

APPLE INC. AND FITBIT, INC.
PETITIONERS
V.
VALENCELL, INC.
PATENT OWNER

CASE IPR2017-00317
U.S. PATENT NO. 8,989,830

**PATENT OWNER'S DEMONSTRATIVE EXHIBITS
IN SUPPORT OF ITS CONDITIONAL MOTION TO AMEND**

ORAL HEARING, FEBRUARY 27, 2018

R. SCOTT RHOADES

U.S. PATENT No. 8,989,830 SUBSTITUTE CLAIM 21

CLAIM 21 – SUBSTITUTE FOR CLAIM 1

United States Patent
LeBoeuf et al.

(11) Patent No.: **US 8,989,830 B2**
(45) Date of Patent: **Mar. 24, 2015**

(54) WEARABLE LIGHT-GUIDING DEVICES FOR PHYSIOLOGICAL MONITORING

(71) Applicant: **Vakocell, Inc.**, Raleigh, NC (US)

(72) Inventors: **Steven Francis LeBoeuf**, Raleigh, NC (US); **Jesse Berkeley Tucker**, Knightdale, NC (US); **Michael Edward Aumer**, Raleigh, NC (US)

(73) Assignee: **Vakocell, Inc.**, Raleigh, NC (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.: **14/484,585**

(22) Filed: **Sep. 12, 2014**

(65) **Prior Publication Data**
US 2015/0032009 A1 Jan. 20, 2015

Related U.S. Application Data
(63) Continuation of application No. 14/184,364, filed on Feb. 19, 2014, now Pat. No. 8,886,269, which is a continuation of application No. 12/691,388, filed on Jan. 21, 2010, now Pat. No. 8,700,111.
(Continued)

(51) **Int. Cl.**
A61B 5/00 (2006.01)
A61B 5/1455 (2006.01)

(52) **U.S. Cl.**
CPC: **A61B 5/002**(2013.01); **A61B 5/6838**(2013.01); **A61B 5/418**(2013.01); **A61B 5/1455**(2013.01); **A61B 5/6803**(2013.01)

(58) **Field of Classification Search**
USPC: **600/330**
CPC: **A61B 5/002**

(10) Patent No.: **US 8,989,830 B2**
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USPC: **600/330**
See application file for complete search history.

(56) **References Cited**
US PATENT DOCUMENTS
3,592,229 A 7/1971 Inoué et al.
4,240,882 A 12/1989 Ang et al.
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JP 2077090 A2 7/2005
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Primary Examiner – Rodney Fuller
(74) Attorney, Agent, or Firm – Myers Haged Sibley & Sawyer

(57) **ABSTRACT**
A monitoring device configured to be attached to the body of a subject includes an outer layer and an inner layer secured together. The inner layer includes light transmissive material and has inner and outer surfaces. A base is secured to at least one of the outer and inner layers, and includes an optical emitter and optical detector. A layer of cladding material is positioned near the outer surface of the inner layer and at least one window is formed in the layer of cladding material that serves as a light-guiding interface to the body of the subject. The light transmissive material delivers light from the optical emitter to the body of the subject along a first direction and collects light from the body of the subject and delivers the collected light in a second direction to the optical detector. The first and second directions are substantially parallel.

20 Claims, 21 Drawing Sheets

A MONITORING DEVICE CONFIGURED TO BE ATTACHED TO THE BODY OF A SUBJECT, COMPRISING:

AN OUTER LAYER AND AN INNER LAYER SECURED TOGETHER, THE INNER LAYER COMPRISING LIGHT TRANSMISSIVE MATERIAL, AND HAVING INNER AND OUTER SURFACES;

A BASE SECURED TO AT LEAST ONE OF THE OUTER AND INNER LAYERS AND COMPRISING AT LEAST ONE OPTICAL EMITTER AND AT LEAST ONE OPTICAL DETECTOR AND AT LEAST ONE MOTION SENSOR;

A LAYER OF CLADