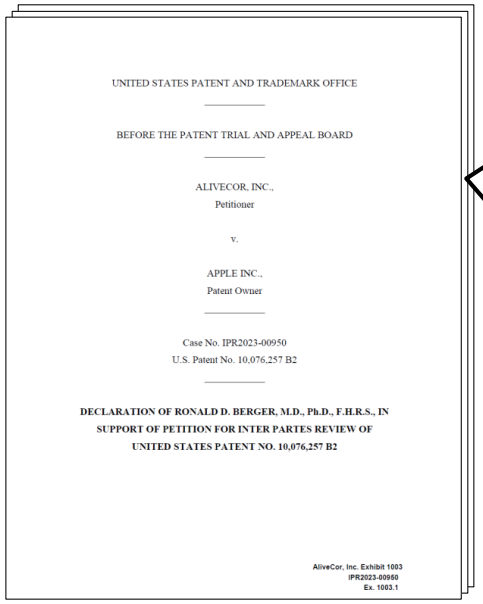


Ex. 1005, Fig. 4 (annotated) (Paper 2, 66)

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE – 92

Ground 1 – Claims 12, 13, 19

[19.a]: the first portion of the electronic device comprises a bezel of the enclosure;



UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ALIVECOR, INC.,
Petitioner

v.

APPLE INC.,
Patent Owner

Case No. IPR2023-00950
U.S. Patent No. 10,076,257 B2

DECLARATION OF RONALD D. BERGER, M.D., Ph.D., F.H.R.S., IN SUPPORT OF PETITION FOR INTER PARTES REVIEW OF UNITED STATES PATENT NO. 10,076,257 B2

AliveCor, Inc. Exhibit 1003
IPR2023-00950
Ex. 1003.1

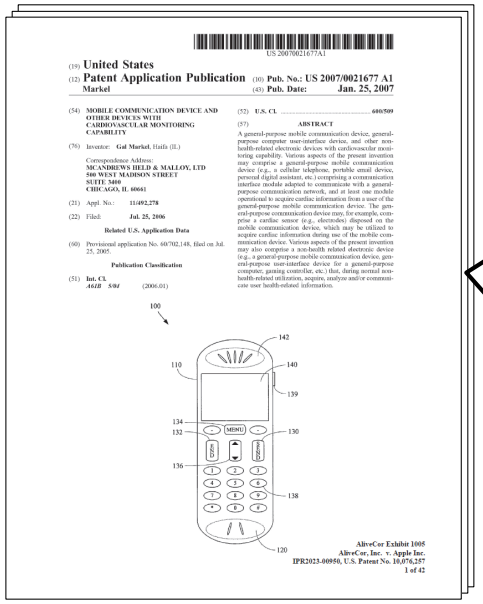
Berger Decl.

327. As explained earlier with respect to claim element [15.d.i], a person of ordinary skill in the art would have understood that the "first electrode" in *Markel*'s Figure 4 is embedded in the "left side portion 410" of the electronic device. The "left side portion 410" corresponds to the claimed "first portion of the enclosure." According to Figure 4 of *Markel*, the "side portions" (dark green, below) wrap around the front and back of the device, like a bezel. Both the front and back view of *Markel*'s electronic device have labels corresponding to the "left side portion 410" (Ex-1005, Fig. 4). As illustrated below, furthermore, the first electrode extends to the rim that encircles *Markel*'s electronic device. *Markel* also discloses that an electrode may be disposed in "a ***border*** of the display" (Ex-1005, [0044] (emphasis added)). From this, a person of ordinary skill in the art would have understood that *Markel*'s "first electrode" is embedded in 410*b* (i.e., the "first portion of the enclosure") includes the "bezel."

Ex. 1003, ¶ 327 (annotated) (Paper 2, 65)

Ground 1 – Claims 12, 13, 19

[19.b]: 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.



US 20070021677A1

(19) United States
(12) Patent Application Publication
Markel

(10) Pub. No.: US 2007/0021677 A1
(43) Pub. Date: Jan. 25, 2007

(54) MOBILE COMMUNICATION DEVICE AND OTHER DEVICES WITH CARDIOVASCULAR MONITORING CAPABILITY

(76) Inventor: Gal Markel, Haifa (IL)

Correspondence Address:
MCANDREWS HELD & MALLOY, LTD
500 WEST MADISON STREET
SUITE 3400
CHICAGO, IL 60661

(21) Appl. No.: 11/492,278

(22) Filed: Jul. 25, 2006

Related U.S. Application Data

(60) Provisional application No. 60/702,148, filed on Jul. 25, 2005.

Publication Classification

(51) Int. Cl.
A61B 5/04 (2006.01)

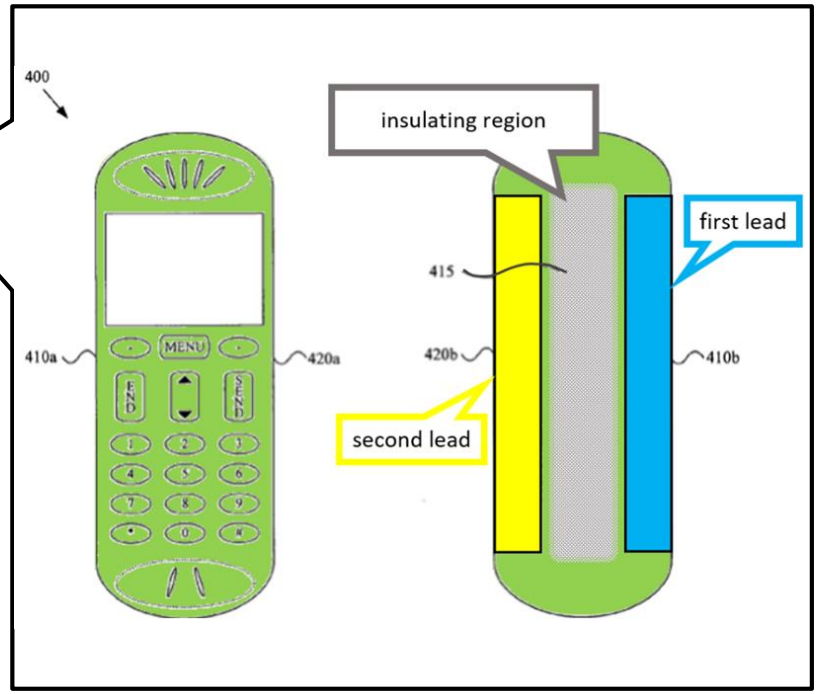
(52) U.S. Cl. 600/509

(57) ABSTRACT

A general-purpose mobile communication device, general-purpose computer user-interface device, and other non-health-related electronic devices with cardiovascular monitoring capability. Various aspects of the present invention may comprise a general-purpose mobile communication device (e.g., a cellular telephone, portable email device, personal digital assistant, etc.) comprising a communication interface module adapted to communicate with a general-purpose communication network, and at least one module operational to acquire cardiac information from a user of the general-purpose mobile communication device. The general-purpose communication device may, for example, comprise a cardiac sensor (e.g., electrodes) disposed on the mobile communication device, which may be utilized to acquire cardiac information during use of the mobile communication device. Various aspects of the present invention may also comprise a non-health related electronic device (e.g., a general-purpose mobile communication device, general-purpose user-interface device for a general-purpose computer, gaming controller, etc.) that, during normal non-health-related utilization, acquires, analyzes and/or communicates user health-related information.

AliveCor Exhibit 1005
AliveCor, Inc. v. Apple Inc.
IPR2023-00950, U.S. Patent No. 10,076,257
1 of 42

Markel

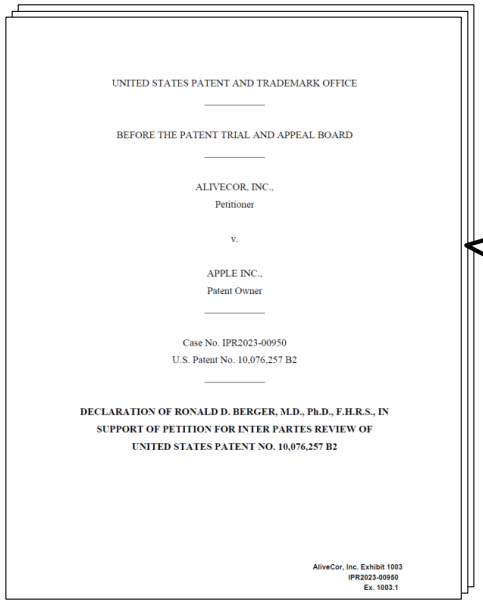


Ex. 1005, Fig. 4 (annotated) (Paper 2, 66)

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE – 94

Ground 1 – Claims 12, 13, 19

[19.b]: 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.



UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ALIVECOR, INC.,
Petitioner

v.

APPLE INC.,
Patent Owner

Case No. IPR2023-00950
U.S. Patent No. 10,076,257 B2

DECLARATION OF RONALD D. BERGER, M.D., Ph.D., F.H.R.S., IN SUPPORT OF PETITION FOR INTER PARTES REVIEW OF UNITED STATES PATENT NO. 10,076,257 B2

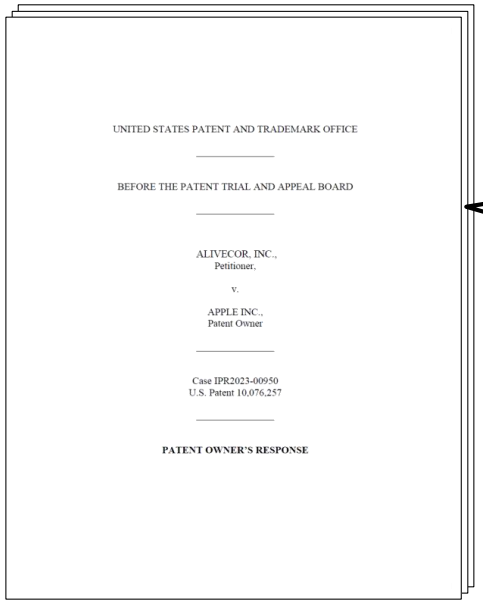
AliveCor, Inc. Exhibit 1003
IPR2023-00950
Ex. 1003.1

Berger Decl.

332. *Markel* further teaches that its electrodes should be electrically isolated. *Markel* teaches that, in its Figure 4 configuration, an "***insulating region 415*** may ***separate*** regions 410*b* and 420*b*" of the electronic device "where regions 410*b* and 420*b* include conductive plastic" (Ex-1005, [0045] (emphasis added)). The "insulating region 415" electrically isolates "regions 410*b* and 420*b*" (Ex-1005, [0045]).

Ex. 1003, ¶ 332 (annotated) (Paper 2, 67)

Ground 1 – Cls. 12, 13, 19 – Apple's Arg. 1



UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ALIVECOR, INC.,
Petitioner,

v.

APPLE INC.,
Patent Owner

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

PATENT OWNER'S RESPONSE

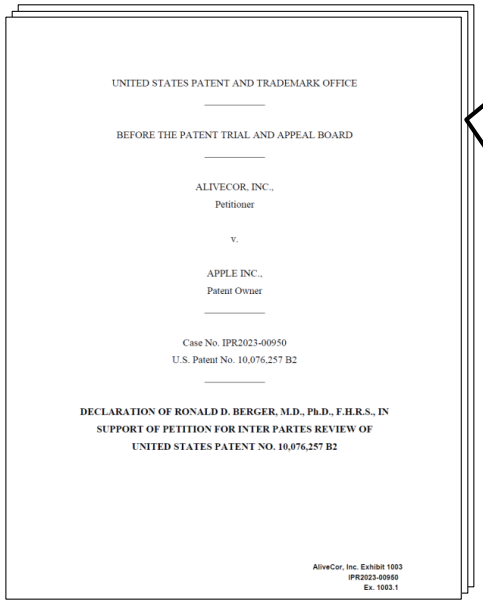
Patent Owner's Response

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

APPLE-2004, ¶157.

AliveCor Exhibit 1024
AliveCor, Inc. v. Apple Inc.
IPR2023-00950, U.S. Patent No. 10,076,257
96 of 249

Ground 1 – Cls. 12, 13, 19 – Apple's Arg. 1 – Reply



UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ALIVECOR, INC.,
Petitioner

v.

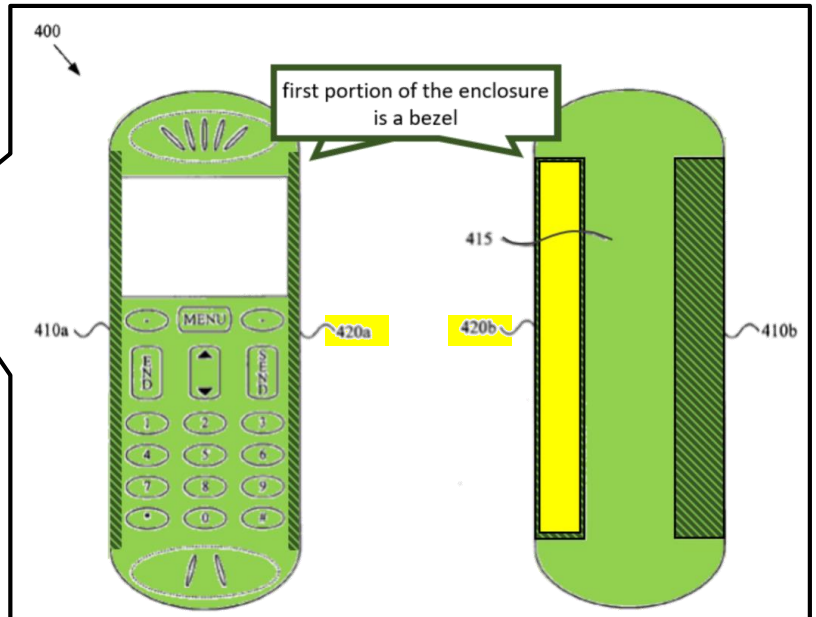
APPLE INC.,
Patent Owner

Case No. IPR2023-00950
U.S. Patent No. 10,076,257 B2

DECLARATION OF RONALD D. BERGER, M.D., Ph.D., F.H.R.S., IN SUPPORT OF PETITION FOR INTER PARTES REVIEW OF UNITED STATES PATENT NO. 10,076,257 B2

AliveCor, Inc. Exhibit 1003
IPR2023-00950
Ex. 1003.1

Berger Decl.

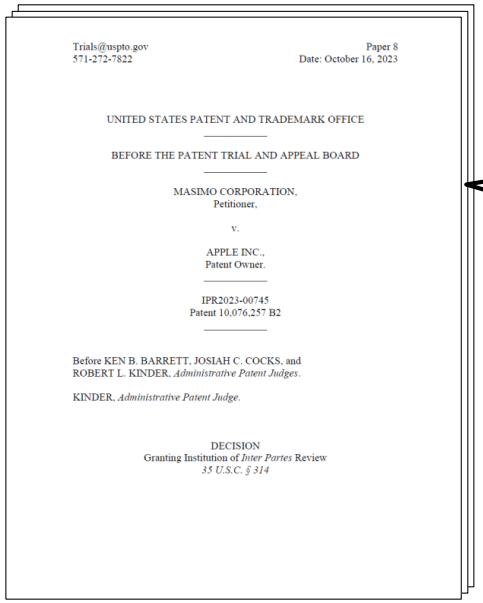


device. The "right side portion 420" corresponds to the claimed "first portion of the enclosure." According to Figure 4 of *Markel*, the "side portions" (dark green, below) wrap around the front and back of the device, like a bezel. Both the front and back view of *Markel*'s electronic device have labels corresponding to the "right side portion 420" (Ex-1005, Fig. 4). As illustrated below, furthermore, the second

Ex. 1003, ¶ 251 (annotated) (Paper 2, 49)

AliveCor Exhibit 1024
AliveCor, Inc. v. Apple Inc.
IPR2023-00950, U.S. Patent No. 10,076,257
97 of 249

Ground 1 – Cls. 12, 13, 19 – Apple's Arg. 1 – Reply



Trials@uspto.gov
571-272-7822

Paper 8
Date: October 16, 2023

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

MASIMO CORPORATION,
Petitioner,

v.

APPLE INC.,
Patent Owner.

IPR2023-00745
Patent 10,076,257 B2

Before KEN B. BARRETT, JOSIAH C. COCKS, and ROBERT L. KINDER, *Administrative Patent Judges*.

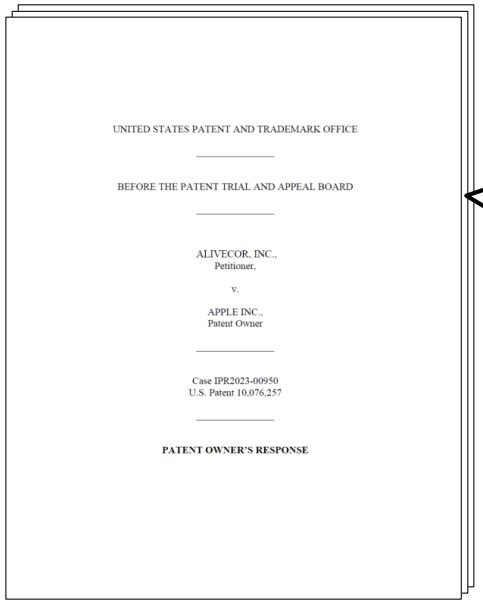
KINDER, *Administrative Patent Judge*.

DECISION
Granting Institution of *Inter Partes* Review
35 U.S.C. § 314

device." Ex. 1005 ¶ 78. Similar to the embodiment of Figure 4 (electrodes molded into side portions), Figure 15 may have "an electrode 1510 on a border portion of the display device 1500," or an "electrode 1530 on a first side of the display device 1500." *Id.*

IPR2023-00745, Institution Dec.

Ground 1 – Cls. 12, 13, 19 – Apple's Arg. 2



UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ALIVECOR, INC.,
Petitioner,

v.

APPLE INC.,
Patent Owner

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

PATENT OWNER'S RESPONSE

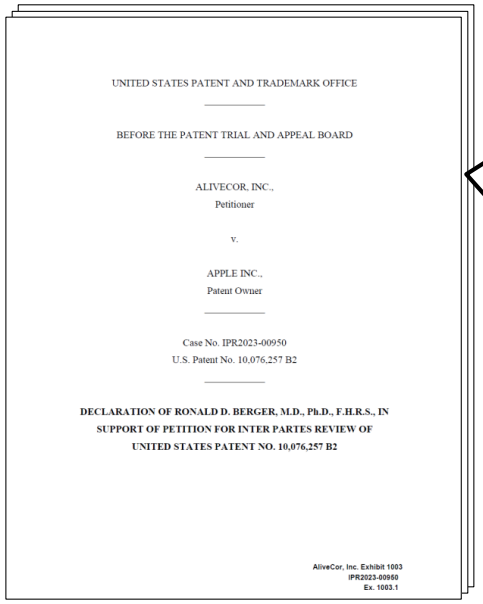
Patent Owner's Response

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

Furthermore, Markel provides no basis or suggestion to make this modification. Just because something ***could*** have been done, that does not mean

AliveCor Exhibit 1024
AliveCor, Inc. v. Apple Inc.
IPR2023-00950, U.S. Patent No. 10,076,257
99 of 249

Ground 1 – Cls. 12, 13, 19 – Apple's Arg. 2 – Reply



UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ALIVECOR, INC.,
Petitioner

v.

APPLE INC.,
Patent Owner

Case No. IPR2023-00950
U.S. Patent No. 10,076,257 B2

DECLARATION OF RONALD D. BERGER, M.D., Ph.D., F.H.R.S., IN SUPPORT OF PETITION FOR INTER PARTES REVIEW OF UNITED STATES PATENT NO. 10,076,257 B2

AliveCor, Inc. Exhibit 1003
IPR2023-00950
Ex. 1003.1

Berger Decl.

252. To the extent that *Markel*'s Figure 4 is not found to disclose that the "first portion of the enclosure" includes the "bezel," this would have been a trivial modification that would have been well-within the general knowledge of a person of ordinary skill in the art. *Markel* discloses "a display 140 (which may also function as a touch screen input feature)" and that "an electrode may be disposed on a video display device 140 (e.g., a ***border of the display*** or integrated into a touch screen)" (Ex-1005, [0044] (emphasis added)). A person of ordinary skill in the art would have been motivated to extend the edges of *Markel*'s "second electrode" in 420b so that they reached the border of the "display 140" (i.e., bezel) because this would have created additional contact area. The additional contact area would have enhanced the ability of the "second electrode" to detect a signal from a user's hand and make it more likely that a user would interact with the second electrode so as to have a successful test.

Ex. 1003, ¶ 252 (annotated) (Paper 2, 49)

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE – 100

Ground 1 – Cls. 12, 13, 19 – Apple's Arg. 2 – Reply

CyWee Grp. Ltd. v. ZTE (USA), Inc.

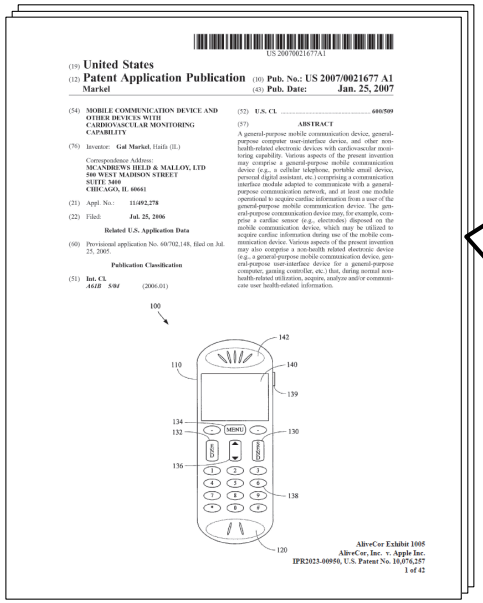
> Motivation to combine can be based on "a known technique to address a known problem using prior art elements according to their established functions."

90 F.4th 1358, 1366 (Fed. Cir. 2024)

AliveCor Exhibit 1024
AliveCor, Inc. v. Apple Inc.
IPR2023-00950, U.S. Patent No. 10,076,257
101 of 249

Ground 1 – Claim 20

[20.a]: 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.



US 2007021677A1

(19) United States
(12) Patent Application Publication
Markel

(10) Pub. No.: US 2007/0021677 A1
(43) Pub. Date: Jan. 25, 2007

(54) MOBILE COMMUNICATION DEVICE AND OTHER DEVICES WITH CARDIOVASCULAR MONITORING CAPABILITY

(76) Inventor: Gal Markel, Haifa (IL)

Correspondence Address:
MCANDREWS HELD & MALLOY, LTD
500 WEST MADISON STREET
SUITE 3400
CHICAGO, IL 60661

(21) Appl. No.: 11/492,278

(22) Filed: Jul. 25, 2006

Related U.S. Application Data

(60) Provisional application No. 60/702,148, filed on Jul. 25, 2005.

Publication Classification

(51) Int. Cl.
A61B 5/04 (2006.01)

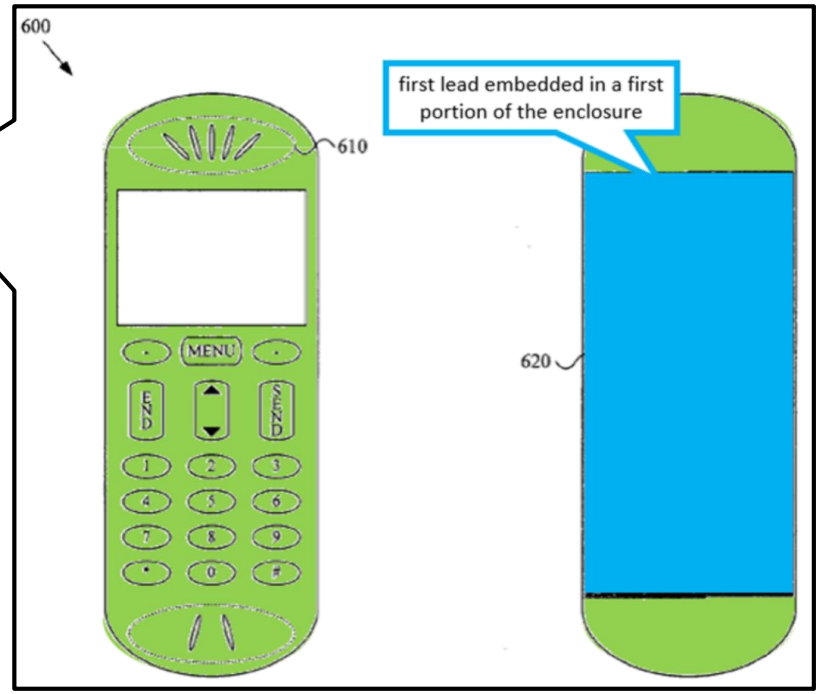
(52) U.S. Cl. 600/509

ABSTRACT

(57) A general-purpose mobile communication device, general-purpose computer user-interface device, and other non-health-related electronic devices with cardiovascular monitoring capability. Various aspects of the present invention may comprise a general-purpose mobile communication device (e.g., a cellular telephone, portable email device, personal digital assistant, etc.) comprising a communication interface module adapted to communicate with a general-purpose communication network, and at least one module operational to acquire cardiac information from a user of the general-purpose mobile communication device. The general-purpose communication device may, for example, comprise a cardiac sensor (e.g., electrodes) disposed on the mobile communication device, which may be utilized to acquire cardiac information during use of the mobile communication device. Various aspects of the present invention may also comprise a non-health related electronic device (e.g., a general-purpose mobile communication device, general-purpose user-interface device for a general-purpose computer, gaming controller, etc.) that, during normal non-health-related utilization, acquire, analyze and/or communicate user health-related information.

AliveCor Exhibit 1005
AliveCor, Inc. v. Apple Inc.
IPR2023-00950, U.S. Patent No. 10,076,257
1 of 42

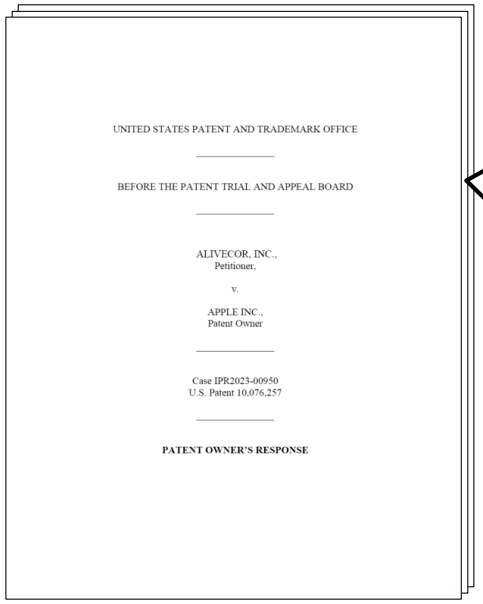
Markel



Ex. 1005, Fig. 6 (annotated) (Paper 2, 54)

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE – 102

Ground 1 – Claim 20 – Apple's Arg.



UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ALIVECOR, INC.,
Petitioner,

v.

APPLE INC.,
Patent Owner

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

PATENT OWNER'S RESPONSE

Patent Owner's Response

Grounds 1 and 2 fail with respect to claim 20 for the same reasons as claim 1. As discussed with respect to claim 1, *supra*, neither Markel alone nor Markel in view of Nissilä discloses or renders obvious a pad or electrode positioned under a portion of the enclosure. APPLE-2004, ¶¶166-170. As previously discussed, each of Markel's electrodes is positioned on the exterior of the device such that the "electrodes contact a user during normal (or typical) use of the MCD 100." EX1005, 4:49-51. Therefore, for the reasons discussed in Section VI.A.1, *supra*, the electrodes in Markel's device detect the first electrical signal of the user's cardiac signal via direct contact between the electrode and the user's skin, ***not*** "via the user's contact with the first portion of the enclosure." APPLE-2004, ¶¶166-168.

AliveCor Exhibit 1024
AliveCor, Inc. v. Apple Inc.
IPR2023-00950, U.S. Patent No. 10,076,257
103 of 249

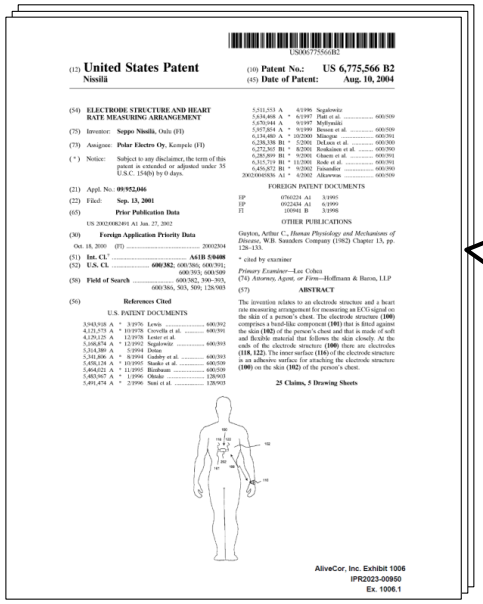
ROADMAP

1. Overview of the Challenged Patent
2. Claim Construction
3. Ground 1 - Markel
4. Ground 2 - Markel + Nissilä
5. Ground 3 - Markel + Righter
6. Apple's Motion to Amend

AliveCor Exhibit 1024
AliveCor, Inc. v. Apple Inc.
IPR2023-00950, U.S. Patent No. 10,076,257
104 of 249

Ground 2 – Overview

Claims 1-22 are unpatentable under pre-AIA 35 U.S.C. §103 over Markel in view of Nissilä.



(12) **United States Patent**
Nissilä

(10) **Patent No.: US 6,775,566 B2**
(45) **Date of Patent: Aug. 10, 2004**

(54) **ELECTRODE STRUCTURE AND HEART RATE MEASURING ARRANGEMENT**

(75) Inventor: **Seppo Nissilä**, Oulu (FI)

(73) Assignee: **Polar Electro Oy**, Kempele (FI)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: **09/952,046**

(22) Filed: **Sep. 13, 2001**

(65) **Prior Publication Data**

US 2002/0082491 A1 Jun. 27, 2002

FOREIGN PATENT DOCUMENTS

EP	0760224 A1	3/1995	
EP	0922434 A1	6/1999	
FI	100941 B	3/1998	

OTHER PUBLICATIONS

5,511,553 A		4/1996	Segalowitz	
5,634,468 A	*	6/1997	Platt et al.	600/509
5,670,944 A		9/1997	Myllymäki	
5,957,854 A	*	9/1999	Besson et al.	600/509
6,134,480 A	*	10/2000	Minogue	600/391
6,238,338 B1	*	5/2001	DeLuca et al.	600/300
6,272,365 B1	*	8/2001	Ronkainen et al.	600/390
6,285,899 B1	*	9/2001	Ghaem et al.	600/391
6,315,719 B1	*	11/2001	Rode et al.	600/391
6,456,872 B1	*	9/2002	Faisandier	600/390
2002/0045836 A1	*	4/2002	Alkawwas	600/509

Nissilä

Ground 2 – Disputes

Claims for which Petitioners rely on disclosure from *Nissilä*	Indep. Cl. 1; Dep. Cls. 6, 8, 10, 15, 20
Unpatentability based on *Nissilä*'s disclosure is Disputed	Indep. Cl. 1; Dep. Cls. 6, 20
Unpatentability based on *Nissilä*'s disclosure is Undisputed	Indep. Cl. 15; Dep. Cls 8, 10

AliveCor Exhibit 1024
AliveCor, Inc. v. Apple Inc.
IPR2023-00950, U.S. Patent No. 10,076,257
106 of 249

Ground 2 – Motivation to Combine (MtC)

[0004] Various aspects of the present invention provide a mobile communication device, general-purpose computer user interface device, and other electronic devices with cardiovascular monitoring capability.

. . . .

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

. . . .

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

Markel

The object of the invention is to provide an improved electrode structure and heart rate measuring arrangement for measuring an electrical heart beat signal on a human body such that the above problems can be solved. This is achieved with the following electrode structure for measuring an ECG signal on the chest of a person. The electrode structure

. . . .

The invention also has an advantage that the electrode structure is inconspicuous, comfortable and well suited for long-term use as compared with the known solutions.

. . . .

According to a second embodiment, as in FIGS. **3** to **6**, the electrodes **118**, **122** of the electrode structure **100** consist of a membrane **119** that is located at both ends of the electrode structure **100**, at the electrode **118**, **122**, and is made of metal, electrically conductive plastic or a similar conductive material. The electrodes **118**, **122** at both ends of the

Nissilä

Ex. 1005, [0004], [0040], [0037]; Ex. 1006, 2:17-20, 4:21-24, 5:32-37 (Paper 2, 69-70)

AliveCor Exhibit 1024
AliveCor, Inc. v. Apple Inc.
IPR2023-00950, U.S. Patent No. 10,076,257
107 of 249

Ground 2 – Motivation to Combine (MtC)

[0004] Various aspects of the present invention provide a mobile communication device, general-purpose computer user interface device, and other electronic devices with cardiovascular monitoring capability.

. . . .

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

. . . .

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

Markel

The object of the invention is to provide an improved electrode structure and heart rate measuring arrangement for measuring an electrical heart beat signal on a human body such that the above problems can be solved. This is achieved with the following electrode structure for measuring an ECG signal on the chest of a person. The electrode structure

. . . .

The invention also has an advantage that the electrode structure is inconspicuous, comfortable and well suited for long-term use as compared with the known solutions.

. . . .

According to a second embodiment, as in FIGS. **3** to **6**, the electrodes **118**, **122** of the electrode structure **100** consist of a membrane **119** that is located at both ends of the electrode structure **100**, at the electrode **118**, **122**, and is made of metal, electrically conductive plastic or a similar conductive material. The electrodes **118**, **122** at both ends of the

Nissilä

Ex. 1005, [0004], [0040], [0037]; Ex. 1006, 2:17-20, 4:21-24, 5:32-37 (Paper 2, 69-70) DEMONSTRATIVE EXHIBIT – NOT EVIDENCE – 108

Ground 2 – Motivation to Combine (MtC)

[0004] Various aspects of the present invention provide a mobile communication device, general-purpose computer user interface device, and other electronic devices with cardiovascular monitoring capability.

. . . .

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

. . . .

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

Markel

The object of the invention is to provide an improved electrode structure and heart rate measuring arrangement for measuring an electrical heart beat signal on a human body such that the above problems can be solved. This is achieved with the following electrode structure for measuring an ECG signal on the chest of a person. The electrode structure

. . . .

The invention also has an advantage that the electrode structure is inconspicuous, comfortable and well suited for long-term use as compared with the known solutions.

. . . .

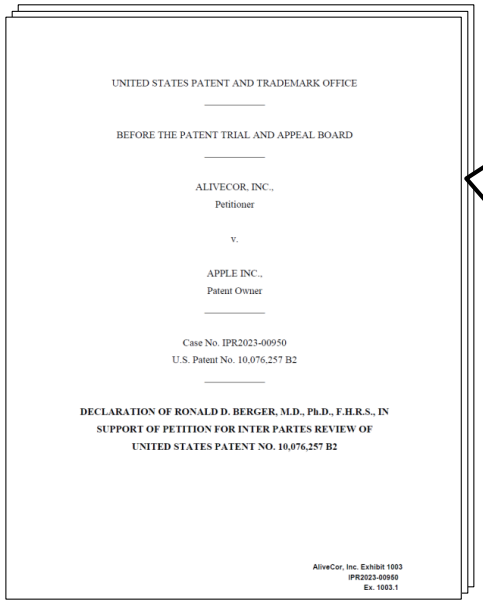
According to a second embodiment, as in FIGS. **3** to **6**, the electrodes **118**, **122** of the electrode structure **100** consist of a membrane **119** that is located at both ends of the electrode structure **100**, at the electrode **118**, **122**, and is made of metal, electrically conductive plastic or a similar conductive material. The electrodes **118**, **122** at both ends of the

Nissilä

Ex. 1005, [0004], [0040], [0037]; Ex. 1006, 2:17-20, 4:21-24, 5:32-37 (Paper 2, 69-70)

AliveCor Exhibit 1024
AliveCor, Inc. v. Apple Inc.
IPR2023-00950, U.S. Patent No. 10,076,257

Ground 2 – Motivation to Combine (MtC)



UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ALIVECOR, INC.,
Petitioner

v.

APPLE INC.,
Patent Owner

Case No. IPR2023-00950
U.S. Patent No. 10,076,257 B2

DECLARATION OF RONALD D. BERGER, M.D., Ph.D., F.H.R.S., IN SUPPORT OF PETITION FOR INTER PARTES REVIEW OF UNITED STATES PATENT NO. 10,076,257 B2

AliveCor, Inc. Exhibit 1003
IPR2023-00950
Ex. 1003.1

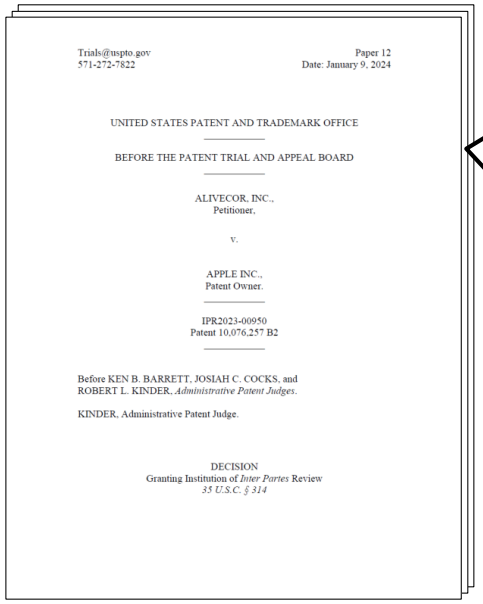
Berger Decl.

355. A person of ordinary skill in the art would be motivated to combine *Nissilä*'s electrode structure with *Markel*'s electronic device in order to accomplish *Markel*'s stated goal of an electrode that is "***substantially concealed (or hidden) from a user*** . . . with ***little or no visible indication*** of the electrode presence," such that "a user need not be aware of the presence of the electrode" (Ex-1005, [0040] (emphasis added)). *Markel*'s hidden electrode is desirable because it increases aesthetics of the device while protecting the electrode from bumps or other damage. Indeed, by concealing the electrode from the user, the user is able to obtain the benefits of having an ECG capability without a ***visible indication*** of the electrode presence that takes away from the device's appearance. A person of ordinary skill in the art would have reasonable expectation of success in combining *Markel* and *Nissilä* because both references disclose an intermediate conductive material made of conductive plastic.

Ex. 1003, ¶ 355 (annotated) (Paper 2, 70-71)

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE – 110

Ground 2 – Motivation to Combine (MtC)



Trials@uspto.gov
571-272-7822

Paper 12
Date: January 9, 2024

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ALIVECOR, INC.,
Petitioner,

v.

APPLE INC.,
Patent Owner.

IPR2023-00950
Patent 10,076,257 B2

Before KEN B. BARRETT, JOSIAH C. COCKS, and ROBERT L. KINDER, *Administrative Patent Judges*.

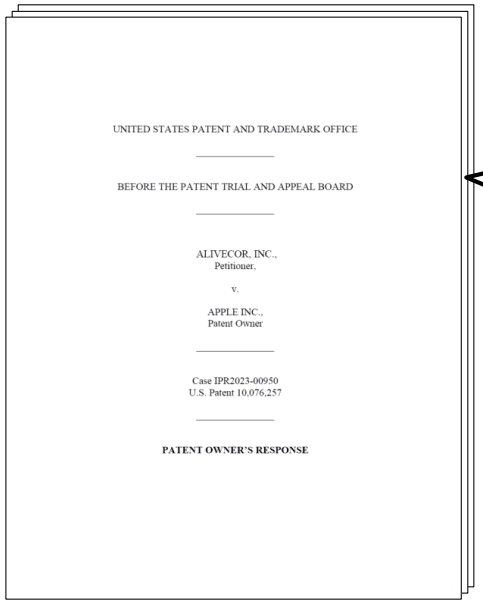
KINDER, Administrative Patent Judge.

DECISION
Granting Institution of *Inter Partes* Review
35 U.S.C. § 314

Institution Decision

Petitioner's motivation for incorporating Nissilä's electrode into Markel – to accomplish Markel's goal of a concealed electrode – is a reasonably sufficient basis or reason to combine the references. On this record, Petitioner demonstrates that a person of ordinary skill in the art would have reason to apply Nissilä's electrode structure having a distinct exterior surface to the teachings of Markel because of the similarities in electrode structure and to achieve a stated goal of Markel. Nissilä's electrode structure uses an external layer of "metal, electrically conductive plastic or a similar conductive material." Ex. 1006, 5:32–37; Ex. 1003 ¶ 355 ("both references disclose an intermediate conductive material made of conductive plastic"). Petitioner has shown this structure could be adopted by Markel's "hidden" electrode having a main body portion formed from conductive plastic and a person having ordinary skill in the art would be motivated to do so in order to achieve Markel's stated goal of an electrode that is substantially concealed (or hidden) from a user. *See* Ex. 1003 ¶ 354.

Ground 2 – MtC – Apple's Arg.



UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ALIVECOR, INC.,
Petitioner,

v.

APPLE INC.,
Patent Owner

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

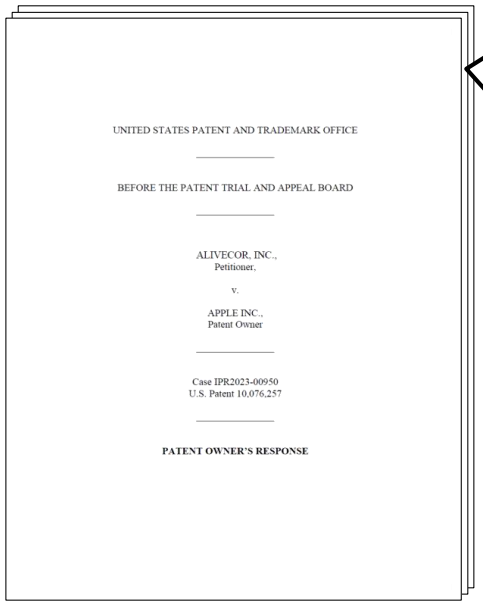
PATENT OWNER'S RESPONSE

Patent Owner's Response

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

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

Ground 2 – MtC – Apple's Arg. 1



UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ALIVECOR, INC.,
Petitioner,

v.

APPLE INC.,
Patent Owner

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

PATENT OWNER'S RESPONSE

Patent Owner's Response

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

. . . .

Electrodes 118 and 122 visually distinct from surrounding portions of band 101

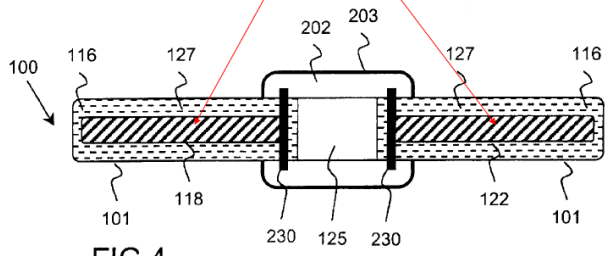
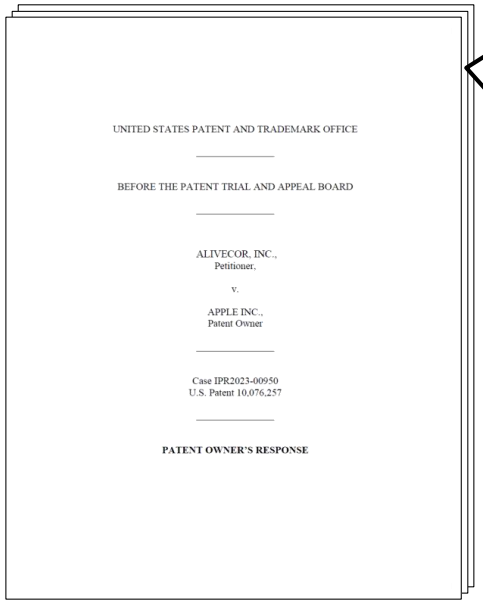


FIG.4

Ground 2 – MtC – Apple's Arg. 1 – Reply



UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ALIVECOR, INC.,
Petitioner,

v.

APPLE INC.,
Patent Owner

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

PATENT OWNER'S RESPONSE

Patent Owner's Response

...004, ¶¶139-143. However, this assertion is based on a faulty premise ...se Nissilä's electrodes are visible and the application of Nissilä's visible elec...des to Markel would hinder Markel's goal of making the electrode "substantially concealed (or hidden) from a user … with little or no visible indication of electrode presence." EX1005, [0040]; APPLE-2004, ¶¶140-141;

. . . .

Electrodes 118 and 122 visually distinct from surrounding portions of band 101

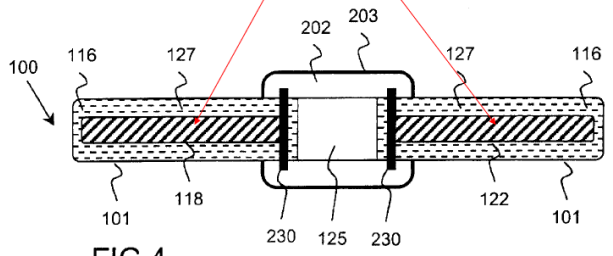
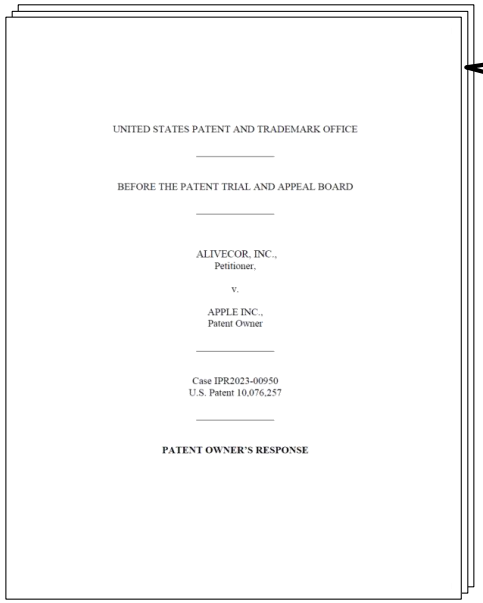


FIG.4

Numeral "119" is absent. *Nissilä*'s Figure 4 was not intended to illustrate membrane 119.

Ground 2 – MtC – Apple's Arg. 2



UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ALIVECOR, INC.,
Petitioner,

v.

APPLE INC.,
Patent Owner

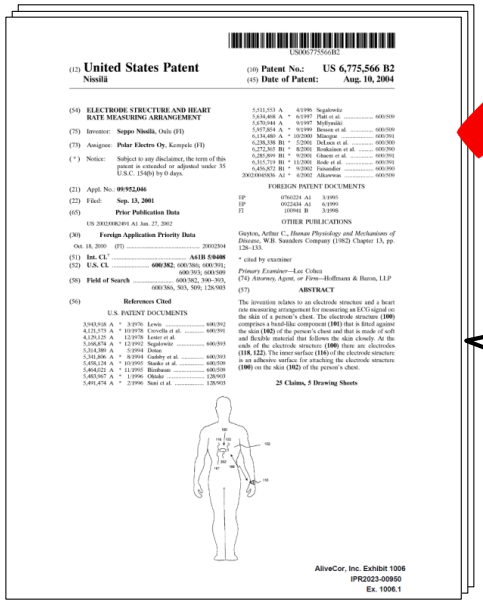
Case IPR2023-00950
U.S. Patent 10,076,257

PATENT OWNER'S RESPONSE

Additionally, AliveCor's proposed combination of Nissilä's flexible electrode in Markel's device fails because Nissilä's electrodes are not suitable for the exterior surface of a handheld device. Specifically, Markel is directed to

Patent Owner's Response

Ground 2 – MtC – Apple's Arg. 2 – Reply



US006775566B2

(12) **United States Patent**
Nissilä

(10) **Patent No.: US 6,775,566 B2**
(45) **Date of Patent: Aug. 10, 2004**

(54) **ELECTRODE STRUCTURE AND HEART RATE MEASURING ARRANGEMENT**

(75) Inventor: **Seppo Nissilä**, Oulu (FI)

(73) Assignee: **Polar Electro Oy**, Kempele (FI)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: **09/952,046**

(22) Filed: **Sep. 13, 2001**

(65) **Prior Publication Data**

US 2002/0082491 A1 Jun. 27, 2002

(30) **Foreign Application Priority Data**

Oct. 18, 2000 (FI) 20002304

(51) **Int. Cl.**[7] **A61B 5/0408**

(52) **U.S. Cl.** **600/382**; 600/386; 600/391; 600/393; 600/509

(58) **Field of Search** 600/382, 390–393, 600/386, 503, 509; 128/903

(56) **References Cited**

U.S. PATENT DOCUMENTS

3,943,918	A *	3/1976	Lewin	600/392
4,121,575	A *	10/1978	Crovella et al.	600/391
4,129,125	A	12/1978	Lester et al.	
5,168,874	A *	12/1992	Segalowitz	600/393
5,314,380	A	5/1994	Doise	
5,341,806	A *	8/1994	Gadsby et al.	600/393
5,450,124	A *	10/1995	Stanke et al.	600/509
5,464,022	A *	11/1995	Bisteboam	600/509
5,483,967	A *	1/1996	Okada	128/903
5,491,474	A *	2/1996	Suni et al.	128/903
5,511,553	A	4/1996	Segalowitz	
5,634,468	A *	6/1997	Platt et al.	600/509
5,670,944	A	9/1997	Myllymäki	
5,957,851	A *	9/1999	Benson et al.	600/509
6,134,480	A *	10/2000	Mikogan	600/391
6,238,338	B1 *	5/2001	DeLuca et al.	600/300
6,272,365	B1 *	8/2001	Roskainen et al.	600/390
6,317,627	B1 *	11/2001	Ennen et al.	600/393
6,335,719	B1 *	11/2001	Rode et al.	600/391
6,456,872	B1 *	9/2002	Faisandier	600/390
2002/0040526	A1 *	4/2002	Alkorrwas	600/509

FOREIGN PATENT DOCUMENTS

EP	0761224	A1	3/1995
EP	0522404	A1	6/1999
FI	105941	B	3/1998

OTHER PUBLICATIONS

Guyton, Arthur C., *Human Physiology and Mechanisms of Disease*, W.B. Saunders Company (1982) Chapter 13, pp. 128–133.

* cited by examiner

Primary Examiner—Lee Cohen
(74) *Attorney, Agent, or Firm*—Hoffmann & Baron, LLP

(57) **ABSTRACT**

The invention relates to an electrode structure and a heart rate measuring arrangement for measuring an ECG signal on the skin of a person's chest. The electrode structure (**100**) comprises a band-like component (**101**) that is fitted against the skin (**102**) of the person's chest and that is made of soft and flexible material that follows the skin closely. At the ends of the electrode structure (**100**) there are electrodes (**118**, **122**). The inner surface (**116**) of the electrode structure is an adhesive surface for attaching the electrode structure (**100**) on the skin (**102**) of the person's chest.

25 Claims, 5 Drawing Sheets

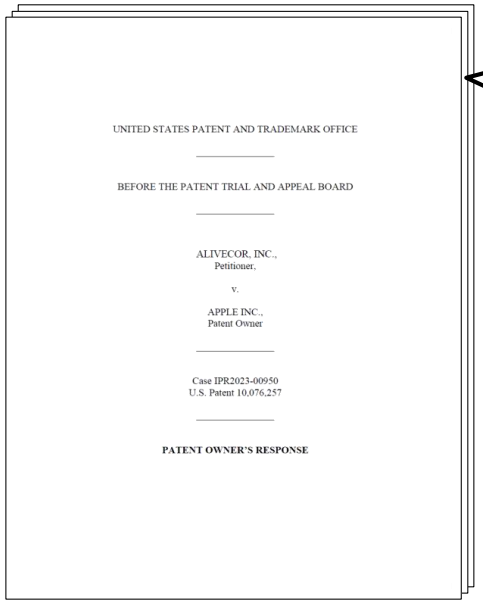
AliveCor, Inc. Exhibit 1006
IPR2023-00950
Ex. 1006.1

Nissilä

Additionally, AliveCor's proposed combination of Nissilä's flexible electrode in Markel's device fails because Nissilä's electrodes are not suitable for the exterior surface of a handheld device. Specifically, Markel is directed to

According to a second embodiment, as in FIGS. **3** to **6**, the electrodes **118**, **122** of the electrode structure **100** consist of a membrane **119** that is located at both ends of the electrode structure **100**, at the electrode **118**, **122**, and is made of metal, electrically conductive plastic or a similar conductive material. The electrodes **118**, **122** at both ends of the

Ground 2 – MtC – Apple's Arg. 3



UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ALIVECOR, INC.,
Petitioner,

v.

APPLE INC.,
Patent Owner

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

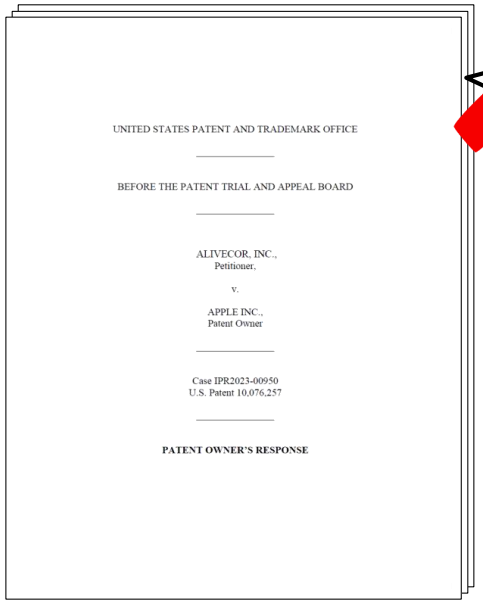
PATENT OWNER'S RESPONSE

Finally, AliveCor's proposed reason for modifying Markel based on Nissilä ignores that ***Markel already achieves its stated goal*** of making the electrode "substantially concealed (or hidden) from a user … with little or no visible indication of electrode presence" by forming the external electrode from "molded conductive plastic." EX1005, [0040]. Even AliveCor's expert agreed, stating that

Patent Owner's Response

AliveCor Exhibit 1024
AliveCor, Inc. v. Apple Inc.
IPR2023-00950, U.S. Patent No. 10,076,257
117 of 249

Ground 2 – MtC – Apple's Arg. 3 – Reply



UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ALIVECOR, INC.,
Petitioner,

v.

APPLE INC.,
Patent Owner

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

PATENT OWNER'S RESPONSE

Patent Owner's Response

Finally, AliveCor's proposed reason for modifying Markel based on Nissilä ignores that ***Markel already achieves its stated goal*** of making the electrode "substantially concealed (or hidden) from a user … with little or no visible indication of electrode presence" by forming the external electrode from "molded conductive plastic." EX1005, [0040]. Even AliveCor's expert agreed, stating that

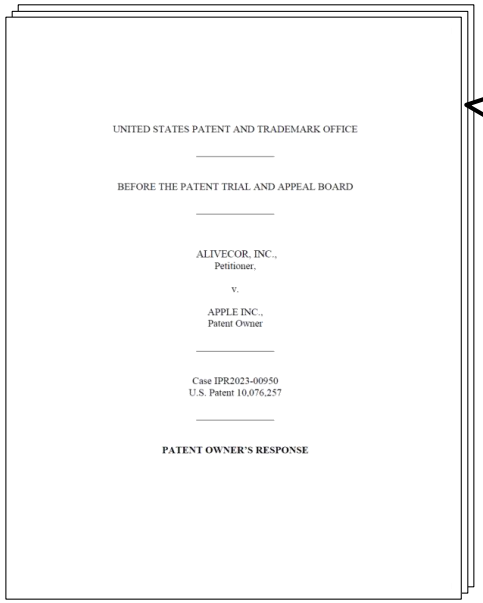
L'Oreal USA, Inc. v. Olaplex, Inc.

"That a particular piece of prior art achieves a desirable goal to some extent hardly means that relevant artisans would have lacked a motivation to achieve the goal to a greater extent."

844 F. App'x 308, 319 (Fed. Cir. 2021)

AliveCor Exhibit 1024
AliveCor, Inc. v. Apple Inc.
IPR2023-00950, U.S. Patent No. 10,076,257
118 of 249

Ground 2 – MtC – Apple's Arg. 4



UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ALIVECOR, INC.,
Petitioner,

v.

APPLE INC.,
Patent Owner

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

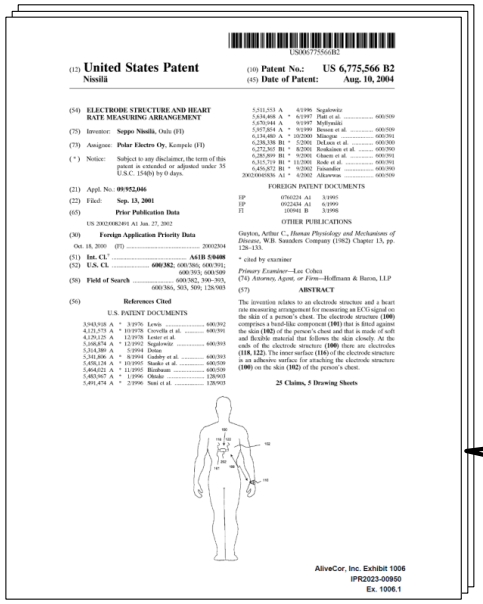
PATENT OWNER'S RESPONSE

Patent Owner's Response

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

AliveCor Exhibit 1024
AliveCor, Inc. v. Apple Inc.
IPR2023-00950, U.S. Patent No. 10,076,257
119 of 249

Ground 2 – MtC – Apple's Arg. 4 – Reply



US006775566B2

(12) **United States Patent**
Nissilä

(10) **Patent No.: US 6,775,566 B2**
(45) **Date of Patent: Aug. 10, 2004**

(54) **ELECTRODE STRUCTURE AND HEART RATE MEASURING ARRANGEMENT**

(75) Inventor: **Seppo Nissilä**, Oulu (FI)

(73) Assignee: **Polar Electro Oy**, Kempele (FI)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: **09/952,046**

(22) Filed: **Sep. 13, 2001**

(65) **Prior Publication Data**

US 2002/0082491 A1 Jun. 27, 2002

(30) **Foreign Application Priority Data**

Oct. 18, 2000 (FI) 20002304

(51) **Int. Cl.**[7] **A61B 5/0408**

(52) **U.S. Cl.** **600/382**; 600/386; 600/391; 600/393; 600/509

(58) **Field of Search** 600/382, 390–393, 600/386, 503, 509; 128/903

(56) **References Cited**

U.S. PATENT DOCUMENTS

3,943,918	A	*	3/1976	Lewin 600/392
4,121,575	A	*	10/1978	Crovella et al. 600/391
4,129,125	A		12/1978	Lester et al.
5,168,874	A	*	12/1992	Segalowitz 600/393
5,314,380	A		5/1994	Dolan
5,341,806	A	*	8/1994	Gadsby et al. 600/393
5,450,124	A	*	10/1995	Stanke et al. 600/509
5,464,022	A	*	11/1995	Bisteboam 600/509
5,483,967	A	*	1/1996	Okuda 128/903
5,491,474	A	*	2/1996	Suni et al. 128/903
5,511,553	A		4/1996	Segalowitz
5,634,468	A	*	6/1997	Platt et al. 600/509
5,670,944	A		9/1997	Myllymäki
5,957,851	A	*	9/1999	Benson et al. 600/509
6,134,480	A	*	10/2000	Mikegun 600/391
6,238,338	B1	*	5/2001	DeLuca et al. 600/300
6,272,365	B1	*	8/2001	Rouhainen et al. 600/390
6,308,090	B1	*	10/2001	Kuisma et al. 600/509
6,315,719	B1	*	11/2001	Rode et al. 600/391
6,456,872	B1	*	9/2002	Faisandier 600/390
2002/0040183	A1	*	4/2002	Altarovsa 600/509

FOREIGN PATENT DOCUMENTS

EP	0761224	A1	3/1995
EP	0522404	A1	6/1999
FI	105941	B	3/1998

OTHER PUBLICATIONS

Guyton, Arthur C., *Human Physiology and Mechanisms of Disease*, W.B. Saunders Company (1982) Chapter 13, pp. 128–133.

* cited by examiner

Primary Examiner—Lee Cohen
(74) *Attorney, Agent, or Firm*—Hoffmann & Baron, LLP

(57) **ABSTRACT**

The invention relates to an electrode structure and a heart rate measuring arrangement for measuring an ECG signal on the skin of a person's chest. The electrode structure **(100)** comprises a band-like component **(101)** that is fitted against the skin **(102)** of the person's chest and that is made of soft and flexible material that follows the skin closely. At the ends of the electrode structure **(100)** there are electrodes **(110, 122)**. The inner surface **(116)** of the electrode structure is an adhesive surface for attaching the electrode structure **(100)** on the skin **(102)** of the person's chest.

25 Claims, 5 Drawing Sheets

Nissilä

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

The invention also has an advantage that the electrode structure is inconspicuous, comfortable and well suited for long-term use as compared with the known solutions.

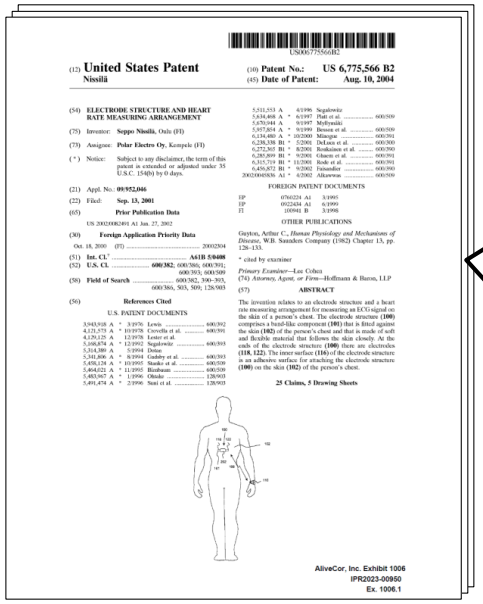
Paper 20, 64; Ex. 1006, 4:21-24 (annotated) (Paper 2, 70)

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE – 120

Ground 2 – Claim 1, [1.c.i]

[Undisputed]

[1.c.i] a first lead comprising a first pad that is embedded in a first portion of the enclosure,



(12) **United States Patent**
Nissilä

(10) **Patent No.: US 6,775,566 B2**
(45) **Date of Patent: Aug. 10, 2004**

(54) **ELECTRODE STRUCTURE AND HEART RATE MEASURING ARRANGEMENT**

(75) Inventor: **Seppo Nissilä**, Oulu (FI)

(73) Assignee: **Polar Electro Oy**, Kempele (FI)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: **09/952,046**

(22) Filed: **Sep. 13, 2001**

(65) **Prior Publication Data**

US 2002/0082491 A1 Jun. 27, 2002

(30) **Foreign Application Priority Data**

Oct. 18, 2000 (FI) 20002304

(51) **Int. Cl.**[7] **A61B 5/0408**

(52) **U.S. Cl.** **600/382**; 600/386; 600/391; 600/393; 600/509

(58) **Field of Search** 600/382, 390–393, 600/386, 503, 509; 128/903

(56) **References Cited**

U.S. PATENT DOCUMENTS

3,943,918 A * 3/1976 Lewin 600/392
4,121,575 A * 10/1978 Crovella et al. 600/391
4,129,125 A 12/1978 Lester et al.
5,168,874 A * 12/1992 Segalowitz 600/393
5,314,380 A 5/1994 Dolan
5,341,806 A * 8/1994 Gadsby et al. 600/393
5,450,124 A * 10/1995 Stanke et al. 600/509
5,464,022 A * 11/1995 Bisteboam 600/509
5,483,967 A * 1/1996 Okada 128/903
5,491,474 A * 2/1996 Suni et al. 128/903

5,511,553 A 4/1996 Segalowitz
5,634,468 A * 6/1997 Platt et al. 600/509
5,670,944 A 9/1997 Myllymäki
5,957,851 A * 9/1999 Benson et al. 600/509
6,134,480 A * 10/2000 Mäntjärvi 600/391
6,238,338 B1 * 5/2001 DeLuca et al. 600/300
6,272,365 B1 8/2001 Roukainen et al. 600/390
6,308,090 B1 * 10/2001 Kraus et al. 600/393
6,315,719 B1 * 11/2001 Kraft et al. 600/391
6,456,872 B1 * 9/2002 Faisandier 600/390
2002/0045836 A1 * 4/2002 Alkawwas 600/509

FOREIGN PATENT DOCUMENTS

EP 0761224 A1 3/1995
EP 0522404 A1 6/1999
FI 100941 B 3/1998

OTHER PUBLICATIONS

Guyton, Arthur C., *Human Physiology and Mechanisms of Disease*, W.B. Saunders Company (1982) Chapter 13, pp. 128–133.

* cited by examiner

Primary Examiner—Lee Cohen
(74) *Attorney, Agent, or Firm*—Hoffmann & Baron, LLP

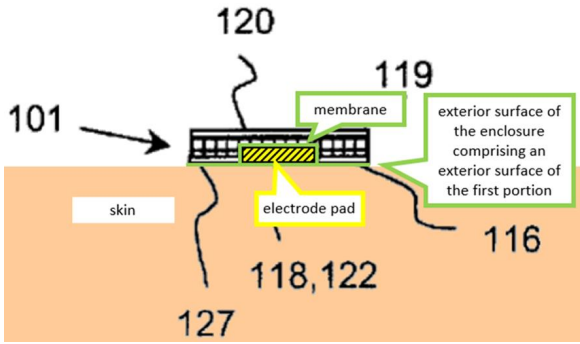
(57) **ABSTRACT**

The invention relates to an electrode structure and a heart rate measuring arrangement for measuring an ECG signal on the skin of a person's chest. The electrode structure **(100)** comprises a band-like component **(101)** that is fitted against the skin **(102)** of the person's chest and that is made of soft and flexible material that follows the skin closely. At the ends of the electrode structure **(100)** there are electrodes **(118, 122)**. The inner surface **(116)** of the electrode structure is an adhesive surface for attaching the electrode structure **(100)** on the skin **(102)** of the person's chest.

25 Claims, 5 Drawing Sheets

AliveCor, Inc. Exhibit 1006
IPR2023-00950
Ex. 1006.1

Nissilä



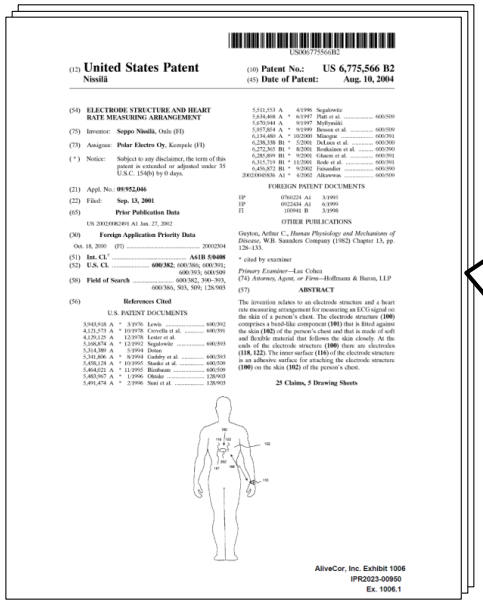
According to a second embodiment, as in FIGS. **3** to **6**, the electrodes **118**, **122** of the electrode structure **100** consist of a membrane **119** that is located at both ends of the electrode structure **100**, at the electrode **118**, **122**, and is made of metal, electrically conductive plastic or a similar conductive material. The electrodes **118**, **122** at both ends of the electrode structure **100** can be equal or narrower in width to the band-like component **101**. The membrane **119** can thus

Ex. 1006, Fig. 5, 5:32-43 (annotated) (Paper 2, 72-73)

Ground 2 – Claim 1, [1.c.ii]

[Undisputed]

[1.c.ii] wherein an exterior surface of the enclosure comprises an exterior surface of the first portion,



(12) **United States Patent**
Nissilä

(10) **Patent No.: US 6,775,566 B2**
(45) **Date of Patent: Aug. 10, 2004**

(54) **ELECTRODE STRUCTURE AND HEART RATE MEASURING ARRANGEMENT**

(75) Inventor: **Seppo Nissilä**, Oulu (FI)

(73) Assignee: **Polar Electro Oy**, Kempele (FI)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: **09/952,046**

(22) Filed: **Sep. 13, 2001**

(65) **Prior Publication Data**

US 2002/0082491 A1 Jun. 27, 2002

(30) **Foreign Application Priority Data**

Oct. 18, 2000 (FI) 20002304

(51) **Int. Cl.**[7] **A61B 5/0408**

(52) **U.S. Cl.** **600/382**; 600/386; 600/391; 600/393; 600/509

(58) **Field of Search** 600/382, 390–393, 600/386, 503, 509; 128/903

(56) **References Cited**

U.S. PATENT DOCUMENTS

3,943,918 A * 3/1976 Lewin 600/392
4,121,575 A * 10/1978 Crovella et al. 600/391
4,129,125 A * 12/1978 Lester et al. 600/391
5,168,874 A * 12/1992 Segalowitz 600/393
5,314,380 A 5/1994 Dolan
5,341,806 A * 8/1994 Gadsby et al. 600/393
5,450,124 A * 10/1995 Stanke et al. 600/509
5,464,022 A * 11/1995 Bisteborn 600/509
5,483,967 A * 1/1996 Okada 128/903
5,491,474 A * 2/1996 Suni et al. 128/903
5,511,553 A 4/1996 Segalowitz
5,634,468 A * 6/1997 Platt et al. 600/509
5,670,944 A 9/1997 Myllymäki
5,957,851 A * 9/1999 Benson et al. 600/509
6,134,480 A * 10/2000 Mäntjärvi 600/391
6,238,338 B1 * 5/2001 DeLuca et al. 600/300
6,272,365 B1 8/2001 Roukainen et al. 600/390
6,285,896 B1 * 9/2001 Tarassenko et al. 600/391
6,315,719 B1 * 11/2001 Rode et al. 600/391
6,456,872 B1 * 9/2002 Faisandier 600/390
2002/0045836 A1 * 4/2002 Alkawwas 600/509

FOREIGN PATENT DOCUMENTS

EP 0761224 A1 3/1995
EP 0522404 A1 6/1999
FI 100941 B 3/1998

OTHER PUBLICATIONS

Guyton, Arthur C., *Human Physiology and Mechanisms of Disease*, W.B. Saunders Company (1982) Chapter 13, pp. 128–133.

* cited by examiner

Primary Examiner—Lee Cohen
(74) *Attorney, Agent, or Firm*—Hoffmann & Baron, LLP

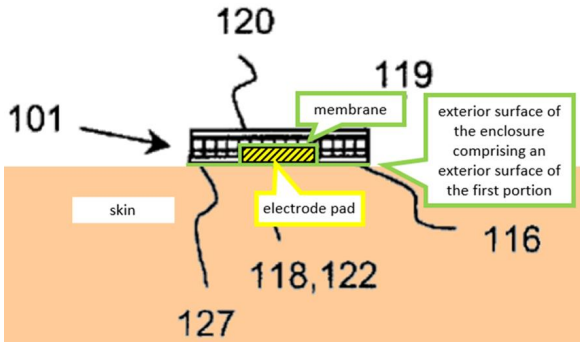
(57) **ABSTRACT**

The invention relates to an electrode structure and a heart rate measuring arrangement for measuring an ECG signal on the skin of a person's chest. The electrode structure (**100**) comprises a band-like component (**101**) that is fitted against the skin (**102**) of the person's chest and that is made of soft and flexible material that follows the skin closely. At the ends of the electrode structure (**100**) there are electrodes (**118, 122**). The inner surface (**116**) of the electrode structure is an adhesive surface for attaching the electrode structure (**100**) on the skin (**102**) of the person's chest.

25 Claims, 5 Drawing Sheets

AliveCor, Inc. Exhibit 1006
IPR2023-00950
Ex. 1006.1

Nissilä



the band-like component **101**. The membrane **119** can thus come into contact with the person's skin surface **102** or on the inner surface **116** of the membrane **119** which is against the person's skin there can be an electrically conductive adhesive **127**. The adhesive **127** is preferably a conductive glue, such as conductive Solgel or a conductive silicone glue. If the electrode **118**, **122** is narrower than the band-like component **101**, it is possible to use a non-conductive adhesive **127** on outer edges of the band **101**, on the inner surfaces thereof, outside the electrodes **118**, **122**.

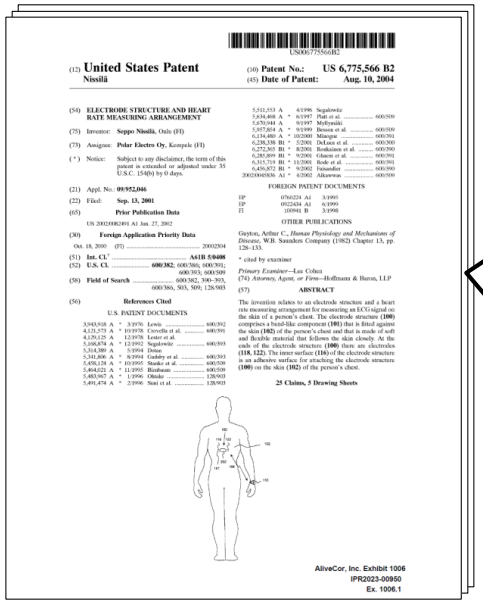
Ex. 1006, Fig. 5, 5:32-43 (annotated) (Paper 2, 72-73)

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE – 122

Ground 2 – Claim 1, [1.c.ii]

[Undisputed]

[1.c.ii] wherein an exterior surface of the enclosure comprises an exterior surface of the first portion,



(12) **United States Patent**
Nissilä

(10) **Patent No.: US 6,775,566 B2**
(45) **Date of Patent: Aug. 10, 2004**

(54) **ELECTRODE STRUCTURE AND HEART RATE MEASURING ARRANGEMENT**

(75) Inventor: **Seppo Nissilä**, Oulu (FI)

(73) Assignee: **Polar Electro Oy**, Kempele (FI)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: **09/952,046**

(22) Filed: **Sep. 13, 2001**

(65) **Prior Publication Data**

US 2002/0082491 A1 Jun. 27, 2002

(30) **Foreign Application Priority Data**

Oct. 18, 2000 (FI) 20002304

(51) **Int. Cl.**[7] **A61B 5/0408**

(52) **U.S. Cl.** **600/382**; 600/386; 600/391; 600/393; 600/509

(58) **Field of Search** 600/382, 390–393, 600/386, 503, 509; 128/903

(56) **References Cited**

U.S. PATENT DOCUMENTS

3,943,918 A * 3/1976 Lewin 600/392
4,121,575 A * 10/1978 Crovella et al. 600/391
4,129,125 A * 12/1978 Lester et al. 600/391
5,168,874 A * 12/1992 Segalowitz 600/393
5,314,380 A 5/1994 Dolan
5,341,806 A * 8/1994 Gadsby et al. 600/393
5,450,124 A * 10/1995 Stanke et al. 600/509
5,464,022 A * 11/1995 Bisteborn 600/509
5,483,967 A * 1/1996 Olinke 128/903
5,491,474 A * 2/1996 Suni et al. 128/903
5,511,553 A 4/1996 Segalowitz
5,634,468 A * 6/1997 Platt et al. 600/509
5,670,944 A 9/1997 Myllymäki
5,957,854 A * 9/1999 Besson et al. 600/509
6,134,480 A * 10/2000 Mäntjärvi 600/391
6,238,338 B1 * 5/2001 DeLuca et al. 600/300
6,272,365 B1 8/2001 Roukainen et al. 600/390
6,285,896 B1 * 9/2001 Tarassenko et al. 600/509
6,315,719 B1 * 11/2001 Rode et al. 600/391
6,456,872 B1 * 9/2002 Faisandier 600/390
2002/0045836 A1 * 4/2002 Alkawwas 600/509

FOREIGN PATENT DOCUMENTS

EP 0761224 A1 3/1995
EP 0522404 A1 6/1999
FI 100941 B 3/1998

OTHER PUBLICATIONS

Guyton, Arthur C., *Human Physiology and Mechanisms of Disease*, W.B. Saunders Company (1982) Chapter 13, pp. 128–133.

* cited by examiner

Primary Examiner—Lee Cohen
(74) *Attorney, Agent, or Firm*—Hoffmann & Baron, LLP

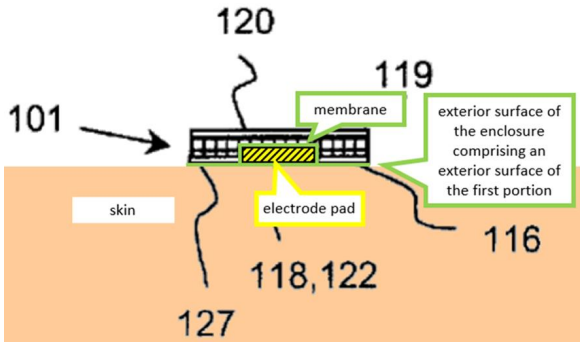
(57) **ABSTRACT**

The invention relates to an electrode structure and a heart rate measuring arrangement for measuring an ECG signal on the skin of a person's chest. The electrode structure **(100)** comprises a band-like component **(101)** that is fitted against the skin **(102)** of the person's chest and that is made of soft and flexible material that follows the skin closely. At the ends of the electrode structure **(100)** there are electrodes **(118, 122)**. The inner surface **(116)** of the electrode structure is an adhesive surface for attaching the electrode structure **(100)** on the skin **(102)** of the person's chest.

25 Claims, 5 Drawing Sheets

AliveCor, Inc. Exhibit 1006
IPR2023-00950
Ex. 1006.1

Nissilä

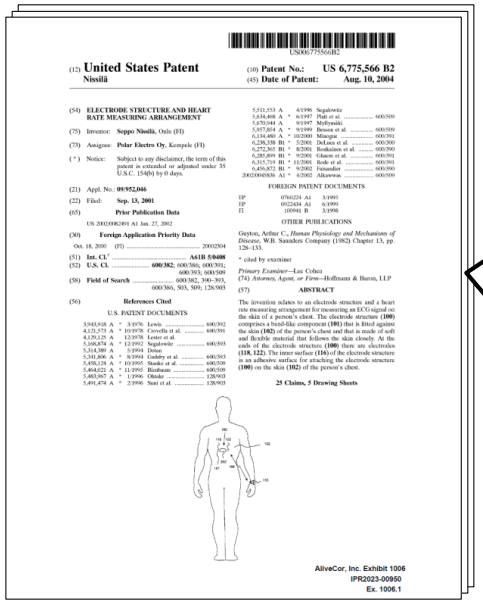


the band-like component **101**. The membrane **119** can thus come into contact with the person's skin surface **102** or on the inner surface **116** of the membrane **119** which is against the person's skin there can be an electrically conductive adhesive **127**. The adhesive **127** is preferably a conductive glue, such as conductive Solgel or a conductive silicone glue. If the electrode **118**, **122** is narrower than the band-like component **101**, it is possible to use a non-conductive adhesive **127** on outer edges of the band **101**, on the inner surfaces thereof, outside the electrodes **118**, **122**.

Ex. 1006, Fig. 5, 5:32-43 (annotated) (Paper 2, 72-73)

Ground 2 – Claim 1, [1.c.iii]

[1.c.iii] wherein the first pad is positioned underneath the exterior surface of the first portion, and wherein the first pad is configured to detect a first electrical signal of the user's cardiac signal via the user's skin's contact with the exterior surface of the first portion of the enclosure; and



US006775566B2

(12) **United States Patent**
Nissilä

(10) **Patent No.: US 6,775,566 B2**
(45) **Date of Patent: Aug. 10, 2004**

(54) **ELECTRODE STRUCTURE AND HEART RATE MEASURING ARRANGEMENT**

(75) Inventor: **Seppo Nissilä**, Oulu (FI)

(73) Assignee: **Polar Electro Oy**, Kempele (FI)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: **09/952,046**

(22) Filed: **Sep. 13, 2001**

(65) **Prior Publication Data**

US 2002/0082491 A1 Jun. 27, 2002

(30) **Foreign Application Priority Data**

Oct. 18, 2000 (FI) 20002304

(51) **Int. Cl.**[7] **A61B 5/0408**

(52) **U.S. Cl.** **600/382**; 600/386; 600/391; 600/393; 600/509

(58) **Field of Search** 600/382, 390–393, 600/386, 503, 509; 128/903

(56) **References Cited**

U.S. PATENT DOCUMENTS

3,943,918 A * 3/1976 Lewis 600/392
4,121,575 A * 10/1978 Crovella et al. 600/391
4,129,125 A * 12/1978 Lester et al. 600/391
5,168,874 A * 12/1992 Segalowitz 600/393
5,314,380 A * 5/1994 Dolan 600/393
5,341,806 A * 8/1994 Gadsby et al. 600/393
5,450,124 A * 10/1995 Stanke et al. 600/509
5,464,022 A * 11/1995 Bisteborn 600/509
5,483,967 A * 1/1996 Okada 128/903
5,491,474 A * 2/1996 Suni et al. 128/903
5,511,553 A 4/1996 Segalowitz
5,634,468 A * 6/1997 Platt et al. 600/509
5,670,944 A 9/1997 Myllymäki
5,957,854 A * 9/1999 Besson et al. 600/509
6,134,480 A * 10/2000 Mikogan 600/391
6,238,338 B1 * 5/2001 DeLuca et al. 600/300
6,272,361 B1 8/2001 Ruokainen et al. 600/390
6,314,324 B1 * 11/2001 Huiku et al. 600/391
6,315,719 B1 * 11/2001 Rode et al. 600/391
6,456,872 B1 * 9/2002 Faisandier 600/390
2002/0045836 A1 * 4/2002 Alkawwas 600/509

FOREIGN PATENT DOCUMENTS

EP 0761224 A1 3/1995
EP 0522404 A1 6/1999
FI 100941 B 3/1998

OTHER PUBLICATIONS

Guyton, Arthur C., *Human Physiology and Mechanisms of Disease*, W.B. Saunders Company (1982) Chapter 13, pp. 128–133.

* cited by examiner

Primary Examiner—Lee Cohen
(74) *Attorney, Agent, or Firm*—Hoffmann & Baron, LLP

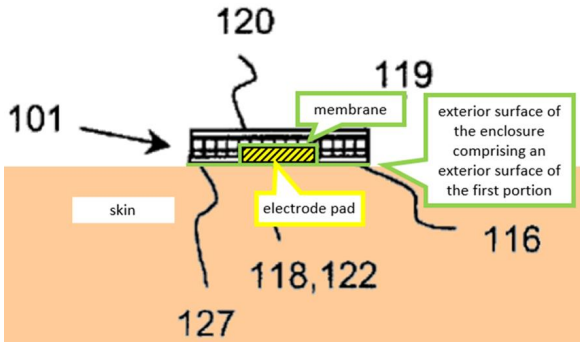
(57) **ABSTRACT**

The invention relates to an electrode structure and a heart rate measuring arrangement for measuring an ECG signal on the skin of a person's chest. The electrode structure **(100)** comprises a band-like component **(101)** that is fitted against the skin **(102)** of the person's chest and that is made of soft and flexible material that follows the skin closely. At the ends of the electrode structure **(100)** there are electrodes **(118, 122)**. The inner surface **(116)** of the electrode structure is an adhesive surface for attaching the electrode structure **(100)** on the skin **(102)** of the person's chest.

25 Claims, 5 Drawing Sheets

AliveCor, Inc. Exhibit 1006
IPR2023-00950
Ex. 1006.1

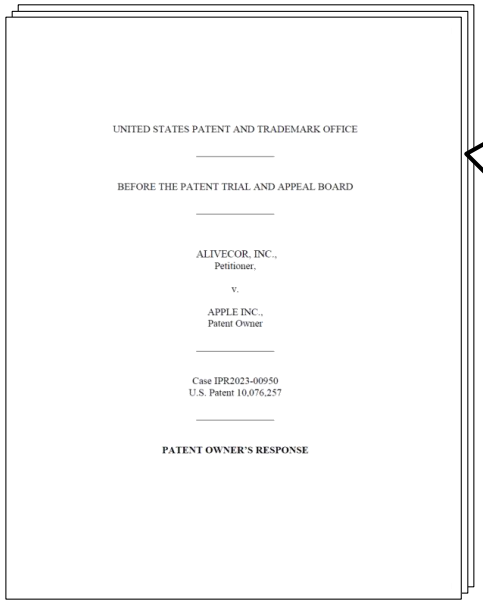
Nissilä



the band-like component **101**. The membrane **119** can thus come into contact with the person's skin surface **102** or on the inner surface **116** of the membrane **119** which is against the person's skin there can be an electrically conductive adhesive **127**. The adhesive **127** is preferably a conductive glue, such as conductive Solgel or a conductive silicone glue. If the electrode **118**, **122** is narrower than the band-like component **101**, it is possible to use a non-conductive adhesive **127** on outer edges of the band **101**, on the inner surfaces thereof, outside the electrodes **118**, **122**.

Ex. 1006, Fig. 5, 5:32-43 (annotated) (Paper 2, 72-73)

Ground 2 – Claim 1 – Apple's Arg.



UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ALIVECOR, INC.,
Petitioner,

v.

APPLE INC.,
Patent Owner

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

PATENT OWNER'S RESPONSE

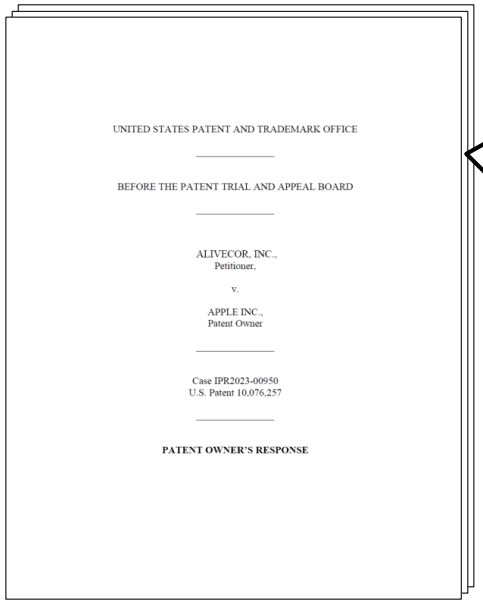
Patent Owner's Response

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

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

AliveCor Exhibit 1024
AliveCor, Inc. v. Apple Inc.
IPR2023-00950, U.S. Patent No. 10,076,257
125 of 249

Ground 2 – Claim 1 – Apple's Arg.



UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ALIVECOR, INC.,
Petitioner,

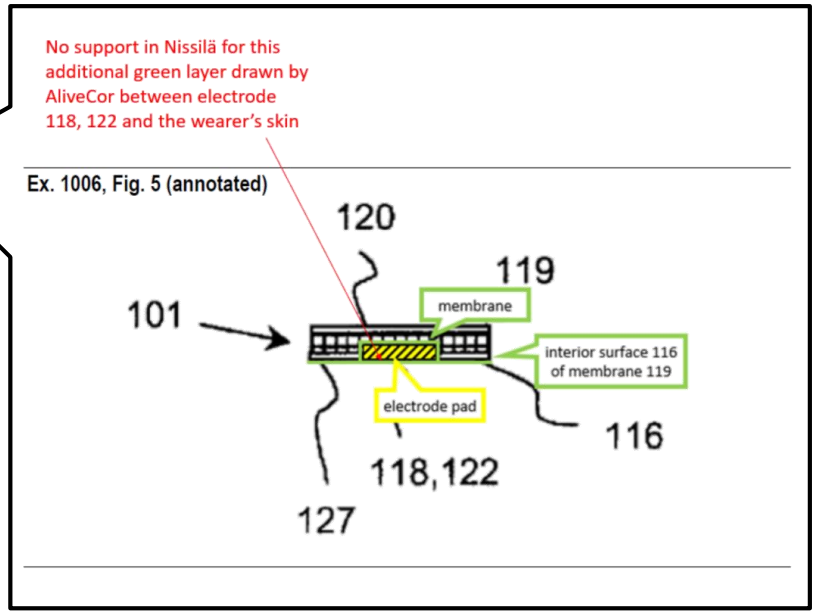
v.

APPLE INC.,
Patent Owner

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

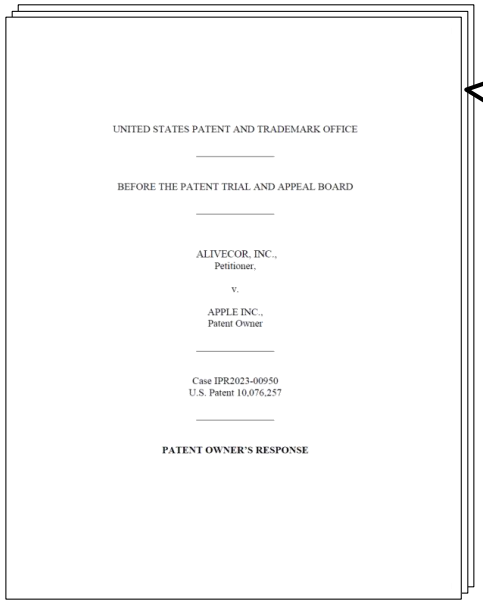
PATENT OWNER'S RESPONSE

Patent Owner's Response



AliveCor Exhibit 1024
AliveCor, Inc. v. Apple Inc.
IPR2023-00950, U.S. Patent No. 10,076,257
126 of 249

Ground 2 – Claim 1 – Apple's Arg. 1



UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ALIVECOR, INC.,
Petitioner,

v.

APPLE INC.,
Patent Owner

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

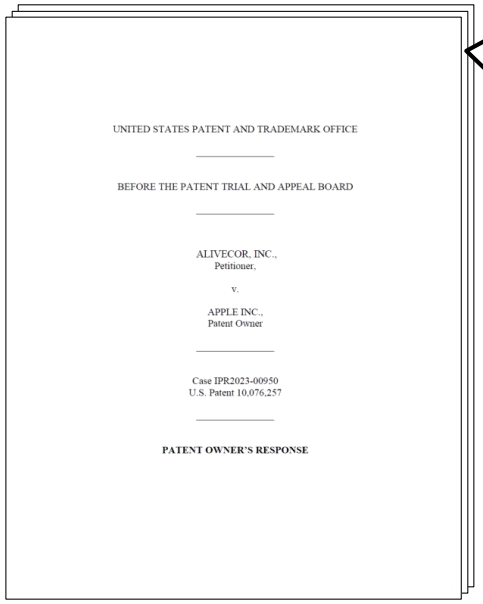
PATENT OWNER'S RESPONSE

Patent Owner's Response

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

AliveCor Exhibit 1024
AliveCor, Inc. v. Apple Inc.
IPR2023-00950, U.S. Patent No. 10,076,257
127 of 249

Ground 2 – Claim 1 – Apple's Arg. 1(a)



UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ALIVECOR, INC.,
Petitioner,

v.

APPLE INC.,
Patent Owner

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

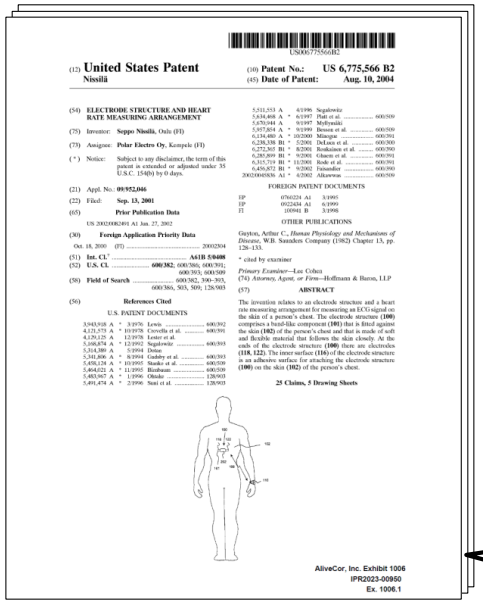
PATENT OWNER'S RESPONSE

Patent Owner's Response

Nissilä only discusses "a membrane" in two narrow instances: one paragraph of the Summary section in column 3 and one paragraph of the Detailed Description in column 5. EX1006, 3:24-40; 5:33-49. Both of these passages disclose that the membrane ***is*** the material that makes up the electrodes, not a separate material that encloses the electrodes. APPLE-2004, ¶¶112-114. In column 3, Nissilä states that "***the first electrode and the second electrode*** of the electrode structure ***consist of an electrically conductive membrane***." EX1006, 3:24-27; 3:32-37. Similarly, Column 5 states that "***the electrodes 118, 122*** of the electrode structure 100 ***consist of a membrane 119*** that is located at both ends of the electrode structure 100, at the electrode 118, 122, and is made of metal, electrically conductive plastic or a similar conductive material." *Id.*, 5:32-38.

AliveCor Exhibit 1024
AliveCor, Inc. v. Apple Inc.
IPR2023-00950, U.S. Patent No. 10,076,257
128 of 249

Ground 2 – Claim 1 – Apple's Arg. 1(a) - Reply



US006775566B2

(12) **United States Patent**
Nissilä

(10) **Patent No.: US 6,775,566 B2**
(45) **Date of Patent: Aug. 10, 2004**

(54) **ELECTRODE STRUCTURE AND HEART RATE MEASURING ARRANGEMENT**

(75) Inventor: **Seppo Nissilä**, Oulu (FI)

(73) Assignee: **Polar Electro Oy**, Kempele (FI)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: **09/952,046**

(22) Filed: **Sep. 13, 2001**

(65) **Prior Publication Data**

US 2002/0082491 A1 Jun. 27, 2002

(30) **Foreign Application Priority Data**

Oct. 18, 2000 (FI) 20002304

(51) **Int. Cl.**[7] **A61B 5/0408**

(52) **U.S. Cl.** **600/382**; 600/386; 600/391; 600/393; 600/509

(58) **Field of Search** 600/382, 390–393, 600/386, 503, 509; 128/903

(56) **References Cited**

U.S. PATENT DOCUMENTS

3,943,918	A	*	3/1976	Lewis 600/392
4,121,575	A	*	10/1978	Crovella et al. 600/391
4,129,125	A		12/1978	Lester et al.
5,168,874	A	*	12/1992	Segalowitz 600/393
5,314,380	A		5/1994	Dolan
5,341,806	A	*	8/1994	Gadsby et al. 600/393
5,450,124	A	*	10/1995	Stanke et al. 600/509
5,464,022	A	*	11/1995	Bisteboam 600/509
5,483,967	A	*	1/1996	Okuda 128/903
5,491,474	A	*	2/1996	Suni et al. 128/903
5,511,553	A		4/1996	Segalowitz
5,634,468	A	*	6/1997	Platt et al. 600/509
5,670,944	A		9/1997	Myllymäki
5,957,851	A	*	9/1999	Benson et al. 600/509
6,134,480	A	*	10/2000	Mikegus 600/391
6,238,338	B1	*	5/2001	DeLuca et al. 600/300
6,272,365	B1	*	8/2001	Roukainen et al. 600/390
6,285,902	B1	*	9/2001	Kienzle et al. 600/509
6,315,719	B1	*	11/2001	Rode et al. 600/391
6,456,872	B1	*	9/2002	Faisandier 600/390
2002/0040183	A1	*	4/2002	Altarovaz 600/509

FOREIGN PATENT DOCUMENTS

EP	0761224	A1	3/1995
EP	0522404	A1	6/1999
FI	105941	B	3/1998

OTHER PUBLICATIONS

Guyton, Arthur C., *Human Physiology and Mechanisms of Disease*, W.B. Saunders Company (1982) Chapter 13, pp. 128–133.

* cited by examiner

Primary Examiner—Lee Cohen
(74) *Attorney, Agent, or Firm*—Hoffmann & Baron, LLP

(57) **ABSTRACT**

The invention relates to an electrode structure and a heart rate measuring arrangement for measuring an ECG signal on the skin of a person's chest. The electrode structure **(100)** comprises a band-like component **(101)** that is fitted against the skin **(102)** of the person's chest and that is made of soft and flexible material that follows the skin closely. At the ends of the electrode structure **(100)** there are electrodes **(118, 122)**. The inner surface **(116)** of the electrode structure is an adhesive surface for attaching the electrode structure **(100)** on the skin **(102)** of the person's chest.

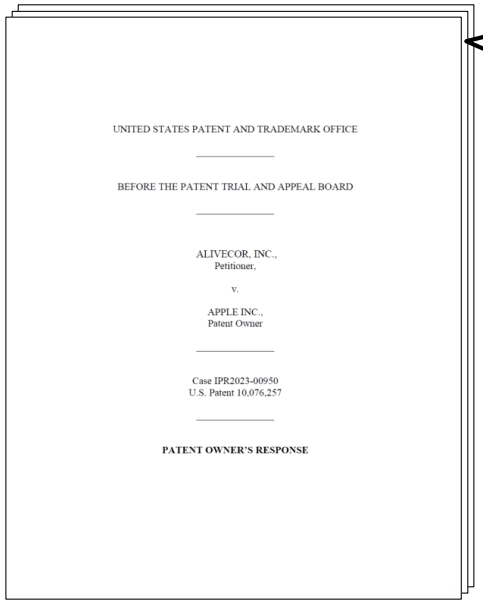
25 Claims, 5 Drawing Sheets

Nissilä

Nissilä only discusses "a membrane" in two narrow instances: one paragraph in the Summary section in column 3 and one paragraph of the Detailed Description in column 5. EX1006, 3:24-40; 5:33-49. Both of these passages disclose that the membrane ***is*** the material that makes up the electrodes, not a separate material that encloses the electrodes. APPLE-2004, ¶¶112-114. In column 3, Nissilä states that "***the first electrode and the second electrode*** of the electrode structure ***consist of an electrically conductive membrane***." EX1006, 3:24-27; 3:32-37. Similarly, Column 5 states that "***the electrodes 118, 122*** of the electrode structure 100 ***consist of a membrane 119*** that is located at both ends of the electrode structure 100, at the electrode 118, 122, and is made of metal, electrically conductive plastic or a similar conductive material." *Id.*, 5:32-38.

6. An electrode structure as claimed in claim **1**, wherein the first electrode and the second electrode of the electrode structure comprise a conductive membrane located at both ends of the electrode structure.

Ground 2 – Claim 1 – Apple's Arg. 1(b)



UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ALIVECOR, INC.,
Petitioner,

v.

APPLE INC.,
Patent Owner

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

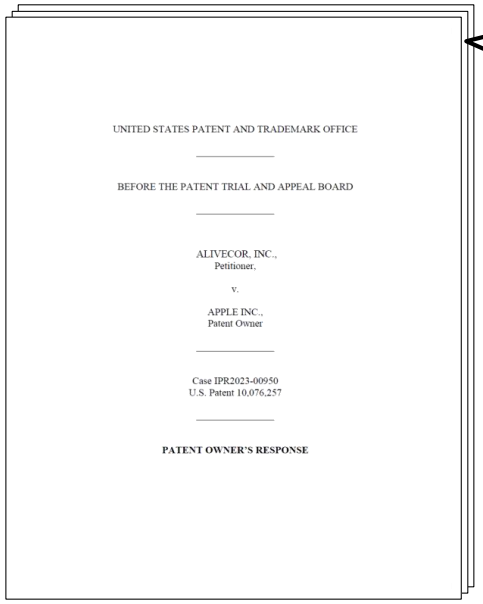
PATENT OWNER'S RESPONSE

Patent Owner's Response

The Figures of Nissilä further support the correct interpretation that each of the electrodes 118 and 122 ***is*** a membrane 119. The reference numeral 119 appears in only one figure in Nissilä—FIG. 5. As shown in FIG. 5, the reference numerals 119, 118, and 122 are all pointing to the same structure, the electrode positioned on the user facing exterior surface of Nissilä's device. APPLE-2004, ¶¶117-118.

AliveCor Exhibit 1024
AliveCor, Inc. v. Apple Inc.
IPR2023-00950, U.S. Patent No. 10,076,257
130 of 249

Ground 2 – Claim 1 – Apple's Arg. 1(b) – Reply



UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ALIVECOR, INC.,
Petitioner,

v.

APPLE INC.,
Patent Owner

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

PATENT OWNER'S RESPONSE

Patent Owner's Response

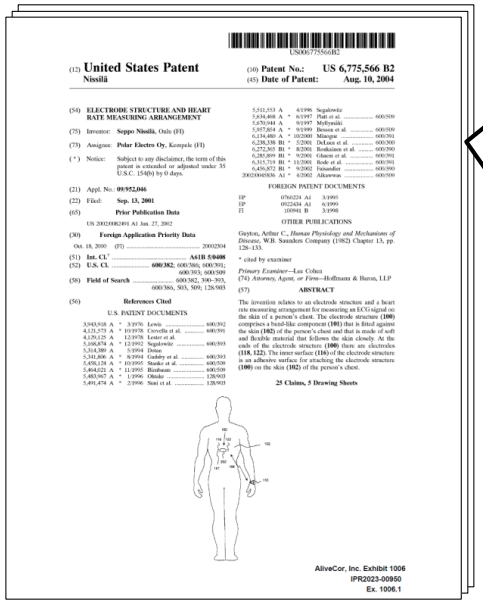
The Figures of Nissilä further support the correct interpretation that each of the electrodes 118 and 122 ***is*** a membrane 119. The reference numeral 119 appears in only one figure in Nissilä—FIG. 5. As shown in FIG. 5, the reference numerals 119, 118, and 122 are all pointing to the same structure, the electrode positioned on the user facing exterior surface of Nissilä's device. APPLE-2004, ¶¶117-118.

DynaEnergetics Europe GmbH v. SWM Int'l, LLC

"Hardesty's disclosure of separately numbered elements demonstrates that charge holder tube 3 is distinct from weight 2."

2024 Pat. App. LEXIS 504, *21 (P.T.A.B. Feb. 5, 2024)

Ground 2 – Claim 1 – Apple's Arg. 1(b) – Reply



(12) **United States Patent**
Nissilä

(10) **Patent No.: US 6,775,566 B2**
(45) **Date of Patent: Aug. 10, 2004**

(54) **ELECTRODE STRUCTURE AND HEART RATE MEASURING ARRANGEMENT**

(75) Inventor: **Seppo Nissilä**, Oulu (FI)

(73) Assignee: **Polar Electro Oy**, Kempele (FI)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: **09/952,046**

(22) Filed: **Sep. 13, 2001**

(65) **Prior Publication Data**

US 2002/0082491 A1 Jun. 27, 2002

(30) **Foreign Application Priority Data**

Oct. 18, 2000 (FI) 20002304

(51) **Int. Cl.**[7] **A61B 5/0408**

(52) **U.S. Cl.** **600/382**; 600/386; 600/391; 600/393; 600/509

(58) **Field of Search** 600/382, 390–393, 600/386, 503, 509; 128/903

(56) **References Cited**

U.S. PATENT DOCUMENTS

3,943,918 A * 3/1976 Lewis 600/392
4,121,575 A * 10/1978 Coviello et al. 600/391
4,129,125 A 12/1978 Lester et al.
5,168,874 A * 12/1992 Segalowitz 600/393
5,314,380 A 5/1994 Dolan
5,341,806 A * 8/1994 Gadsby et al. 600/393
5,450,124 A * 10/1995 Stanke et al. 600/509
5,464,022 A * 11/1995 Bisteham 600/509
5,483,967 A * 1/1996 Okada 128/903
5,491,474 A * 2/1996 Suni et al. 128/903

5,511,553 A 4/1996 Segalowitz
5,634,468 A * 6/1997 Platt et al. 600/509
5,670,944 A 9/1997 Myllymäki
5,957,851 A * 9/1999 Benson et al. 600/509
6,134,480 A * 10/2000 Mäntjärvi 600/391
6,238,338 B1 * 5/2001 DeLuca et al. 600/300
6,272,365 B1 * 8/2001 Rouhainen et al. 600/390
6,317,627 B1 * 11/2001 Ennen et al. 600/509
6,317,719 B1 * 11/2001 Rode et al. 600/391
6,456,872 B1 * 9/2002 Faisandier 600/393
2002/0045836 A1 * 4/2002 Alkawwas 600/509

FOREIGN PATENT DOCUMENTS

EP 0761224 A1 3/1995
EP 0522434 A1 6/1999
FI 103941 B 3/1998

OTHER PUBLICATIONS

Guyton, Arthur C., *Human Physiology and Mechanisms of Disease*, W.B. Saunders Company (1982) Chapter 13, pp. 128–133.

* cited by examiner

Primary Examiner—Lee Cohen
(74) *Attorney, Agent, or Firm*—Hoffmann & Baron, LLP

(57) **ABSTRACT**

The invention relates to an electrode structure and a heart rate measuring arrangement for measuring an ECG signal on the skin of a person's chest. The electrode structure **(100)** comprises a band-like component **(101)** that is fitted against the skin **(102)** of the person's chest and that is made of soft and flexible material that follows the skin closely. At the ends of the electrode structure **(100)** there are electrodes **(118, 122)**. The inner surface **(116)** of the electrode structure is an adhesive surface for attaching the electrode structure **(100)** on the skin **(102)** of the person's chest.

25 Claims, 5 Drawing Sheets

AliveCor, Inc. Exhibit 1006
IPR2023-00950
Ex. 1006.1

Nissilä

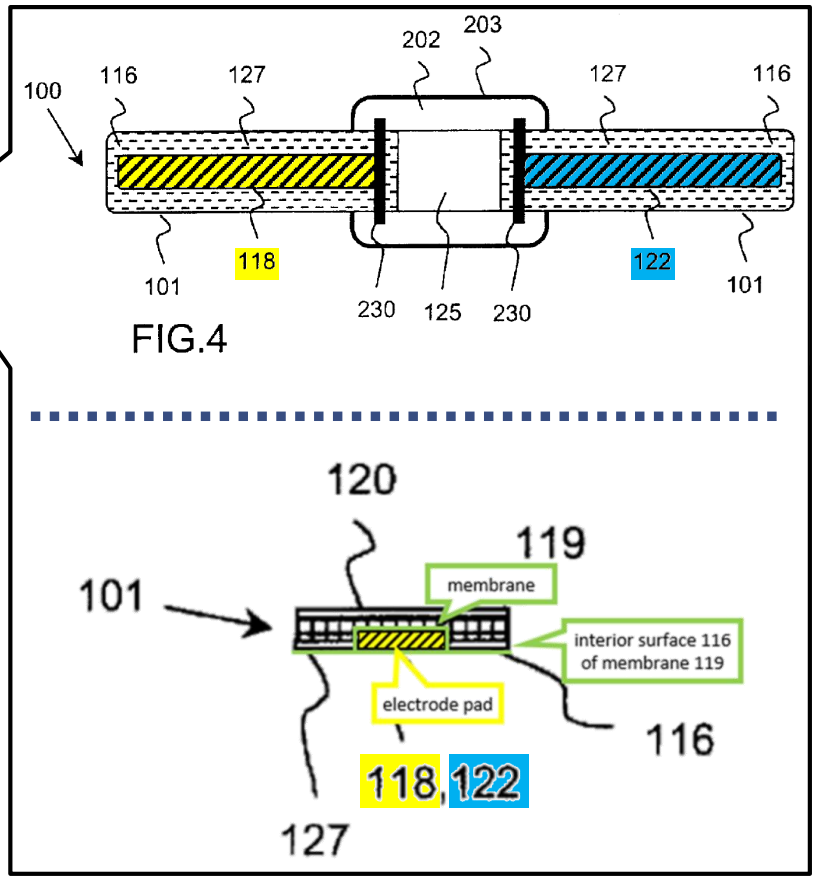
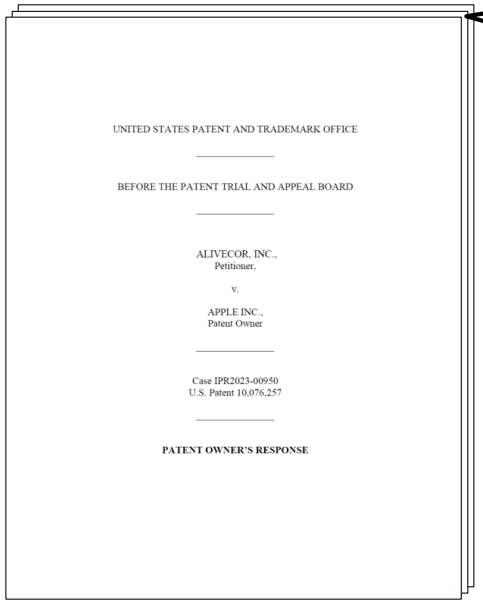


FIG.4

Ex. 1006, Figs. 4, 5 (annotated) (Ex. 1003, ¶ 90; Paper 2, 6)

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE – 132

Ground 2 – Claim 1 – Apple's Arg. 1(c)



UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ALIVECOR, INC.,
Petitioner,

v.

APPLE INC.,
Patent Owner

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

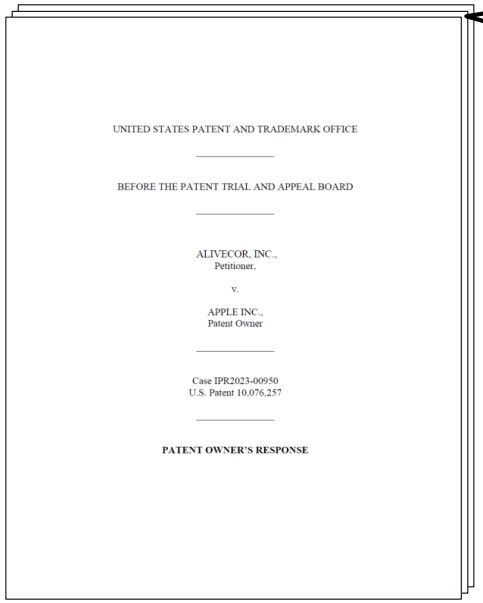
PATENT OWNER'S RESPONSE

This correct interpretation of Nissilä's disclosure—that the membrane 119 ***is*** the electrodes 118 and 122—is further supported by the English translation of the Finnish patent to which Nissilä claims priority (APPLE-2007). APPLE-2004,

Patent Owner's Response

AliveCor Exhibit 1024
AliveCor, Inc. v. Apple Inc.
IPR2023-00950, U.S. Patent No. 10,076,257
133 of 249

Ground 2 – Claim 1 – Apple's Arg. 1(c) – Reply



UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ALIVECOR, INC.,
Petitioner,

v.

APPLE INC.,
Patent Owner

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

PATENT OWNER'S RESPONSE

Patent Owner's Response

This correct interpretation of Nissilä's disclosure—that the membrane 119 ***is*** the electrodes 118 and 122—is further supported by the English translation of the Finnish patent to which Nissilä claims priority (APPLE-2007). APPLE-2004,

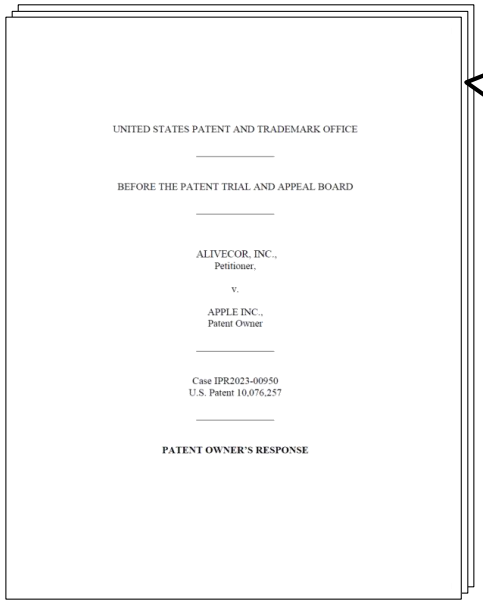
SAS Inst., Inc. v. Iancu

"Nothing suggests the Director enjoys a license to depart from the petition" and consider "a different inter partes review."

584 U.S. 357, 365 (2018)

AliveCor Exhibit 1024
AliveCor, Inc. v. Apple Inc.
IPR2023-00950, U.S. Patent No. 10,076,257
134 of 249

Ground 2 – Claim 1 – Apple's Arg. 1(d)



UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ALIVECOR, INC.,
Petitioner,

v.

APPLE INC.,
Patent Owner

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

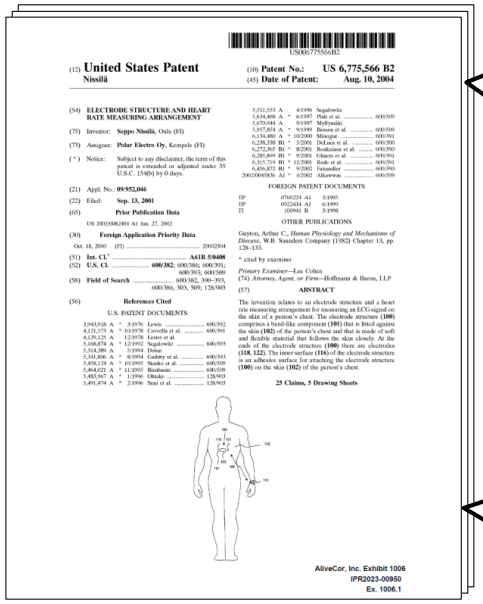
PATENT OWNER'S RESPONSE

Patent Owner's Response

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

AliveCor Exhibit 1024
AliveCor, Inc. v. Apple Inc.
IPR2023-00950, U.S. Patent No. 10,076,257
135 of 249

Ground 2 – Claim 1 – Apple's Arg. 1(d) – Reply



US006775566B2

(12) **United States Patent**
Nissilä

(10) **Patent No.: US 6,775,566 B2**
(45) **Date of Patent: Aug. 10, 2004**

(54) **ELECTRODE STRUCTURE AND HEART RATE MEASURING ARRANGEMENT**

(75) Inventor: **Seppo Nissilä**, Oulu (FI)

(73) Assignee: **Polar Electro Oy**, Kempele (FI)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: **09/952,046**

(22) Filed: **Sep. 13, 2001**

(65) **Prior Publication Data**

US 2002/0082491 A1 Jun. 27, 2002

(30) **Foreign Application Priority Data**

Oct. 18, 2000 (FI) 20002304

(51) **Int. Cl.**[7] **A61B 5/0408**

(52) **U.S. Cl.** **600/382**; 600/386; 600/391; 600/393; 600/509

(58) **Field of Search** 600/382, 390–393, 600/386, 503, 509; 128/903

(56) **References Cited**

U.S. PATENT DOCUMENTS

3,943,918	A	*	3/1976	Lewin 600/392
4,121,575	A	*	10/1978	Coviello et al. 600/391
4,129,125	A	*	12/1978	Lester et al. 600/391
5,168,874	A	*	12/1992	Segalowitz 600/393
5,314,380	A	*	5/1994	Dolan 600/393
5,341,806	A	*	8/1994	Gadsby et al. 600/393
5,450,124	A	*	10/1995	Stanke et al. 600/509
5,464,022	A	*	11/1995	Bisteborn 600/509
5,483,967	A	*	1/1996	Okada 128/903
5,491,474	A	*	2/1996	Suni et al. 128/903
5,511,553	A		4/1996	Segalowitz
5,634,468	A	*	6/1997	Platt et al. 600/509
5,670,944	A		9/1997	Myllymäki
5,957,851	A	*	9/1999	Benson et al. 600/509
6,134,480	A	*	10/2000	Mäntjärvi 600/391
6,238,338	B1	*	5/2001	DeLuca et al. 600/300
6,272,365	B1	*	8/2001	Rouhainen et al. 600/390
6,285,896	B1	*	9/2001	Tumey et al. 600/393
6,315,719	B1	*	11/2001	Rode et al. 600/391
6,456,872	B1	*	9/2002	Faisandier 600/390
2002/0040183	A1	*	4/2002	Altarovna 600/509

FOREIGN PATENT DOCUMENTS

EP	0761224 A1	3/1995
EP	0522404 A1	6/1999
FI	105941 B	3/1998

OTHER PUBLICATIONS

Guyton, Arthur C., *Human Physiology and Mechanisms of Disease*, W.B. Saunders Company (1982) Chapter 13, pp. 128–133.

* cited by examiner

Primary Examiner—Lee Cohen
(74) *Attorney, Agent, or Firm*—Hoffmann & Baron, LLP

(57) **ABSTRACT**

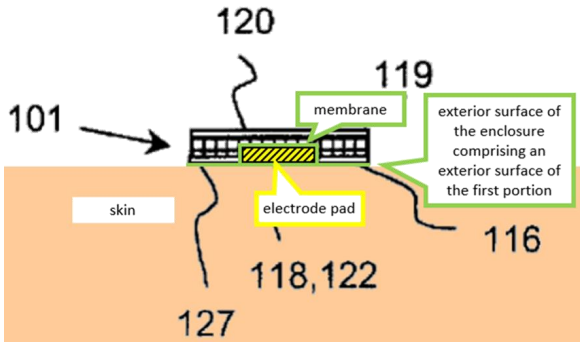
The invention relates to an electrode structure and a heart rate measuring arrangement for measuring an ECG signal on the skin of a person's chest. The electrode structure **(100)** comprises a band-like component **(101)** that is fitted against the skin **(102)** of the person's chest and that is made of soft and flexible material that follows the skin closely. At the ends of the electrode structure **(100)** there are electrodes **(118, 122)**. The inner surface **(116)** of the electrode structure is an adhesive surface for attaching the electrode structure **(100)** on the skin **(102)** of the person's chest.

25 Claims, 5 Drawing Sheets

AliveCor, Inc. Exhibit 1006
IPR2023-00950
Ex. 1006.1

Nissilä

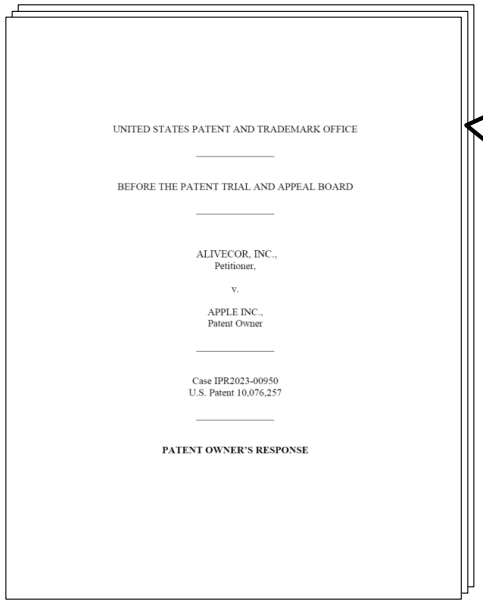
Other disclosures of Nissilä confirm that the electrodes are positioned on the external, user facing surface of Nissilä's device without an intervening layer between the electrodes and the user's skin. APPLE-2004, ¶122. For example, Nissilä states that "[b]ecause the inner surface 116 of the electrode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



Paper 20, 51; Ex. 1006, Fig. 5 (annotated) (Paper 2, 72-73)

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE – 136

Ground 2 – Claim 1 – Apple's Arg. 2



UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ALIVECOR, INC.,
Petitioner,

v.

APPLE INC.,
Patent Owner

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

PATENT OWNER'S RESPONSE

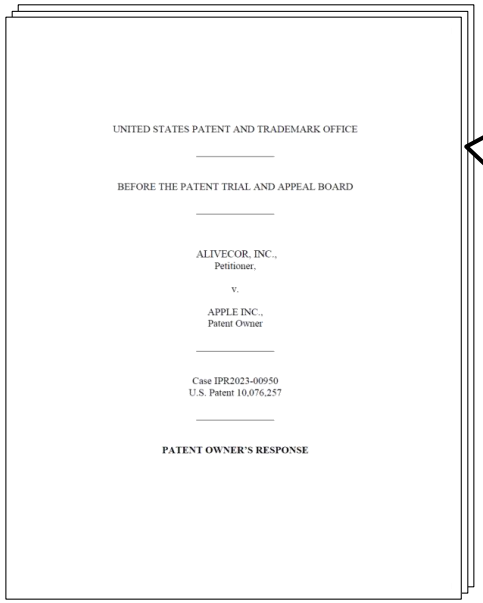
Patent Owner's Response

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

As discussed in the previous section, Nissilä discloses that the membrane 119 ***is*** the electrodes 118 and 122 of Nissilä's device. However, even if one were to ignore the clear "consist of" language in Nissilä and adopt AliveCor's fabricated reconstruction of Nissilä in which the membrane 119 is a separate and distinct component from each of the electrodes 118 and 122,[8] there is still no teaching or suggestion in Nissilä of the membrane 119 being positioned between the electrodes and the skin of the user. APPLE-2004, ¶¶124-132.

AliveCor Exhibit 1024
AliveCor, Inc. v. Apple Inc.
IPR2023-00950, U.S. Patent No. 10,076,257
137 of 249

Ground 2 – Claim 1 – Apple's Arg. 2



UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

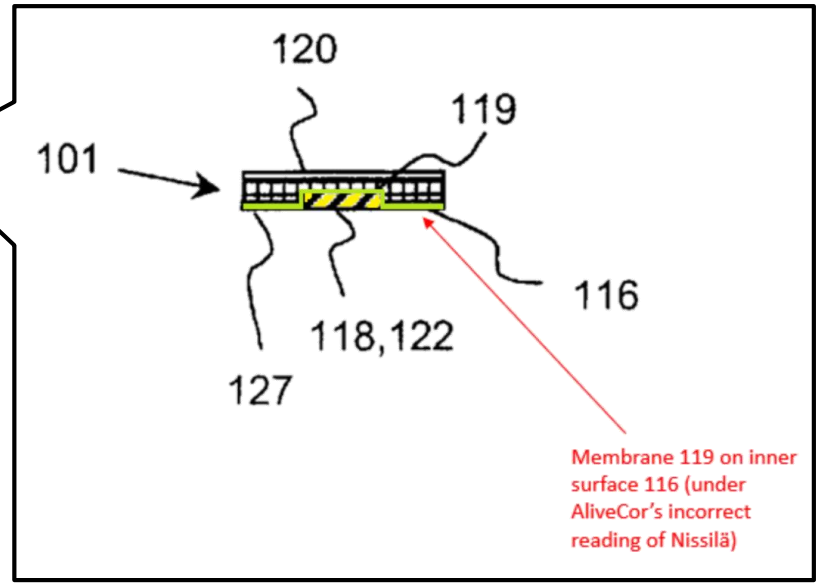
ALIVECOR, INC.,
Petitioner,

v.

APPLE INC.,
Patent Owner

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

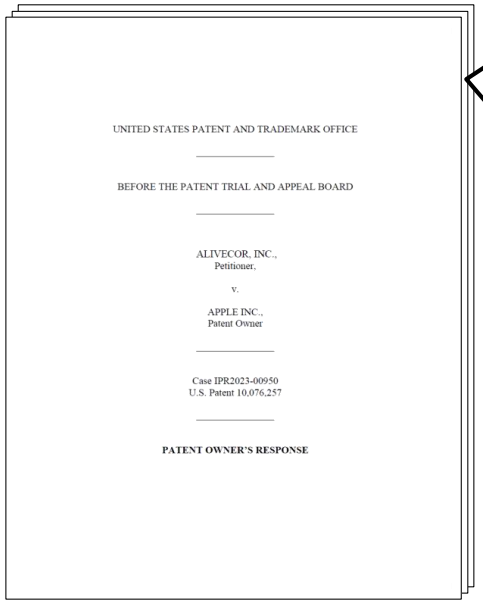
PATENT OWNER'S RESPONSE



Patent Owner's Response

AliveCor Exhibit 1024
AliveCor, Inc. v. Apple Inc.
IPR2023-00950, U.S. Patent No. 10,076,257
138 of 249

Ground 2 – Claim 1 – Apple's Arg. 2(a)



UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ALIVECOR, INC.,
Petitioner,

v.

APPLE INC.,
Patent Owner

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

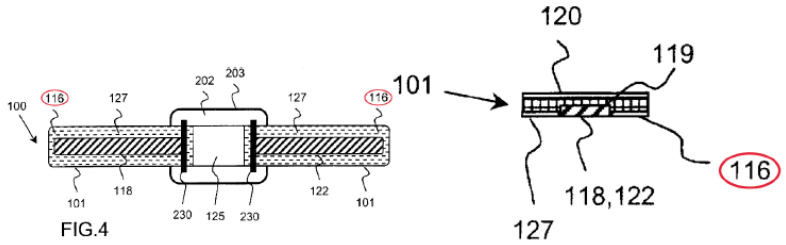
PATENT OWNER'S RESPONSE

Patent Owner's Response

electrically conductive plastic or a similar conductive material." *Id.*, 5:32-38. FIG. 5 shows the reference numeral 119 pointing to the top of the electrode 118, 122.

. . . .

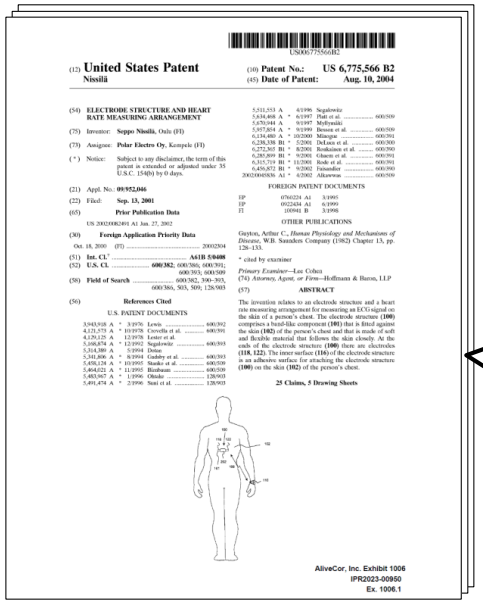
Nissilä therefore describes that the "membrane 119" can contact the user's skin "on the inner surface 116." APPLE-2004, ¶126. FIGs. 4 and 5 of Nissilä show that the "inner surface 116" surrounds the electrodes 118, 122:



EX1006, FIG. 4 EX1006, FIG. 5

AliveCor Exhibit 1024
AliveCor, Inc. v. Apple Inc.
IPR2023-00950, U.S. Patent No. 10,076,257
139 of 249

Ground 2 – Claim 1 – Apple's Arg. 2(a) - Reply



(12) **United States Patent**
Nissilä

(10) **Patent No.: US 6,775,566 B2**
(45) **Date of Patent: Aug. 10, 2004**

(54) **ELECTRODE STRUCTURE AND HEART RATE MEASURING ARRANGEMENT**

(75) Inventor: **Seppo Nissilä**, Oulu (FI)

(73) Assignee: **Polar Electro Oy**, Kempele (FI)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: **09/952,046**

(22) Filed: **Sep. 13, 2001**

(65) **Prior Publication Data**

US 2002/0082491 A1 Jun. 27, 2002

(30) **Foreign Application Priority Data**

Oct. 18, 2000 (FI) 20002304

(51) **Int. Cl.**[7] **A61B 5/0408**

(52) **U.S. Cl.** **600/382**; 600/386; 600/391; 600/393; 600/509

(58) **Field of Search** 600/382, 390–393, 600/386, 503, 509; 128/903

(56) **References Cited**

U.S. PATENT DOCUMENTS

FOREIGN PATENT DOCUMENTS

OTHER PUBLICATIONS

(57) **ABSTRACT**

The invention relates to an electrode structure and a heart rate measuring arrangement for measuring an ECG signal on the skin of a person's chest. The electrode structure (**100**) comprises a band-like component (**101**) that is fitted against the skin (**102**) of the person's chest and that is made of soft and flexible material that follows the skin closely. At the ends of the electrode structure (**100**) there are electrodes (**118, 122**). The inner surface (**116**) of the electrode structure is an adhesive surface for attaching the electrode structure (**100**) on the skin (**102**) of the person's chest.

25 Claims, 5 Drawing Sheets

AliveCor, Inc. Exhibit 1006
IPR2023-00950
Ex. 1006.1

Nissilä

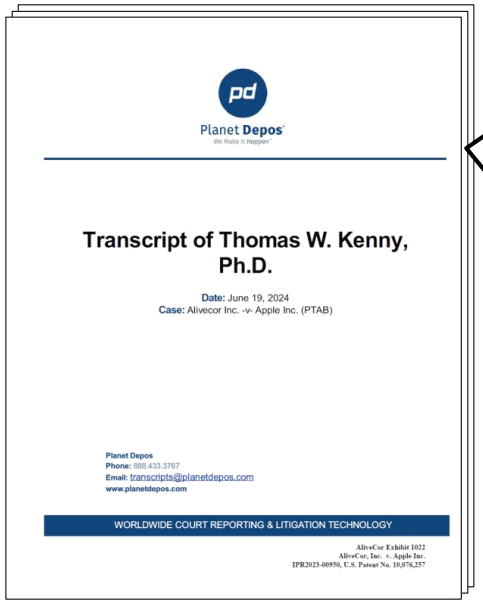
...cally conductive plastic or a similar conductive material." *Id.*, 5:32-38. FIG. ...ows the reference numeral 119 pointing to the top of the electrode 118, 122.

. . . .

Nissilä therefore describes that the "membrane 119" can contact the user's skin "on the inner surface 116." APPLE-2004, ¶126. FIGs. 4 and 5 of Nissilä show that the "inner surface 116" surrounds the electrodes 118, 122:

the band-like component **101**. The membrane **119** can thus come into contact with the person's skin surface **102** or on the inner surface **116** of the membrane **119** which is against the person's skin there can be an electrically conductive adhesive **127**. The adhesive **127** is preferably a conductive glue, such as conductive Solgel or a conductive silicone glue. If the electrode **118, 122** is narrower than the band-like component **101**, it is possible to use a non-conductive adhesive **127** on outer edges of the band **101**, on the inner surfaces thereof, outside the electrodes **118, 122**.

Ground 2 – Claim 1 – Apple's Arg. 2(a) - Reply



Kenny Tr.

Q. So I'd like to talk about the end of that sentence first where it says "a conductive adhesive 127." . . . Would a POSITA have known that a conductive adhesive can conduct electrical signals?

A. I think so.

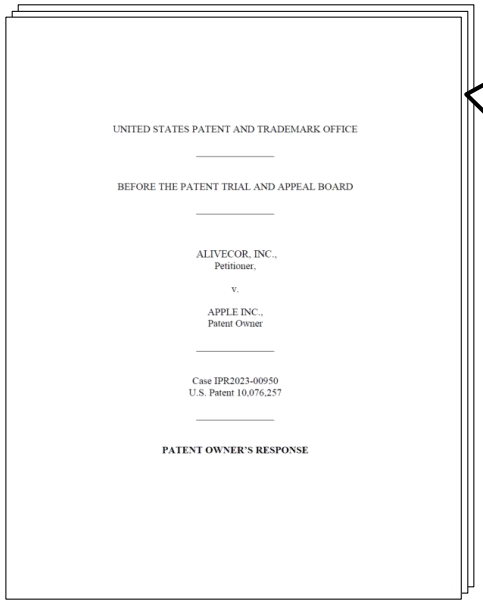
Q. Would a POSITA have known that a conductive adhesive could conduct electrical signals from a person's skin?

A. I think that's the understanding of Nissila, that the membrane -- the membrane 119 which includes the electrodes left and right, 118 and 122, receives electrical signals from the skin and that the adhesive can help play a role in that conduction.

Ex. 1022, 121:10-122:3 (Paper 25, 20)

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE – 141

Ground 2 – Claim 1 – Apple's Arg. 2(b)



UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ALIVECOR, INC.,
Petitioner,

v.

APPLE INC.,
Patent Owner

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

PATENT OWNER'S RESPONSE

Patent Owner's Response

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

Electrodes 118 and 122 visually distinct from surrounding portions of band 101

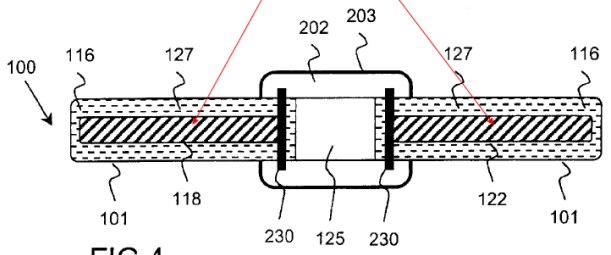
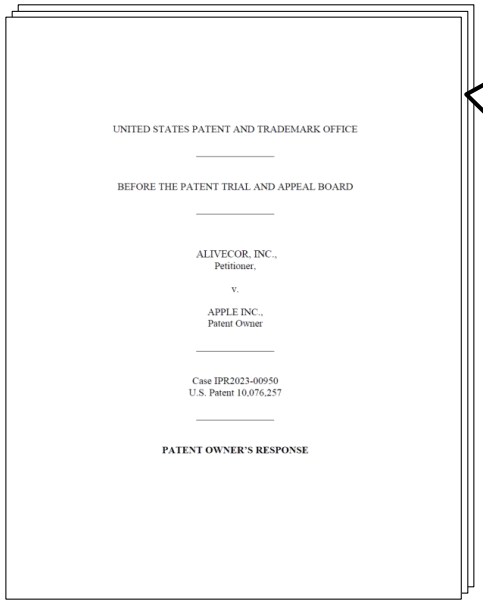


FIG.4

AliveCor Exhibit 1024
AliveCor, Inc. v. Apple Inc.
IPR2023-00950, U.S. Patent No. 10,076,257
142 of 249

Ground 2 – Claim 1 – Apple's Arg. 2(b) - Reply



UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ALIVECOR, INC.,
Petitioner,

v.

APPLE INC.,
Patent Owner

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

PATENT OWNER'S RESPONSE

Patent Owner's Response

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

Electrodes 118 and 122 visually distinct from surrounding portions of band 101

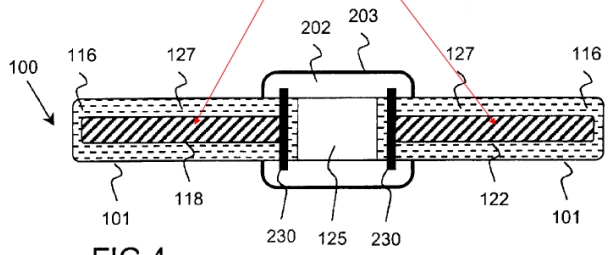


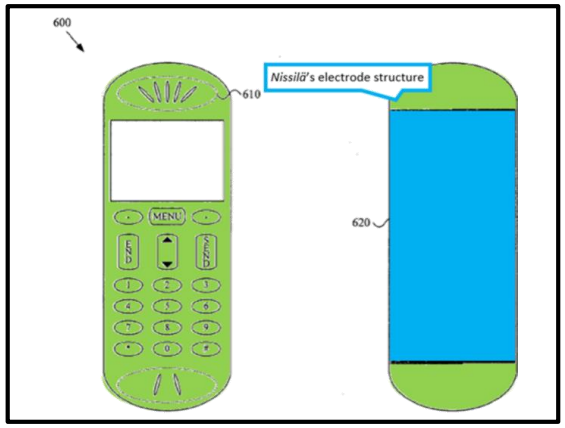
FIG.4

Numeral "119" is absent. *Nissilä*'s Figure 4 was not intended to illustrate membrane 119.

Ground 2 – Claim 1, [1.d.i]- [1.d.ii]

[Undisputed] ***[1.d.i] a second lead comprising a second pad that is embedded in a second portion of the enclosure,***

[Undisputed] ***[1.d.ii] wherein the second pad is configured to detect a second electrical signal of the user's cardiac signal via the user's skin's contact with at least one of the second pad and the second portion of the enclosure; and***



Markel

366. From this, a person of ordinary skill in the art would have been motivated to implement *Nissilä*'s electrode structure in at least the "main body portion 620" of *Markel*'s Figure 6. This construction would have accomplished *Markel*'s stated goal of an electrode that is "***substantially concealed (or hidden) from a user*** . . . with ***little or no visible indication*** of the electrode presence," such that "a user need not be aware of the presence of the electrode" (Ex-1005, [0040] (emphasis added)). This is illustrated in at least *Markel*'s Figure 6 (annotated below):

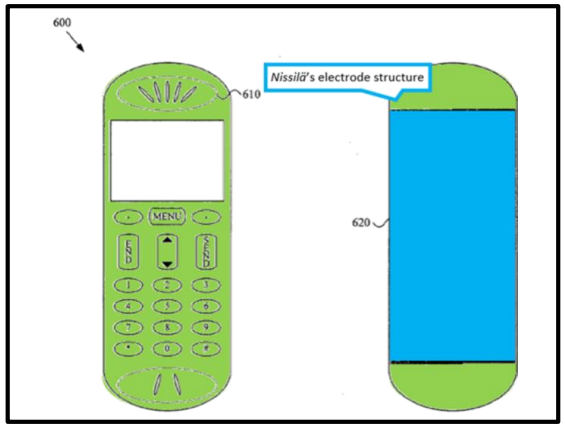
Berger Decl.

Ex. 1003, ¶ 366; Ex. 1005, Fig. 6 (annotated) (Paper 2, 75-76)

AliveCor Exhibit 1024
AliveCor, Inc. v. Apple Inc.
IPR2023-00950, U.S. Patent No. 10,076,257
144 of 249

Ground 2 – Claim 6

[6.a]: the exterior surface of the enclosure further comprises an exterior surface of the second portion;
[6.b]: the second pad is configured to detect the second electrical signal of the user's cardiac signal via the user's contact with the exterior surface of the second portion;



Markel

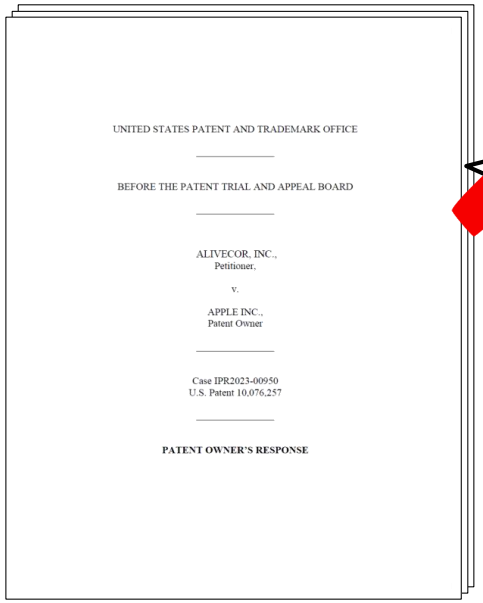
372. From this, a person of ordinary skill in the art would have been motivated to implement *Nissilä*'s electrode structure in at least the "main body portion 620" of *Markel*'s Figure 6. This construction would have accomplished *Markel*'s stated goal of an electrode that is "***substantially concealed (or hidden) from a user*** . . . with ***little or no visible indication*** of the electrode presence," such that "a user need not be aware of the presence of the electrode" (Ex-1005, [0040] (emphasis added)). This is illustrated in at least *Markel*'s Figure 6 (annotated below):

Berger Decl.

Ex. 1003, ¶ 372; Ex. 1005, Fig. 6 (annotated) (Paper 2, 79-80)

AliveCor Exhibit 1024
AliveCor, Inc. v. Apple Inc.
IPR2023-00950, U.S. Patent No. 10,076,257
145 of 249

Ground 2 – Claim 6 – Apple's Arg.



UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ALIVECOR, INC.,
Petitioner,

v.

APPLE INC.,
Patent Owner

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

PATENT OWNER'S RESPONSE

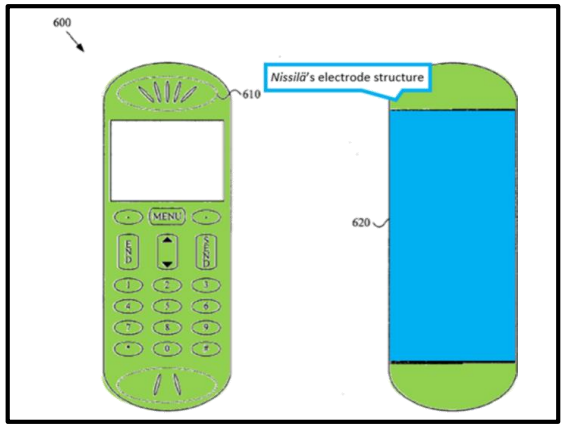
Patent Owner's Response

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

AliveCor Exhibit 1024
AliveCor, Inc. v. Apple Inc.
IPR2023-00950, U.S. Patent No. 10,076,257
146 of 249

Ground 2 – Claim 20

[20.a]: 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

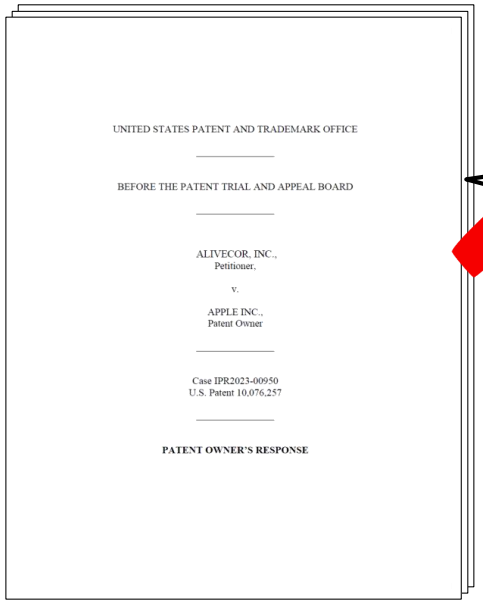
394. From this, a person of ordinary skill in the art would have been motivated to implement *Nissilä*'s electrode structure in at least the "main body portion 620" of *Markel*'s Figure 6. This construction would have accomplished *Markel*'s stated goal of an electrode that is "***substantially concealed (or hidden) from a user*** . . . with ***little or no visible indication*** of the electrode presence," such that "a user need not be aware of the presence of the electrode" (Ex-1005, [0040] (emphasis added)). This is illustrated in at least *Markel*'s Figure 6 (annotated below):

Berger Decl.

Ex. 1003, ¶ 394; Ex. 1005, Fig. 6 (annotated) (Paper 2, 84)

AliveCor Exhibit 1024
AliveCor, Inc. v. Apple Inc.
IPR2023-00950, U.S. Patent No. 10,076,257
147 of 249

Ground 2 – Claim 20 – Apple's Arg.



UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ALIVECOR, INC.,
Petitioner,

v.

APPLE INC.,
Patent Owner

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

PATENT OWNER'S RESPONSE

Patent Owner's Response

With respect to Ground 2, as discussed in Section VI.A.2, *supra*, Nissilä does not disclose a separate membrane positioned between the electrodes 118, 122 and the user's skin. Rather, Nissilä is express that "[b]ecause the inner

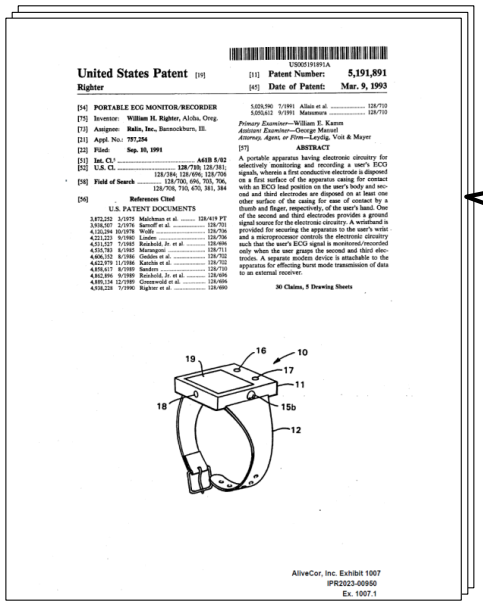
ROADMAP

1. Overview of the Challenged Patent
2. Claim Construction
3. Ground 1 - Markel
4. Ground 2 - Markel + Nissilä
5. Ground 3 - Markel + Righter
6. Apple's Motion to Amend

AliveCor Exhibit 1024
AliveCor, Inc. v. Apple Inc.
IPR2023-00950, U.S. Patent No. 10,076,257
149 of 249

Ground 3 – Overview

Claims 12-13 and 19 are unpatentable under pre-AIA 35 U.S.C. §103 over *Markel* in view of *Nissilä* and/or *Righter*.



United States Patent [19]
Righter

[11] Patent Number: 5,191,891
[45] Date of Patent: Mar. 9, 1993

[54] PORTABLE ECG MONITOR/RECORDER
[75] Inventor: William H. Righter, Aloha, Oreg.
[73] Assignee: Ralin, Inc., Bannockburn, Ill.
[21] Appl. No.: 757,254
[22] Filed: Sep. 10, 1991

[51] Int. Cl.[5] A61B 5/02
[52] U.S. Cl. 128/710; 128/381; 128/384; 128/696; 128/708
[58] Field of Search 128/700, 696, 703, 706, 128/708, 710, 670, 381, 384

[56] References Cited
U.S. PATENT DOCUMENTS

3,872,252	3/1975	Malchman et al.	128/419 PT
3,938,507	2/1976	Sarroff et al.	128/731
4,120,294	10/1978	Wolfe	128/736
4,221,223	9/1980	Linden	128/736
4,511,527	7/1985	Reinhold, Jr. et al.	128/696
4,535,783	8/1985	Marangoni	128/711
4,606,352	8/1986	Geddes et al.	128/732
4,622,979	11/1986	Katchis et al.	128/732
4,625,733	12/1986	Savit	128/696
4,802,491	8/1989	Reinhold, Jr. et al.	128/696
4,895,154	12/1989	Greenwold et al.	128/696
4,938,228	7/1990	Righter et al.	128/660
5,029,590	7/1991	Allain et al.	128/710
5,050,612	9/1991	Matsumura	128/710

Primary Examiner—William E. Kamm
Assistant Examiner—George Manuel
Attorney, Agent, or Firm—Leydig, Voit & Mayer

[57] ABSTRACT

A portable apparatus having electronic circuitry for selectively monitoring and recording a user's ECG signals, wherein a first conductive electrode is disposed on a first surface of the apparatus casing for contact with an ECG lead position on the user's body and second and third electrodes are disposed on at least one other surface of the casing for ease of contact by a thumb and finger, respectively, of the user's hand. One of the second and third electrodes provides a ground signal source for the electronic circuitry. A wristband is provided for securing the apparatus to the user's wrist and a microprocessor controls the electronic circuitry such that the user's ECG signal is monitored/recorded only when the user grasps the second and third electrodes. A separate modem device is attachable to the apparatus for effecting burst mode transmission of data to an external receiver.

30 Claims, 5 Drawing Sheets

AliveCor, Inc. Exhibit 1007
IPR2023-00950
Ex. 1007.1

Righter

United States Patent [19]
Righter

[11] Patent Number: 5,191,891
[45] Date of Patent: Mar. 9, 1993

[54] PORTABLE ECG MONITOR/RECORDER
[75] Inventor: William H. Righter, Aloha, Oreg.
[73] Assignee: Ralin, Inc., Bannockburn, Ill.
[21] Appl. No.: 757,254

5,029,590 7/1991 Allain et al. 128/710
5,050,612 9/1991 Matsumura 128/710

Primary Examiner—William E. Kamm
Assistant Examiner—George Manuel
Attorney, Agent, or Firm—Leydig, Voit & Mayer

Ex. 1007, Cover (annotated) (Paper 2, 6)

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE – 150

Ground 3 – Disputes

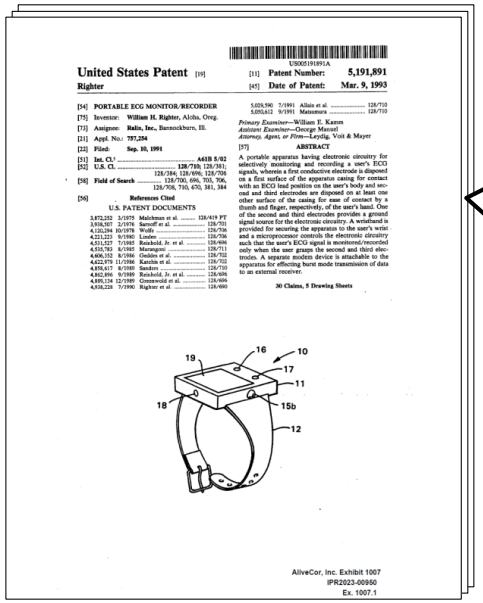
Claims for which Petitioners rely on disclosure from *Righter*	Dep. Cls. 12, 13, 19
Unpatentability based on *Righter's* disclosure is Disputed	Dep. Cls. 12, 13, 19
Unpatentability based on *Righter's* disclosure is Undisputed	

AliveCor Exhibit 1024
AliveCor, Inc. v. Apple Inc.
IPR2023-00950, U.S. Patent No. 10,076,257
151 of 249

Ground 3 – Motivation to Combine

[Undisputed]

Motivation to Combine



United States Patent [19]
Righter

[11] Patent Number: 5,191,891
[45] Date of Patent: Mar. 9, 1993

[54] PORTABLE ECG MONITOR/RECORDER

[75] Inventor: William H. Righter, Aloha, Oreg.

[73] Assignee: Ralin, Inc., Bannockburn, Ill.

[21] Appl. No.: 797,254

[22] Filed: Sep. 10, 1991

[51] Int. Cl.[5] A61B 5/02

[52] U.S. Cl. 128/710; 128/381; 128/384; 128/696; 128/708

[58] Field of Search 128/700, 696, 703, 706, 128/708, 710, 670, 381, 384

[56] References Cited
U.S. PATENT DOCUMENTS

[57] ABSTRACT

A portable apparatus having electronic circuitry for selectively monitoring and recording a user's ECG signals, wherein a first conductive electrode is disposed on a first surface of the apparatus casing for contact with an ECG lead position on the user's body and second and third electrodes are disposed on at least one other surface of the casing for ease of contact by a thumb and finger, respectively, of the user's hand. One of the second and third electrodes provides a ground signal source for the electronic circuitry. A wristband is provided for securing the apparatus to the user's wrist and a microprocessor controls the electronic circuitry such that the user's ECG signal is monitored/recorded only when the user grasps the second and third electrodes. A separate modem device is attachable to the apparatus for effecting burst mode transmission of data to an external receiver.

30 Claims, 5 Drawing Sheets

AliveCor, Inc. Exhibit 1007
IPR2023-00950
Ex. 1007.1

Righter

The present invention relates to an apparatus for monitoring and recording ECG data, and more particularly to a self-contained, portable ECG monitor/-recorder.

. . . .

In view of the foregoing, it is a primary object of the present invention to provide an apparatus that records medical-grade ECG data and yet is convenient and comfortable for a user to wear.

. . . .

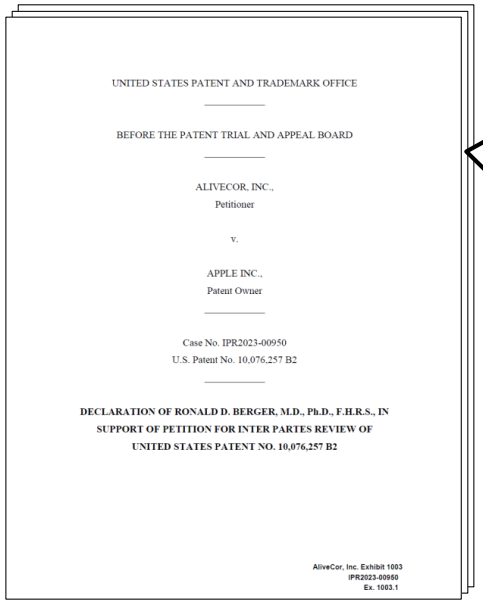
hung around the user's neck. As such, the first electrode **15***a* is disposed to facilitate electrical contact with an ECG lead position on the user's chest, and the other two electrodes **15***b*, **15***c* can still be easily grasped by the user at the on-set of a cardiac event.

Ex. 1007, 1:6-9, 1:65-68, 3:44-45 (annotated) (Paper 2, 85-86)

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE – 152

Ground 3 – Motivation to Combine

[Undisputed]



UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ALIVECOR, INC.,
Petitioner

v.

APPLE INC.,
Patent Owner

Case No. IPR2023-00950
U.S. Patent No. 10,076,257 B2

DECLARATION OF RONALD D. BERGER, M.D., Ph.D., F.H.R.S., IN SUPPORT OF PETITION FOR INTER PARTES REVIEW OF UNITED STATES PATENT NO. 10,076,257 B2

AliveCor, Inc. Exhibit 1003
IPR2023-00950
Ex. 1003.1

Berger Decl.

Motivation to Combine

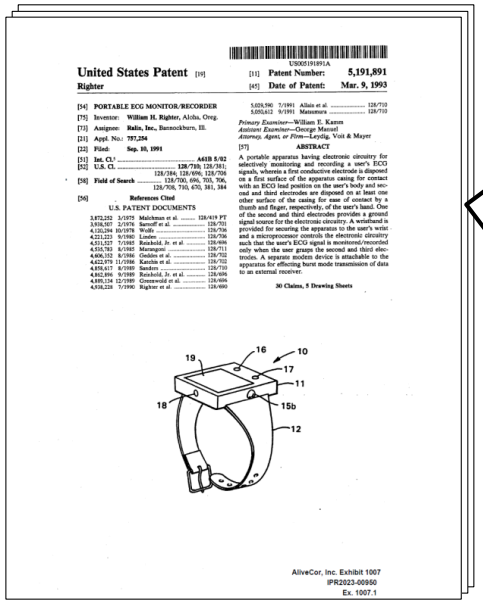
by the user at the on-set of a cardiac event" (Ex-1007, 3:44–45). Thus, a person of ordinary skill in the art would be motivated to implement the convenient placement of the electrodes on *Righter* on the electronic device of *Markel* so as to encourage user use and to further make it easier and more likely that a user will successfully use the device to provide ECG data.

401. A person of ordinary skill in the art would have reasonable expectation of success in combining the electrode placement in *Righter* with *Markel* and/or *Nissilä* because (1) *Markel* discloses that "electrodes may be ***incorporated into the [electronic device] in any of a variety of manners***" and "in any of a ***variety of locations***," (Ex-1005, [0035], [0045]), and (2) the watch in *Righter* "can be easily adapted" (Ex-1007, 3:32–37).

Ex. 1003, ¶ 400-401 (annotated) (Paper 2, 86)

Ground 3 – Claims 12, 13, 19

[12.a]: wherein the first portion of the enclosure is a bezel.



United States Patent [19]
Righter

[11] Patent Number: 5,191,891
[45] Date of Patent: Mar. 9, 1993

[54] PORTABLE ECG MONITOR/RECORDER
[75] Inventor: William H. Righter, Aloha, Oreg.
[73] Assignee: Ralin, Inc., Bannockburn, Ill.
[21] Appl. No.: 797,254
[22] Filed: Sep. 30, 1991

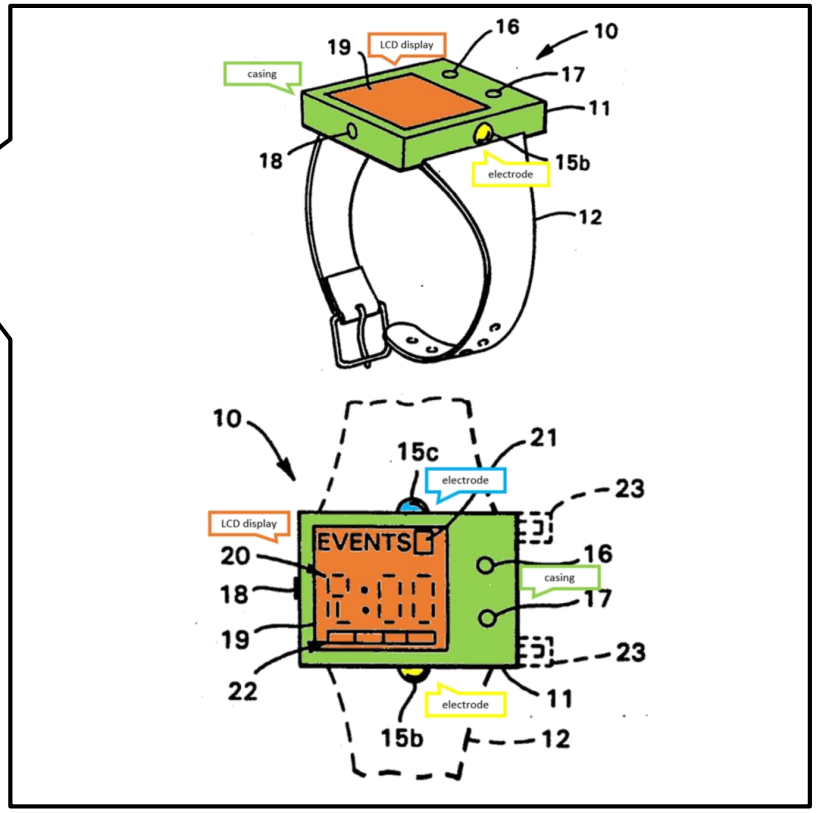
ABSTRACT

[57] A portable apparatus having electronic circuitry for selectively monitoring and recording a user's ECG signals, wherein a first conductive electrode is disposed on a first surface of the apparatus casing for contact with an ECG lead position on the user's body and second and third electrodes are disposed on at least one other surface of the casing for ease of contact by a thumb and finger, respectively, of the user's hand. One of the second and third electrodes provides a ground signal source for the electronic circuitry. A wristband is provided for securing the apparatus to the user's wrist and a microprocessor controls the electronic circuitry such that the user's ECG signal is monitored/recorded only when the user grasps the second and third electrodes. A separate modem device is attachable to the apparatus for effecting burst mode transmission of data to an external receiver.

30 Claims, 5 Drawing Sheets

AliveCor, Inc. Exhibit 1007
IPR2023-00950
Ex. 1007.1

Righter

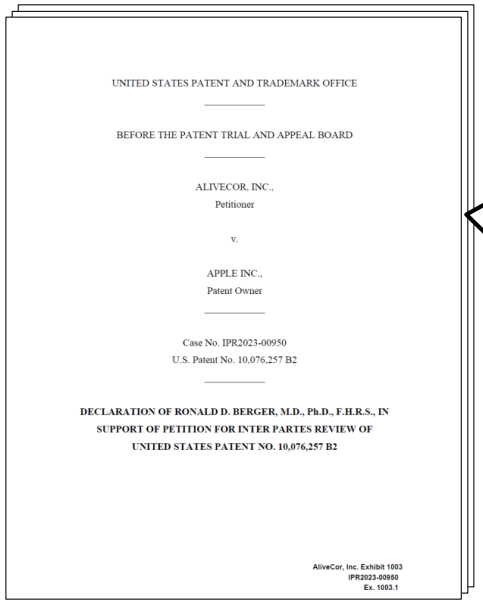


Ex. 1007, Figs. 1A, 1B (annotated) (Paper 2, 88)

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE – 154

Ground 3 – Claims 12, 13, 19

[12.a]: wherein the first portion of the enclosure is a bezel.



UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ALIVECOR, INC.,
Petitioner

v.

APPLE INC.,
Patent Owner

Case No. IPR2023-00950
U.S. Patent No. 10,076,257 B2

DECLARATION OF RONALD D. BERGER, M.D., Ph.D., F.H.R.S., IN SUPPORT OF PETITION FOR INTER PARTES REVIEW OF UNITED STATES PATENT NO. 10,076,257 B2

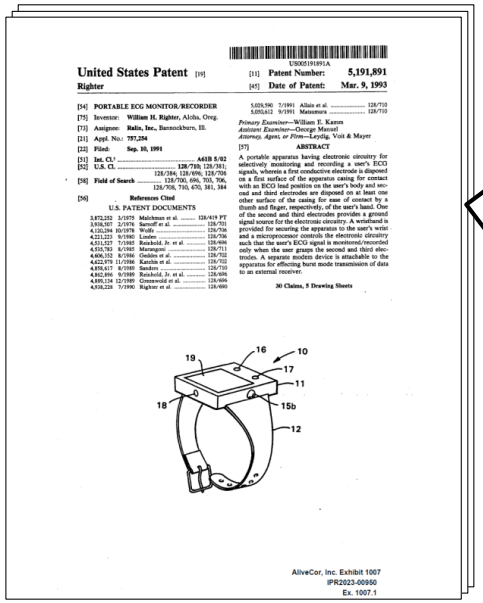
AliveCor, Inc. Exhibit 1003
IPR2023-00950
Ex. 1003.1

Berger Decl.

405. Second, *Righter* renders obvious that the first portion of the enclosure is a bezel. As explained earlier in Ground 1 with respect to claim element [12.a] (the discussion of which is incorporated herein), in the context of the '257 patent and the claim language, a person of ordinary skill in the art would have understood the plain and ordinary meaning of "bezel" to include a rim that encircles an electronic device. I again apply this plain and ordinary meaning of "bezel" in my analysis below. *Righter* discloses that "[a]n LCD display 19 is also provided on the top surface of the casing" (Ex-1007, 3:25–26). Because the "side surfaces of the casing 11" encircle the top surface of the casing, including an LCD display, the "side surfaces" are a bezel. Thus, *Righter* renders obvious an electrode pad embedded in a "side surface[] of the casing 11" (i.e., the first portion of the enclosure) which is a bezel.

Ground 3 – Claims 12, 13, 19

[13.a]: wherein the second portion of the enclosure is a bezel.



United States Patent [19]
Righter

[11] Patent Number: 5,191,891
[45] Date of Patent: Mar. 9, 1993

[54] PORTABLE ECG MONITOR/RECORDER
[75] Inventor: William H. Righter, Aloha, Oreg.
[73] Assignee: Ralin, Inc., Bannockburn, Ill.
[21] Appl. No.: 797,254
[22] Filed: Sep. 10, 1991

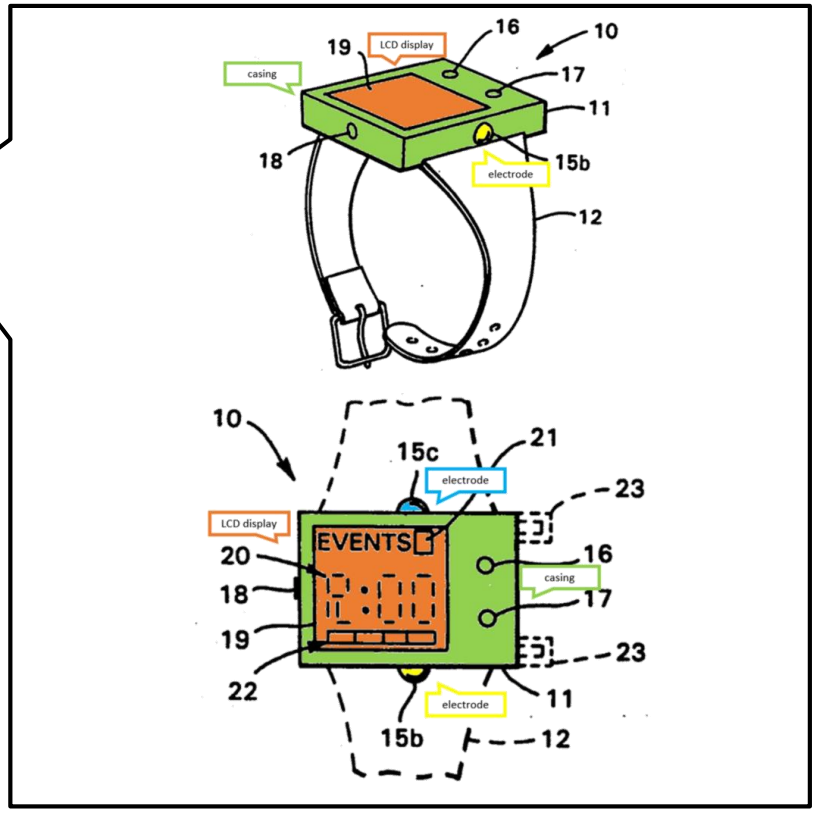
ABSTRACT

[57] A portable apparatus having electronic circuitry for selectively monitoring and recording a user's ECG signals, wherein a first conductive electrode is disposed on a first surface of the apparatus casing for contact with an ECG lead position on the user's body and second and third electrodes are disposed on at least one other surface of the casing for ease of contact by a thumb and finger, respectively, of the user's hand. One of the second and third electrodes provides a ground signal source for the electronic circuitry. A wristband is provided for securing the apparatus to the user's wrist and a microprocessor controls the electronic circuitry such that the user's ECG signal is monitored/recorded only when the user grasps the second and third electrodes. A separate modem device is attachable to the apparatus for effecting burst mode transmission of data to an external receiver.

30 Claims, 5 Drawing Sheets

AliveCor, Inc. Exhibit 1007
IPR2023-00950
Ex. 1007.1

Righter

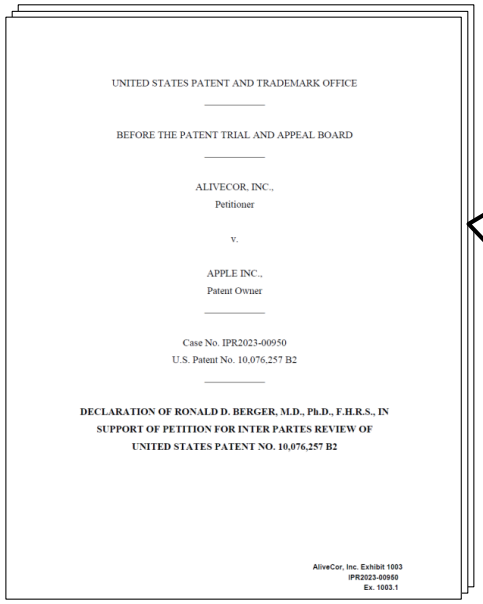


Ex. 1007, Figs. 1A, 1B (annotated) (Paper 2, 90)

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE – 156

Ground 3 – Claims 12, 13, 19

[13.a]: wherein the second portion of the enclosure is a bezel.



UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ALIVECOR, INC.,
Petitioner

v.

APPLE INC.,
Patent Owner

Case No. IPR2023-00950
U.S. Patent No. 10,076,257 B2

DECLARATION OF RONALD D. BERGER, M.D., Ph.D., F.H.R.S., IN SUPPORT OF PETITION FOR INTER PARTES REVIEW OF UNITED STATES PATENT NO. 10,076,257 B2

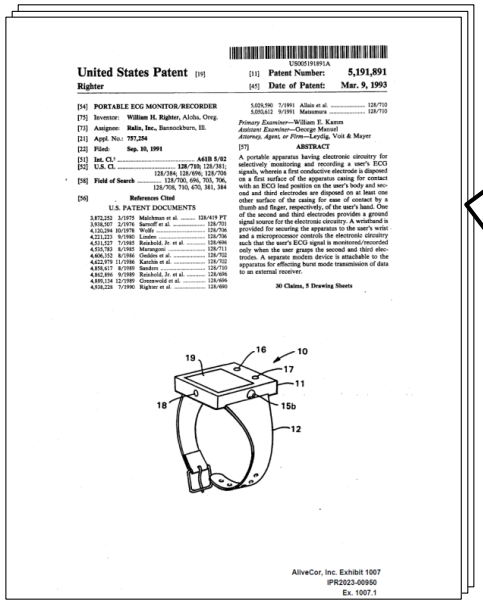
AliveCor, Inc. Exhibit 1003
IPR2023-00950
Ex. 1003.1

Berger Decl.

410. Second, *Righter* renders obvious that the second portion of the enclosure is a bezel. As explained earlier in Ground 1 with respect to claim element [12.a] (the discussion of which is incorporated herein), in the context of the '257 patent and the claim language, a person of ordinary skill in the art would have understood the plain and ordinary meaning of "bezel" to include a rim that encircles an electronic device. I again apply this plain and ordinary meaning of "bezel" in my analysis below. *Righter* discloses that "[a]n LCD display 19 is also provided on the top surface of the casing " (Ex-1007, 3:25–26). Because the "side surfaces of the casing 11" encircle the top surface of the casing, including an LCD display, the "side surfaces" are a bezel. Thus, *Righter* renders obvious an electrode pad embedded in a "side surface[] of the casing 11" (i.e., the second portion of the enclosure) which is a bezel. This is illustrated in at least *Righter*'s Figures 1A and 1B below:

Ground 3 – Claims 12, 13, 19

[19.a]: the first portion of the electronic device comprises a bezel of the enclosure;



United States Patent [19]
Righter

[11] Patent Number: 5,191,891
[45] Date of Patent: Mar. 9, 1993

[54] PORTABLE ECG MONITOR/RECORDER
[75] Inventor: William H. Righter, Aloha, Oreg.
[73] Assignee: Ralin, Inc., Bannockburn, Ill.
[21] Appl. No.: 797,254
[22] Filed: Sep. 30, 1991

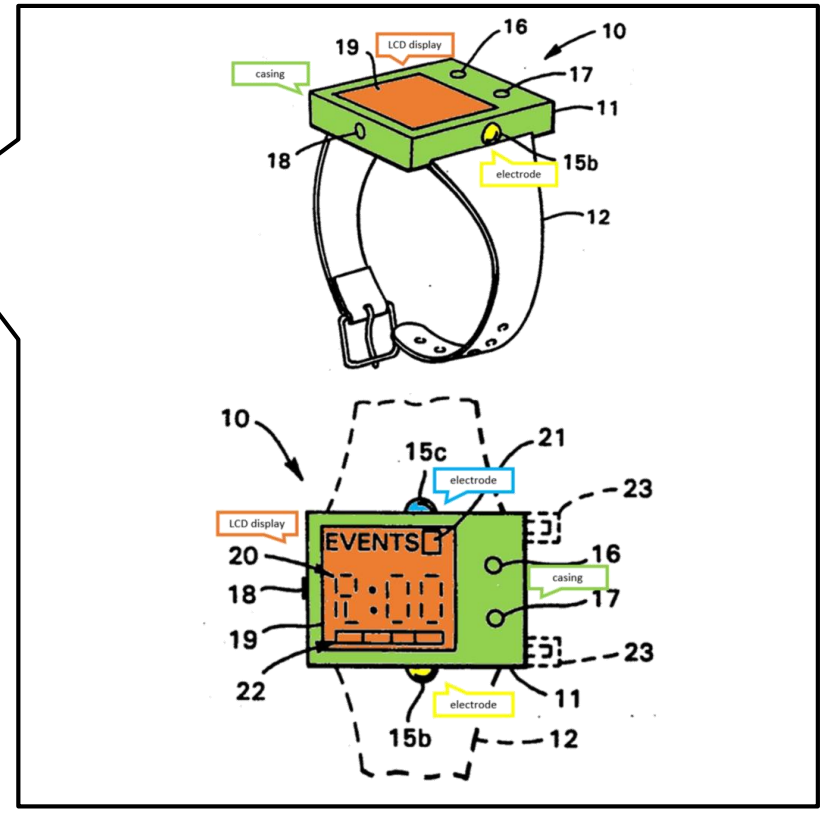
ABSTRACT

[57] A portable apparatus having electronic circuitry for selectively monitoring and recording a user's ECG signals, wherein a first conductive electrode is disposed on a first surface of the apparatus casing for contact with an ECG lead position on the user's body and second and third electrodes are disposed on at least one other surface of the casing for ease of contact by a thumb and finger, respectively, of the user's hand. One of the second and third electrodes provides a ground signal source for the electronic circuitry. A wristband is provided for securing the apparatus to the user's wrist and a microprocessor controls the electronic circuitry such that the user's ECG signal is monitored/recorded only when the user grasps the second and third electrodes. A separate modem device is attachable to the apparatus for effecting burst mode transmission of data to an external receiver.

30 Claims, 5 Drawing Sheets

AliveCor, Inc. Exhibit 1007
IPR2023-00950
Ex. 1007.1

Righter

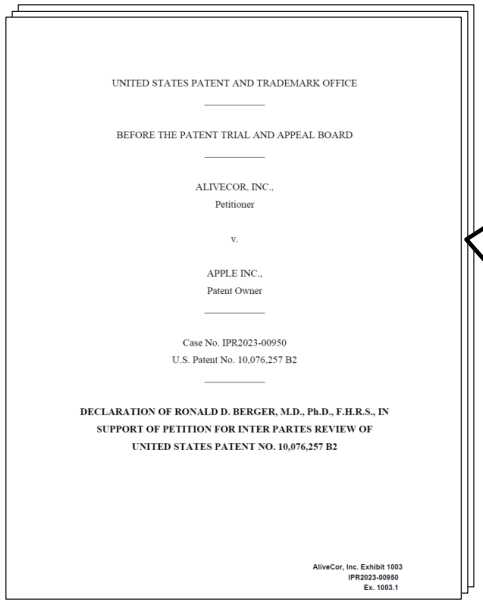


Ex. 1007, Figs. 1A, 1B (annotated) (Paper 2, 91)

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE – 158

Ground 3 – Claims 12, 13, 19

[19.a]: the first portion of the electronic device comprises a bezel of the enclosure;



UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ALIVECOR, INC.,
Petitioner

v.

APPLE INC.,
Patent Owner

Case No. IPR2023-00950
U.S. Patent No. 10,076,257 B2

DECLARATION OF RONALD D. BERGER, M.D., Ph.D., F.H.R.S., IN SUPPORT OF PETITION FOR INTER PARTES REVIEW OF UNITED STATES PATENT NO. 10,076,257 B2

AliveCor, Inc. Exhibit 1003
IPR2023-00950
Ex. 1003.1

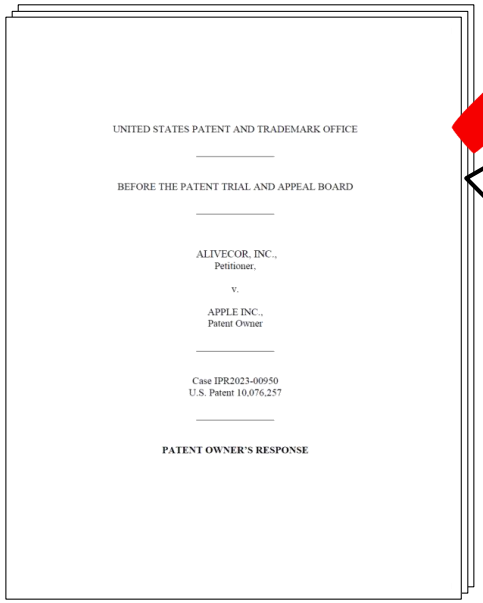
Berger Decl.

415. Second, *Righter* renders obvious that the first portion of the device comprises a bezel of the enclosure. As explained earlier in Ground 1 with respect to claim element [12.a] (the discussion of which is incorporated herein), in the context of the '257 patent and the claim language, a person of ordinary skill in the art would have understood the plain and ordinary meaning of "bezel" to include a rim that encircles an electronic device. I again apply this plain and ordinary meaning of "bezel" in my analysis below. *Righter* discloses that "[a]n LCD display 19 is also provided on the top surface of the casing " (Ex-1007, 3:25–26). Because the "side surfaces of the casing 11" encircle the top surface of the casing, including an LCD display, the "side surfaces" are a bezel. Thus, *Righter* renders obvious an electrode embedded in a "side surface[] of the casing 11" (i.e., the first portion of the enclosure) which is a bezel. This is illustrated in at least *Righter*'s Figures 1A and 1B below:

Ex. 1003, ¶ 405 (annotated) (Paper 2, 91)

AliveCor Exhibit 1024
AliveCor, Inc. v. Apple Inc.
IPR2023-00950, U.S. Patent No. 10,076,257
159 of 249

Ground 3 – Cls. 12, 13, 19 – Apple's Arg. 1



UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ALIVECOR, INC.,
Petitioner,

v.

APPLE INC.,
Patent Owner

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

PATENT OWNER'S RESPONSE

Patent Owner's Response

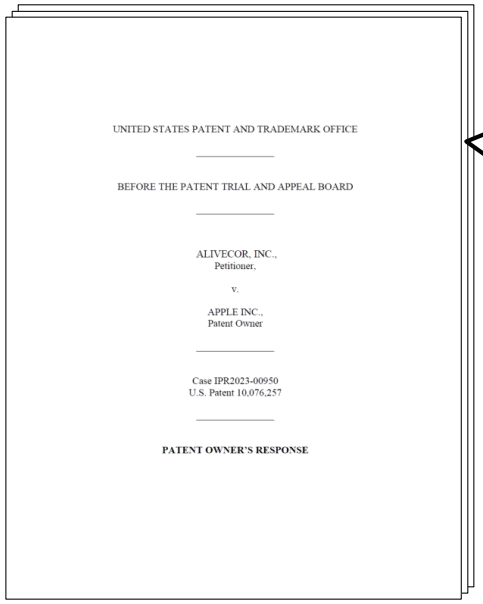
With respect to Ground 3, as discussed in Section IV, *supra*, the term "bezel" means "A rim that secures a transparent covering for an indicating device such as a meter, oscilloscope, or watch." APPLE-2008; APPLE-2004, ¶¶38, 161. Ground 3 fails with respect to claims 12, 13, and 19 because Righter fails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

. . . .

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

AliveCor Exhibit 1024
AliveCor, Inc. v. Apple Inc.
IPR2023-00950, U.S. Patent No. 10,076,257
160 of 249

Ground 3 – Cls. 12, 13, 19 – Apple's Arg. 2



UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ALIVECOR, INC.,
Petitioner,

v.

APPLE INC.,
Patent Owner

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

PATENT OWNER'S RESPONSE

Patent Owner's Response

Even under AliveCor's improperly broad construction for the term "bezel" ("a rim that encircles an electronic device" (Pet., 87)), Righter fails to disclose that the electrodes are embedded in a bezel. Specifically, the sides and top face of Righter's watch appear to be made from one piece and not from a front face supported by a "rim" defined by the sides. APPLE-2004, ¶164. AliveCor has made no effort to identify that Righter discloses such a configuration in which the sides form a "rim" that supports the front of the watch and therefore Ground 3 fails even under AliveCor's improper construction.

AliveCor Exhibit 1024
AliveCor, Inc. v. Apple Inc.
IPR2023-00950, U.S. Patent No. 10,076,257
161 of 249

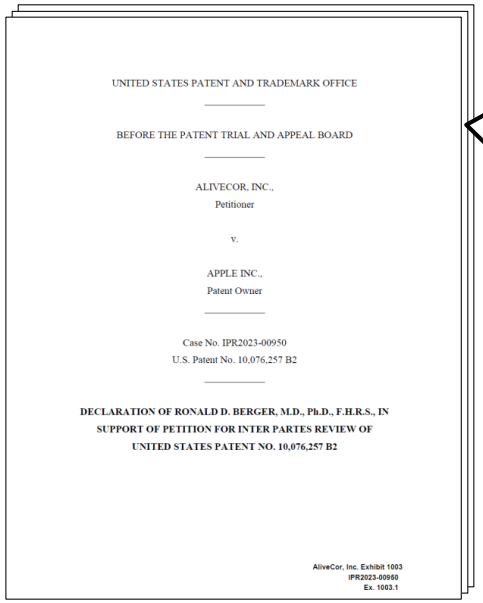
Ground 3 – Cls. 12, 13, 19 – Apple's Arg. 2

[12.a]: wherein the first portion of the enclosure is a bezel.

AliveCor's Construction
"plain and ordinary meaning" "A POSITA would have understood the plain and ordinary meaning of 'bezel' to include a rim that encircles an electronic device"

AliveCor Exhibit 1024
AliveCor, Inc. v. Apple Inc.
IPR2023-00950, U.S. Patent No. 10,076,257
162 of 249

Ground 3 – Cls. 12, 13, 19 – Apple's Arg. 2 - Reply



UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ALIVECOR, INC.,
Petitioner

v.

APPLE INC.,
Patent Owner

Case No. IPR2023-00950
U.S. Patent No. 10,076,257 B2

DECLARATION OF RONALD D. BERGER, M.D., Ph.D., F.H.R.S., IN SUPPORT OF PETITION FOR INTER PARTES REVIEW OF UNITED STATES PATENT NO. 10,076,257 B2

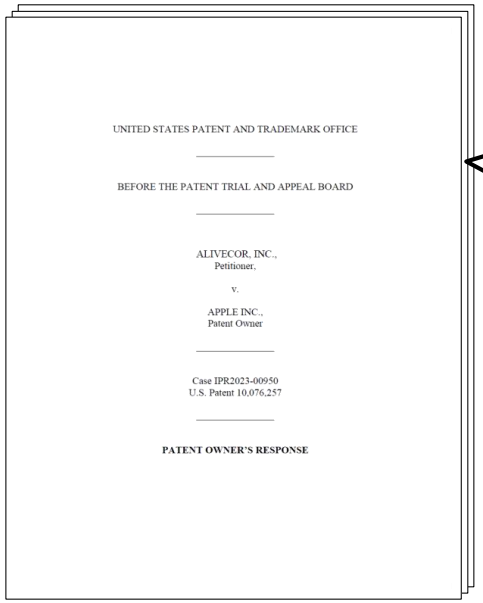
AliveCor, Inc. Exhibit 1003
IPR2023-00950
Ex. 1003.1

Berger Decl.

405. Second, *Righter* renders obvious that the first portion of the enclosure is a bezel. As explained earlier in Ground 1 with respect to claim element [12.a] (the discussion of which is incorporated herein), in the context of the '257 patent and the claim language, a person of ordinary skill in the art would have understood the plain and ordinary meaning of "bezel" to include a rim that encircles an electronic device. I again apply this plain and ordinary meaning of "bezel" in my analysis below. *Righter* discloses that "[a]n LCD display 19 is also provided on the top surface of the casing" (Ex-1007, 3:25–26). Because the "side surfaces of the casing 11" encircle the top surface of the casing, including an LCD display, the "side surfaces" are a bezel. Thus, *Righter* renders obvious an electrode pad embedded in a "side surface[] of the casing 11" (i.e., the first portion of the enclosure) which is a bezel.

Ex. 1003, ¶ 405 (annotated) (Paper 2, 87-88; Paper 25, 29)

Ground 3 – Cls. 12, 13, 19 – Apple's Arg. 3



UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ALIVECOR, INC.,
Petitioner,

v.

APPLE INC.,
Patent Owner

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

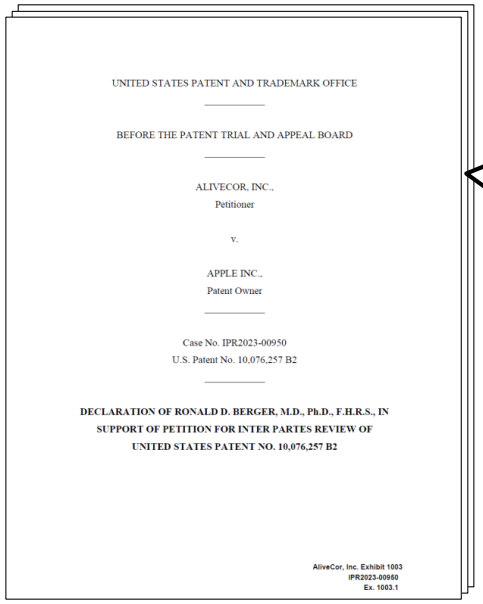
PATENT OWNER'S RESPONSE

Patent Owner's Response

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

AliveCor Exhibit 1024
AliveCor, Inc. v. Apple Inc.
IPR2023-00950, U.S. Patent No. 10,076,257
164 of 249

Ground 3 – Cls. 12, 13, 19 – Apple's Arg. 3 – Reply



UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ALIVECOR, INC.,
Petitioner

v.

APPLE INC.,
Patent Owner

Case No. IPR2023-00950
U.S. Patent No. 10,076,257 B2

DECLARATION OF RONALD D. BERGER, M.D., Ph.D., F.H.R.S., IN SUPPORT OF PETITION FOR INTER PARTES REVIEW OF UNITED STATES PATENT NO. 10,076,257 B2

AliveCor, Inc. Exhibit 1003
IPR2023-00950
Ex. 1003.1

Berger Decl.

333. Based on this disclosure, a person of ordinary skill in the art would have also known that an "insulating region" should electrically isolate the "bezel" from the "display 140." As explained in Section VI.B (the discussion of which is incorporated herein), a person of ordinary skill in the art would have known that an ECG is a measure of the electrical activity of the heart based on an electrical potential difference. A person of ordinary skill in the art would also have known that in order to measure the potential difference, *Markel*'s electrodes should be electrically isolated as taught in *Markel*'s Figure 4.

Ex. 1003, ¶ 333 (annotated) (Paper 25, 29-30)

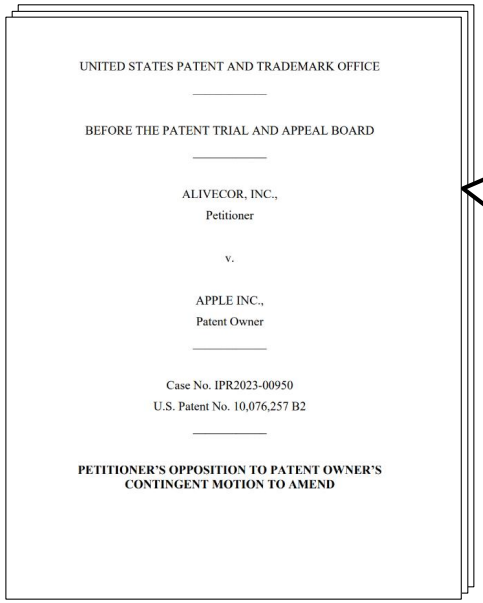
AliveCor Exhibit 1024
AliveCor, Inc. v. Apple Inc.
IPR2023-00950, U.S. Patent No. 10,076,257
165 of 249

ROADMAP

1. Overview of the Challenged Patent
2. Claim Construction
3. Ground 1 - Markel
4. Ground 2 - Markel + Nissilä
5. Ground 3 - Markel + Righter
6. Apple's Motion to Amend

AliveCor Exhibit 1024
AliveCor, Inc. v. Apple Inc.
IPR2023-00950, U.S. Patent No. 10,076,257
166 of 249

Apple's Motion to Amend



UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ALIVECOR, INC.,
Petitioner

v.

APPLE INC.,
Patent Owner

Case No. IPR2023-00950
U.S. Patent No. 10,076,257 B2

PETITIONER'S OPPOSITION TO PATENT OWNER'S CONTINGENT MOTION TO AMEND

Opp. to Motion to Amend

Statutory and Regulatory Requirements

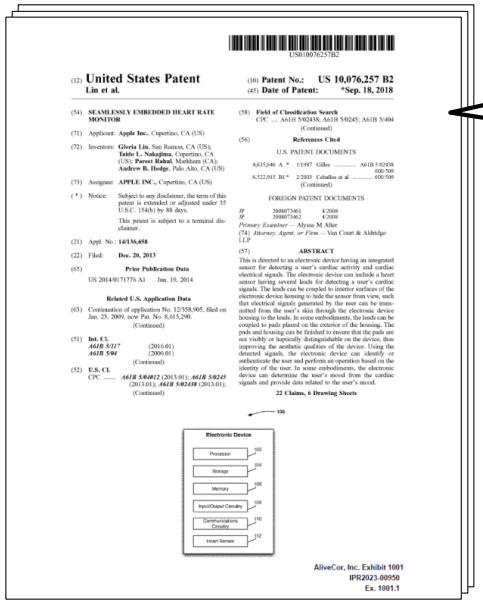
- Unreasonable Number of Substitute Claims
- Enlargement (claim 26)
- New Matter (claims 23, 26-27)

Patentability

- Indefiniteness (claim 24)
- Obviousness (claims 23-27)

AliveCor Exhibit 1024
AliveCor, Inc. v. Apple Inc.
IPR2023-00950, U.S. Patent No. 10,076,257
167 of 249

Apple Failed Its Burden - Number of Substitute Claims



(12) **United States Patent**
Lin et al.

(10) **Patent No.: US 10,076,257 B2**
(45) **Date of Patent: *Sep. 18, 2018**

(54) **SEAMLESSLY EMBEDDED HEART RATE MONITOR**

(71) Applicant: **Apple Inc.**, Cupertino, CA (US)

(72) Inventors: **Gloria Lin**, San Ramon, CA (US); **Taido L. Nakajima**, Cupertino, CA (US); **Parsa Rahal**, Markham (CA); **Andrew B. Hodge**, Palo Alto, CA (US)

(73) Assignee: **APPLE INC.**, Cupertino, CA (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 88 days.

This patent is subject to a terminal disclaimer.

(21) Appl. No.: **14/136,658**

(22) Filed: **Dec. 20, 2013**

(65) **Prior Publication Data**

US 2014/0171775 A1 Jun. 10, 2014

Related U.S. Application Data

(63) Continuation of application No. 12/358,905, filed on Jan. 25, 2009, now Pat. No. 8,615,290.
(Continued)

(51) **Int. Cl.**
A61B 5/117 (2016.01)
A61B 5/04 (2006.01)
(Continued)

(52) **U.S. Cl.**
CPC ***A61B 5/04012*** (2013.01); ***A61B 5/0245*** (2013.01); ***A61B 5/02438*** (2013.01);
(Continued)

(58) **Field of Classification Search**
CPC ... A61B 5/02438; A61B 5/0245; A61B 5/404
(Continued)

(56) **References Cited**

U.S. PATENT DOCUMENTS

4,635,646 A * 1/1987 Gilles A61B 5/02438 600/509
6,522,915 B1 * 2/2003 Caballos et al. 600/509
(Continued)

FOREIGN PATENT DOCUMENTS

JP 2008073461 4/2008
JP 2008073462 4/2008

Primary Examiner — Alyssa M Alter
(74) *Attorney, Agent, or Firm* — Van Court & Aldridge LLP

(57) **ABSTRACT**

This is directed to an electronic device having an integrated sensor for detecting a user's cardiac activity and cardiac electrical signals. The electronic device can include a heart sensor having several leads for detecting a user's cardiac signals. The leads can be coupled to interior surfaces of the electronic device housing to hide the sensor from view, such that electrical signals generated by the user can be transmitted from the user's skin through the electronic device housing to the leads. In some embodiments, the leads can be coupled to pads placed on the exterior of the housing. The pads and housing can be finished to ensure that the pads are not visibly or haptically distinguishable on the device, thus improving the aesthetic qualities of the device. Using the detected signals, the electronic device can identify or authenticate the user and perform an operation based on the identity of the user. In some embodiments, the electronic device can determine the user's mood from the cardiac signals and provide data related to the user's mood.

22 Claims, 6 Drawing Sheets

AliveCor, Inc. Exhibit 1001
IPR2023-00950
Ex. 1001.1

’257 Patent

12. The electronic device of claim **1**, wherein the first portion of the enclosure is a bezel.

13. The electronic device of claim **1**, wherein the second portion of the enclosure is a bezel.

Ex. 1001, cls. 12, 13

X

25. (Substitute for claim 12, if found unpatentable)

The electronic device of claim 1, **further comprising a touch screen display,** wherein the first portion of the enclosure is a bezel**;** . . .

26. (Substitute for claim 13 if found unpatentable)

The electronic device of claim 1, wherein the ~~second~~ first portion of the enclosure is a bezel**, the electronic device further comprising:** . . .

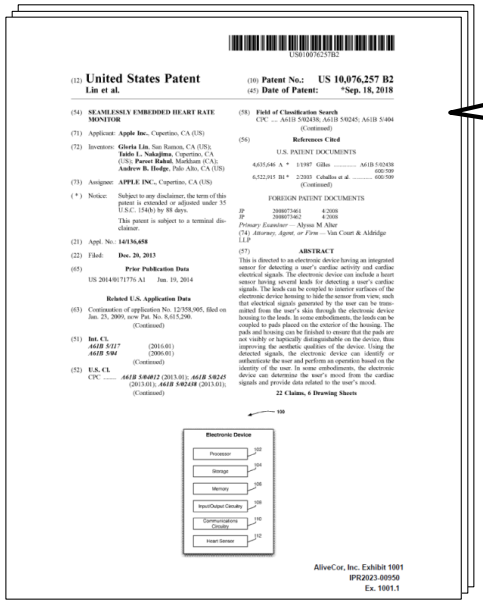
Paper 29, Claims Appendix

AliveCor Exhibit 1024
AliveCor, Inc. v. Apple Inc.
IPR2023-00950, U.S. Patent No. 10,076,257
168 of 249

Apple Failed Its Burden - Number of Substitute Claims

"Apple has effectively proposed more than one substitute claim for original claim 12 without demonstrating any need to do so."

Paper 32, 1-2



(12) **United States Patent**
Lin et al.

(10) **Patent No.: US 10,076,257 B2**
(45) **Date of Patent: *Sep. 18, 2018**

(54) **SEAMLESSLY EMBEDDED HEART RATE MONITOR**

(71) Applicant: **Apple Inc.**, Cupertino, CA (US)

(72) Inventors: **Gloria Lin**, San Ramon, CA (US); **Taido L. Nakajima**, Cupertino, CA (US); **Parsel Rahul**, Markham (CA); **Andrew B. Hodge**, Palo Alto, CA (US)

(73) Assignee: **APPLE INC.**, Cupertino, CA (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 88 days.

This patent is subject to a terminal disclaimer.

(21) Appl. No.: **14/136,658**

(22) Filed: **Dec. 20, 2013**

(65) **Prior Publication Data**

US 2014/0171775 A1 Jun. 10, 2014

Related U.S. Application Data

(63) Continuation of application No. 12/358,905, filed on Jan. 25, 2009, now Pat. No. 8,615,290.
(Continued)

(51) **Int. Cl.**
A61B 5/117 (2016.01)
A61B 5/04 (2006.01)
(Continued)

(52) **U.S. Cl.**
CPC ***A61B 5/04012*** (2013.01); ***A61B 5/0245*** (2013.01); ***A61B 5/02438*** (2013.01);
(Continued)

(58) **Field of Classification Search**
CPC ... A61B 5/02438; A61B 5/0245; A61B 5/404
(Continued)

(56) **References Cited**

U.S. PATENT DOCUMENTS

4,635,646 A * 1/1987 Gilles A61B 5/02438 600/509
6,522,915 B1 * 2/2003 Caballos et al. 600/509
(Continued)

FOREIGN PATENT DOCUMENTS

JP 2008073461 4/2008
JP 2008073462 4/2008

Primary Examiner — Alyssa M Alter
(74) *Attorney, Agent, or Firm* — Van Court & Aldridge LLP

(57) **ABSTRACT**

This is directed to an electronic device having an integrated sensor for detecting a user's cardiac activity and cardiac electrical signals. The electronic device can include a heart sensor having several leads for detecting a user's cardiac signals. The leads can be coupled to interior surfaces of the electronic device housing to hide the sensor from view, such that electrical signals generated by the user can be transmitted from the user's skin through the electronic device housing to the leads. In some embodiments, the leads can be coupled to pads placed on the exterior of the housing. The pads and housing can be finished to ensure that the pads are not visibly or haptically distinguishable on the device, thus improving the aesthetic qualities of the device. Using the detected signals, the electronic device can identify or authenticate the user and perform an operation based on the identity of the user. In some embodiments, the electronic device can determine the user's mood from the cardiac signals and provide data related to the user's mood.

22 Claims, 6 Drawing Sheets

AliveCor, Inc. Exhibit 1001
IPR2023-00950
Ex. 1001.1

'257 Patent

12. The electronic device of claim **1**, wherein the first portion of the enclosure is a bezel.

~~13~~. The electronic device of claim **1**, wherein the second portion of the enclosure is a bezel.

Ex. 1001, cls. 12, 13

25. (Substitute for claim 12, if found unpatentable)

The electronic device of claim 1, **further comprising a touch screen display,** wherein the first portion of the enclosure is a bezel**;** . . .

26. (Substitute for claim 13 if found unpatentable)

The electronic device of claim 1, wherein the ~~second~~ first portion of the enclosure is a bezel**, the electronic device further comprising:** . . .

Paper 29, Claims Appendix

AliveCor Exhibit 1024
AliveCor, Inc. v. Apple Inc.
IPR2023-00950, U.S. Patent No. 10,076,257
169 of 249

Apple Failed Its Burden - Number of Substitute Claims

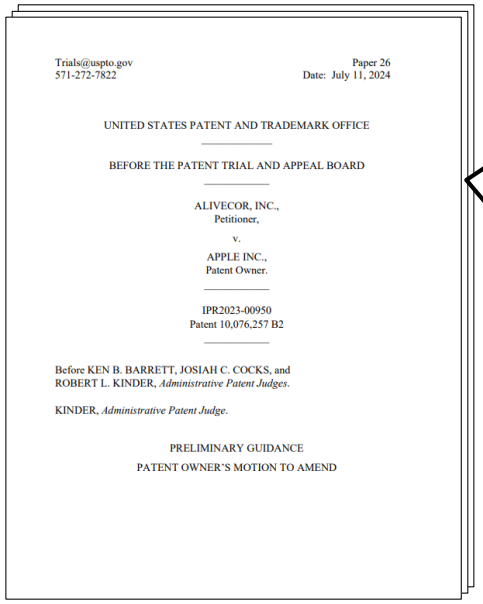
Lectrosonics, Inc. v. Zaxom, Inc.

"[T]o the extent a patent owner seeks to propose more than one substitute claim for each cancelled claim, the patent owner should explain in the motion the need for the additional claims and why the number of proposed substitute claims is reasonable."

IPR2018-01129, Paper 15 at 4-5 (PTAB Feb. 29, 2019)

AliveCor Exhibit 1024
AliveCor, Inc. v. Apple Inc.
IPR2023-00950, U.S. Patent No. 10,076,257
170 of 249

Apple Failed Its Burden - Number of Substitute Claims



Trials@uspto.gov
571-272-7822

Paper 26
Date: July 11, 2024

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ALIVECOR, INC.,
Petitioner,

v.

APPLE INC.,
Patent Owner.

IPR2023-00950
Patent 10,076,257 B2

Before KEN B. BARRETT, JOSIAH C. COCKS, and ROBERT L. KINDER, *Administrative Patent Judges*.

KINDER, *Administrative Patent Judge*.

PRELIMINARY GUIDANCE
PATENT OWNER'S MOTION TO AMEND

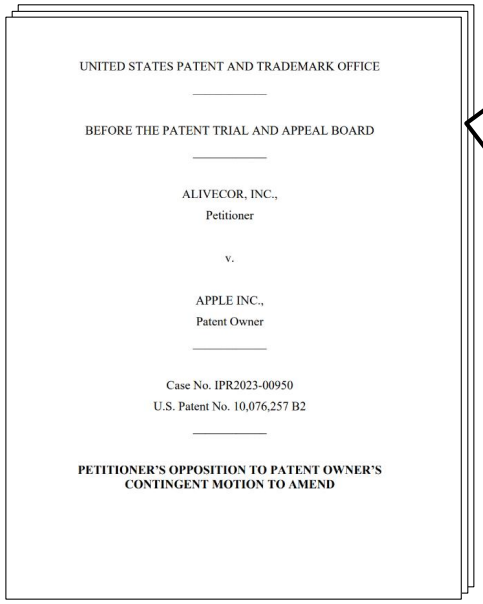
Preliminary Guidance

So, although Patent Owner calls proposed claims 23–29 "[s]ubstitute[s] for" originally challenged claims 16–22 (*see id.*), Patent Owner's proposed claims 23–29 lack a meaningful relationship to original claims 16–22, and the limitations of proposed claims 23–29 are not traceable to the limitations of original claims 16–22.

A patent owner "may file one motion to amend a patent," (37 C.F.R. § 42.121(a)); however, what Patent Owner has done in this instance is propose an entirely new claim set not related to the limitations of the original claims 16–22. We question whether Patent Owner has proposed a reasonable number of *substitute claims* within the confines of our limited mandate set forth in 35 U.S.C. § 315(d). Patent Owner has the burden to establish that the proposed number of substitute claims is reasonable. Patent Owner has not sufficiently explained why seven proposed new claims—*whose features and dependencies are not traceable to features and dependencies of the seven original claims they are intended to replace*—represent "*a reasonable* number of substitute claims" to "*replace each challenged claim*." *See* 37 C.F.R. §§ 42.121(a)(3) (emphases added), 42.121(d)(1) (noting that "patent owner bears the burden of persuasion to show, by a preponderance of the evidence, that the motion to amend complies with the requirements of . . . paragraphs (a)(2), (a)(3), (b)(1), and (b)(2) of [37 C.F.R. § 42.121]"). The parties should further address whether Patent Owner's proposed new claims comply with our statutory and regulatory requirements, including 37 C.F.R. § 42.121.

AliveCor Exhibit 1024
AliveCor, Inc. v. Apple Inc.
IPR2023-00950, U.S. Patent No. 10,076,257
171 of 249

Apple Failed Its Burden - Number of Substitute Claims



UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ALIVECOR, INC.,
Petitioner

v.

APPLE INC.,
Patent Owner

Case No. IPR2023-00950
U.S. Patent No. 10,076,257 B2

PETITIONER'S OPPOSITION TO PATENT OWNER'S CONTINGENT MOTION TO AMEND

Opp. to Motion to Amend

claim for that challenged claim." *Lectrosonics*, Paper 15 at 5. Apple did not follow the Board's guidance and, therefore, has not met its burden to show that at least the following features are traceable to the features in the original dependent claims:

- "first pad is embedded in an inner surface of an electrically conductive metal bezel" (substitute claim 24) and "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" (original claim 11);
- "third lead comprising a third pad . . ." and "wherein the first pad detects signals through a first hand, and the second and third pads detect signals through a second hand" (substitute claim 26) and "second portion of the enclosure is a bezel" (original claim 13); and
- "wherein the detected cardiac signal is an electrocardiogram signal" and "wherein the processor is further configured to . . . authenticate[] the user" (substitute claim 27) and "first pad is positioned on the interior surface of the first portion" (original claim 14).

AliveCor Exhibit 1024
AliveCor, Inc. v. Apple Inc.
IPR2023-00950, U.S. Patent No. 10,076,257
172 of 249

Apple Failed Its Burden - Number of Substitute Claims

Lectrosonics, Inc. v. Zaxom, Inc.

"To help the Board determine whether a motion to amend meets the requirement, the motion should, for each proposed substitute claim, specifically identify the challenged claim that it is intended to replace. All proposed claims should be ***traceable to an original challenged claim as a proposed substitute claim for that challenged claim***."

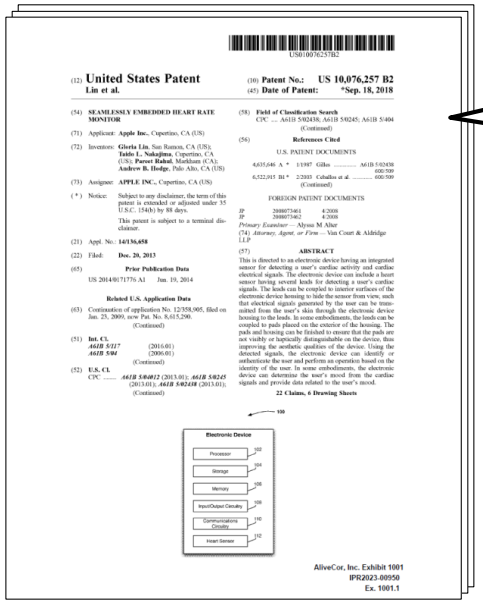
IPR2018-01129, Paper 15 at 5 (PTAB Feb. 29, 2019) (emphasis added)

AliveCor Exhibit 1024
AliveCor, Inc. v. Apple Inc.
IPR2023-00950, U.S. Patent No. 10,076,257
173 of 249

Apple Failed Its Burden - Enlargement

"Apple's substitute claim 26 broadened original claim 13 by deleting a limitation."

Paper 32, 4



(12) **United States Patent**
Lin et al.

(10) **Patent No.: US 10,076,257 B2**
(45) **Date of Patent: *Sep. 18, 2018**

(54) **SEAMLESSLY EMBEDDED HEART RATE MONITOR**

(71) Applicant: **Apple Inc.**, Cupertino, CA (US)

(72) Inventors: **Gloria Lin**, San Ramon, CA (US); **Taido L. Nakajima**, Cupertino, CA (US); **Parsel Rahul**, Markham (CA); **Andrew B. Hodge**, Palo Alto, CA (US)

(73) Assignee: **APPLE INC.**, Cupertino, CA (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 88 days.

This patent is subject to a terminal disclaimer.

(21) Appl. No.: **14/136,658**

(22) Filed: **Dec. 20, 2013**

(65) **Prior Publication Data**

US 2014/0171775 A1 Jun. 19, 2014

Related U.S. Application Data

(63) Continuation of application No. 12/358,905, filed on Jan. 23, 2009, now Pat. No. 8,615,290.
(Continued)

(51) **Int. Cl.**
A61B 5/117 (2016.01)
A61B 5/04 (2006.01)
(Continued)

(52) **U.S. Cl.**
CPC ***A61B 5/04012*** (2013.01); ***A61B 5/0245*** (2013.01); ***A61B 5/02438*** (2013.01);
(Continued)

(58) **Field of Classification Search**
CPC ... A61B 5/02438; A61B 5/0245; A61B 5/404
(Continued)

(56) **References Cited**

U.S. PATENT DOCUMENTS

4,635,646 A * 1/1987 Gilles A61B 5/02438 600/509
6,522,915 B1 * 2/2003 Caballos et al. 600/509
(Continued)

FOREIGN PATENT DOCUMENTS

JP 2008073461 4/2008
JP 2008073462 4/2008

Primary Examiner — Alyssa M Alter
(74) *Attorney, Agent, or Firm* — Van Court & Aldridge LLP

(57) **ABSTRACT**

This is directed to an electronic device having an integrated sensor for detecting a user's cardiac activity and cardiac electrical signals. The electronic device can include a heart sensor having several leads for detecting a user's cardiac signals. The leads can be coupled to interior surfaces of the electronic device housing to hide the sensor from view, such that electrical signals generated by the user can be transmitted from the user's skin through the electronic device housing to the leads. In some embodiments, the leads can be coupled to pads placed on the exterior of the housing. The pads and housing can be finished to ensure that the pads are not visibly or haptically distinguishable on the device, thus improving the aesthetic qualities of the device. Using the detected signals, the electronic device can identify or authenticate the user and perform an operation based on the identity of the user. In some embodiments, the electronic device can determine the user's mood from the cardiac signals and provide data related to the user's mood.

22 Claims, 6 Drawing Sheets

AliveCor, Inc. Exhibit 1001
IPR2023-00950
Ex. 1001.1

'257 Patent

12. The electronic device of claim **1**, wherein the first portion of the enclosure is a bezel.

13. The electronic device of claim **1**, wherein the second portion of the enclosure is a bezel.

Ex. 1001, cl. 13

26. (Substitute for claim 13 if found unpatentable)

The electronic device of claim 1, wherein the ~~second~~ first portion of the enclosure is a bezel, **the electronic device further comprising:** . . .

Paper 29, Claims Appendix

Written Description Requirement – Claims 23, 27

Claim	Written Description Support		
	APPLE-2016	**APPLE-2017**	**APPLE-2012**
23	Amended features: ¶¶[0009]-[0011], [0033], [0047], [0050], [0055]; FIGS. 3, 5	Amended features: ¶¶[0009]-[0011], [0033], [0047], [0050], [0055]; FIGS. 3, 5	Amended features: ¶¶[0008]-[0010], [0032], [0046], [0049], [0054], cl. 18; FIGS. 3, 5
27	Amended features: ¶¶[0005], [0007], [0033], [0047]-[0048], [0051], [0055], Abstract, cls. 1, 16, 20; FIG. 4B	Amended features: ¶¶[0005], [0007], [0033], [0047]-[0048], [0051], [0055], Abstract, cls. 1, 16, 20; FIG. 4B	Amended features: ¶¶[0004], [0006], [0032], [0046]-[0047], [0050], [0054], [0058] (Abstract), cls. 1, 16, 20; FIG. 4B

AliveCor Exhibit 1024
AliveCor, Inc. v. Apple Inc.
IPR2023-00950, U.S. Patent No. 10,076,257
175 of 249

Written Description Requirement – Claims 23, 27

37 C.F.R. § 42.6(a)(3)

"Arguments must not be incorporated by reference from one document into another document. Combined motions, oppositions, replies, or other combined documents are not permitted."

37 C.F.R. §42.121(b)(1)

"A motion to amend claims must . . . set forth: (1) The support in the original disclosure of the patent for each claim that is added or amended."

AliveCor Exhibit 1024
AliveCor, Inc. v. Apple Inc.
IPR2023-00950, U.S. Patent No. 10,076,257
176 of 249

Written Description Requirement – Claims 23, 27

Sisvel Int'l S.A. v. Sierra Wireless, Inc.

"A patent owner bears the burden of persuasion to show, by a preponderance of the evidence, that the motion to amend complies with the [applicable] requirements."

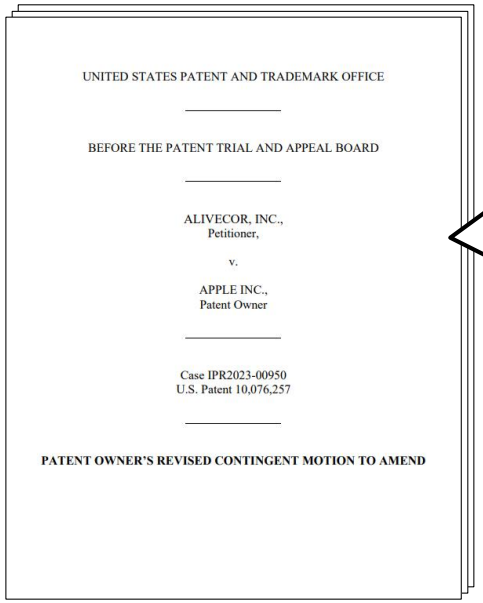
81 F.4th 1231, 1240-41 (Fed. Cir. 2023)

AliveCor Exhibit 1024
AliveCor, Inc. v. Apple Inc.
IPR2023-00950, U.S. Patent No. 10,076,257
177 of 249

Written Description Requirement – Claim 26

"Apple has failed to show written description support for substitute claim 26's recital of a 'third pad that is embedded in the second portion of the enclosure.'"

Paper 32, 5-6



UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ALIVECOR, INC.,
Petitioner,

v.

APPLE INC.,
Patent Owner

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

PATENT OWNER'S REVISED CONTINGENT MOTION TO AMEND

Apple's Revised MTA

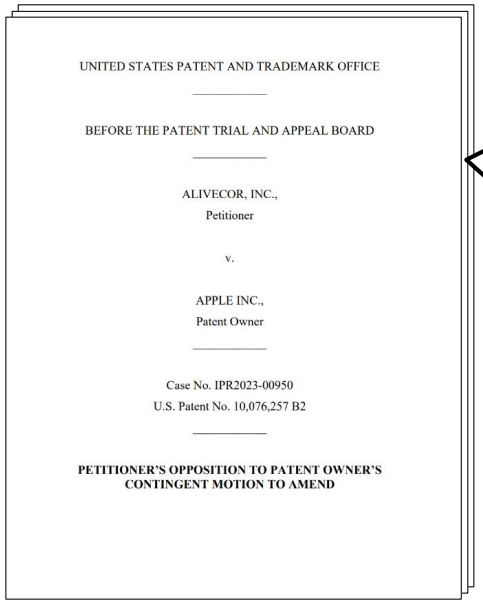
The electronic device of claim 1, wherein the ~~second~~ first portion of the enclosure is a bezel**, the electronic device further comprising:**

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

wherein the second pad is configured to detect the second electrical signal of the user's cardiac signal via the user's skin's contact with the second pad;

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

Written Description Requirement – Claim 26



UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ALIVECOR, INC.,
Petitioner

v.

APPLE INC.,
Patent Owner

Case No. IPR2023-00950
U.S. Patent No. 10,076,257 B2

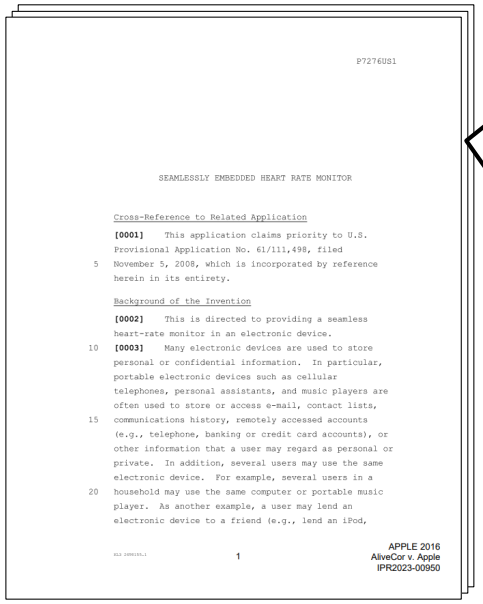
PETITIONER'S OPPOSITION TO PATENT OWNER'S CONTINGENT MOTION TO AMEND

Opp. to Motion to Amend

in the same *portion* of the enclosure or bezel. The written description actually teaches the opposite—i.e., that leads are "placed along ***different portions***" of the enclosure (APPLE-2016, [0047]; APPLE-2017, [0047]; APPLE-2012, [0046]). Indeed, Apple itself has relied on disclosure that the bezel is "separated into ***any suitable number of electrically isolated segments***" (Paper 29 at 15-16 (citing APPLE-2016, [0048], [0050]; APPLE-2017, [0048], [0050]; APPLE-2012, [0047], [0048])). The written description repeatedly discloses leads embedded in ***different*** "portions," "sections," "segments," and "positions" (APPLE-2016, [0046]-[0050]; APPLE-2017, [0046]-[0050]; APPLE-2012, [0046]-[0050]) and never discloses two or more leads embedded in the ***same*** portion of the enclosure. Disclosure that merely

AliveCor Exhibit 1024
AliveCor, Inc. v. Apple Inc.
IPR2023-00950, U.S. Patent No. 10,076,257
179 of 249

Written Description Requirement – Claim 26



P7276US1

SEAMLESSLY EMBEDDED HEART RATE MONITOR

Cross-Reference to Related Application

[0001] This application claims priority to U.S. Provisional Application No. 61/111,498, filed November 5, 2008, which is incorporated by reference herein in its entirety.

Background of the Invention

[0002] This is directed to providing a seamless heart-rate monitor in an electronic device.

[0003] Many electronic devices are used to store personal or confidential information. In particular, portable electronic devices such as cellular telephones, personal assistants, and music players are often used to store or access e-mail, contact lists, communications history, remotely accessed accounts (e.g., telephone, banking or credit card accounts), or other information that a user may regard as personal or private. In addition, several users may use the same electronic device. For example, several users in a household may use the same computer or portable music player. As another example, a user may lend an electronic device to a friend (e.g., lend an iPod,

1

APPLE 2016
AliveCor v. Apple
IPR2023-00950

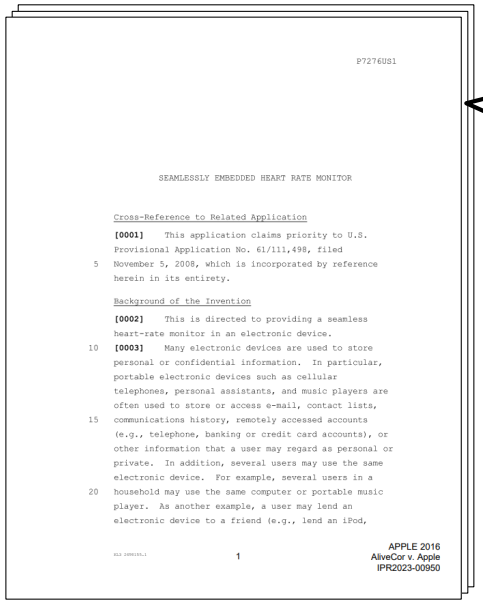
APPLE-2016

[0048] In some embodiments, entire portions of the bezel can be used as leads for the heart sensor. FIG. 5 is a schematic view of an illustrative electronic device using portions of the bezel as leads in accordance with one embodiment of the invention. Similar to electronic device 300 (FIG. 3), electronic device 500 can include display 502 and bezel 510. Bezel 510 can be separated into several electrically isolated segments, for example segments 522 and 524. The segments can be electrically isolated using isolating portions 530 and 532, which can be constructed from any suitable non-conductive material, such as for example a composite material, a plastic, rubber, or any other suitable material. Although FIG. 5 shows bezel 510 broken into two segments having similar sizes, it will be understood that bezel 510 can be separated into any suitable number of electrically isolated segments, and each segment can have any suitable size. In particular, the sizes and distribution of each segment can be selected based on physiological considerations (e.g., where a user's hand will be positioned on the device, or aligning the segments to contact particular portions of the user's body).

APPLE-2016, [0048] (Paper 32, 5-6)

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE – 180

Written Description Requirement – Claim 26



P7276US1

SEAMLESSLY EMBEDDED HEART RATE MONITOR

Cross-Reference to Related Application

[0001] This application claims priority to U.S. Provisional Application No. 61/111,498, filed November 5, 2008, which is incorporated by reference herein in its entirety.

Background of the Invention

[0002] This is directed to providing a seamless heart-rate monitor in an electronic device.

[0003] Many electronic devices are used to store personal or confidential information. In particular, portable electronic devices such as cellular telephones, personal assistants, and music players are often used to store or access e-mail, contact lists, communications history, remotely accessed accounts (e.g., telephone, banking or credit card accounts), or other information that a user may regard as personal or private. In addition, several users may use the same electronic device. For example, several users in a household may use the same computer or portable music player. As another example, a user may lend an electronic device to a friend (e.g., lend an iPod,

1

APPLE 2016
AliveCor v. Apple
IPR2023-00950

APPLE-2016

signals to a processor using connector 474. In addition, if several leads are placed along different portions of bezel 460, the distance between adjacent leads can be sufficiently large (e.g., substantially larger than the thickness of bezel 460) that different leads of bezel 460 cannot detect the same electrical signal.

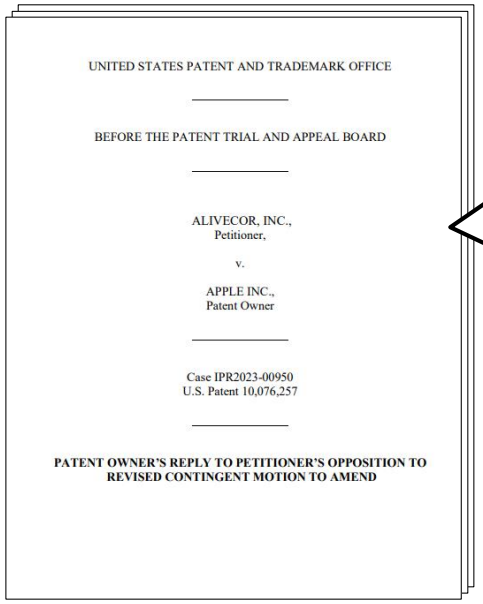
APPLE-2016, [0046] (Paper 32, 5-6)

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE – 181

Written Description Requirement – Apple's Arg.

"Apple's Reply fails to address the deficiency identified in AliveCor's Opposition."

Paper 38, 4



UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ALIVECOR, INC.,
Petitioner,

v.

APPLE INC.,
Patent Owner

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

PATENT OWNER'S REPLY TO PETITIONER'S OPPOSITION TO REVISED CONTINGENT MOTION TO AMEND

Apple's Reply (MTA)

Regarding substitute claim 26, the priority documents disclose that: (1) "bezel 310 can include ***any other suitable number of leads, or any other suitable distribution of leads,***" (*see* APPLE-2016, [0042]; APPLE-2017, [0042]; APPLE-2012, [0041]); (2) "***each lead can include a pad or extended area placed on the outer or inner surface of an electronic device bezel or housing***" (*see* APPLE-2016, [0034]; APPLE-2017, [0034]; APPLE-2012, [0033]); and (3) "the leads can be exposed such that the user may directly contact the leads" and that the leads can be positioned adjacent each other with "an electrically isolating component… inserted between adjacent leads" (*see* APPLE-2016, [0009]-[0010]; APPLE-2017, [0009]-[0010]; APPLE-2012, [0008]-[0009]).

Paper 36, 4-5

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE – 182

Written Description Req. – Apple's Arg. – Reply

Ariad Pharmaceuticals, Inc. v. Eli Lilly and Co.

"[A] description which renders obvious a claimed invention is not sufficient to satisfy the written description requirement of that invention."

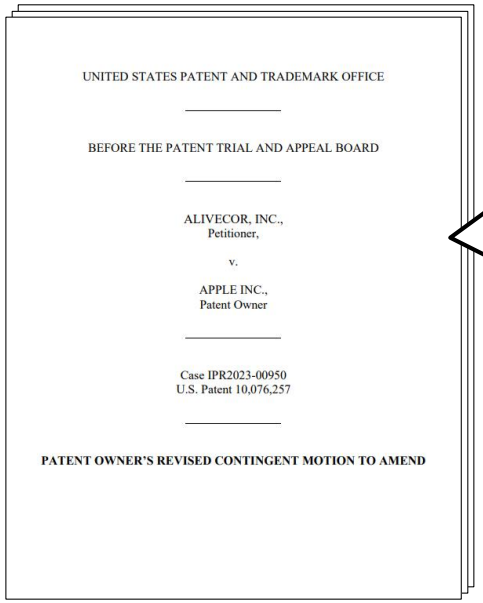
598 F.3d 1336, 1354 (Fed. Cir. 2010)

AliveCor Exhibit 1024
AliveCor, Inc. v. Apple Inc.
IPR2023-00950, U.S. Patent No. 10,076,257
183 of 249

Written Description Requirement – Claim 26

"Apple has failed to show written description support for substitute claim 26's recital of a third pad embedded in a portion of the enclosure and exposed for 'user's skin's contact with the third pad.'"

Paper 32, 6



UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ALIVECOR, INC.,
Petitioner,

v.

APPLE INC.,
Patent Owner

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

PATENT OWNER'S REVISED CONTINGENT MOTION TO AMEND

Apple's Revised MTA

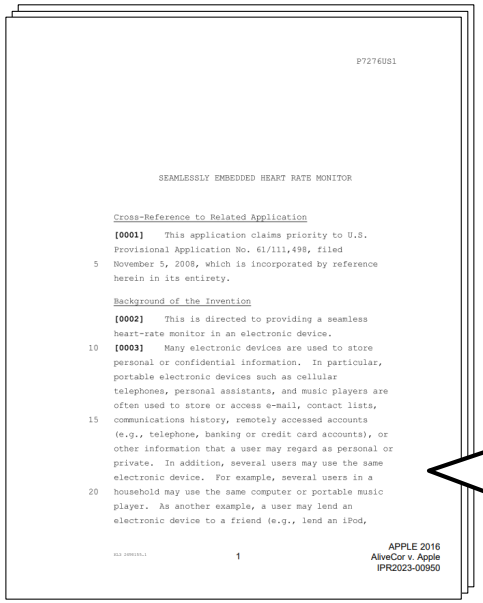
The electronic device of claim 1, wherein the ~~second~~ first portion of the enclosure is a bezel**, the electronic device further comprising:**

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

wherein the second pad is configured to detect the second electrical signal of the user's cardiac signal via the user's skin's contact with the second pad;

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

Written Description Requirement – Claim 26



P7276US1

SEAMLESSLY EMBEDDED HEART RATE MONITOR

Cross-Reference to Related Application

[0001] This application claims priority to U.S. Provisional Application No. 61/111,498, filed November 5, 2008, which is incorporated by reference herein in its entirety.

Background of the Invention

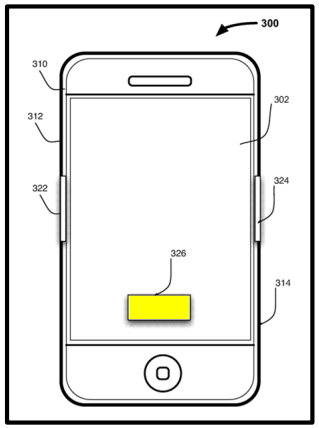
[0002] This is directed to providing a seamless heart-rate monitor in an electronic device.

[0003] Many electronic devices are used to store personal or confidential information. In particular, portable electronic devices such as cellular telephones, personal assistants, and music players are often used to store or access e-mail, contact lists, communications history, remotely accessed accounts (e.g., telephone, banking or credit card accounts), or other information that a user may regard as personal or private. In addition, several users may use the same electronic device. For example, several users in a household may use the same computer or portable music player. As another example, a user may lend an electronic device to a friend (e.g., lend an iPod,

1

APPLE 2016
AliveCor v. Apple
IPR2023-00950

APPLE-2016



"Figure 3 is the only figure with a third lead. Not only is that lead embedded in the display, . . . it is also not exposed for 'user's skin's contact with the third pad.'"

Paper 32, 6

[0043] In some embodiments, electronic device 300 can include additional lead 326 embedded in or behind display 302. Lead 326 can be operative to detect a user's heart activity as the user moves a finger across display 302, for example in the vicinity of or directly over lead 326 (e.g., as the user drags a finger over lead 326 to move a slider when unlocking the electronic device). Using lead 326, the electronic device can detect an electrical signal from a different portion of the user's body (e.g., leads 322 and 324 detect signals through a first hand, and lead 326 detects signals through the second hand), which can provide the processor with additional information for determining characteristics of the user's cardiac activity.

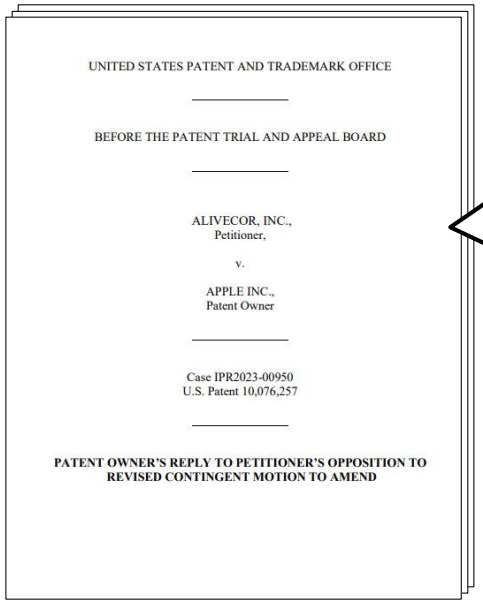
APPLE-2016, [0043], Fig. 3 (annotated) (Paper 32, 6)

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE – 185

Written Description Requirement – Apple's Reply

"Apple's Reply fails to address the third pad that is exposed 'for user's contact with the third pad.'"

Paper 38, 5



UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ALIVECOR, INC.,
Petitioner,

v.

APPLE INC.,
Patent Owner

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

PATENT OWNER'S REPLY TO PETITIONER'S OPPOSITION TO REVISED CONTINGENT MOTION TO AMEND

Regarding substitute claim 26, the priority documents disclose that: (1) "bezel 310 can include ***any other suitable number of leads, or any other suitable distribution of leads***," (*see* APPLE-2016, [0042]; APPLE-2017, [0042]; APPLE-2012, [0041]); (2) "***each lead can include a pad or extended area placed on the outer or inner surface of an electronic device bezel or housing***" (*see* APPLE-2016, [0034]; APPLE-2017, [0034]; APPLE-2012, [0033]); and (3) "the leads can be exposed such that the user may directly contact the leads" and that the leads can be positioned adjacent each other with "an electrically isolating component… inserted between adjacent leads" (*see* APPLE-2016, [0009]-[0010]; APPLE-2017, [0009]-[0010]; APPLE-2012, [0008]-[0009]).

Apple's Reply (MTA)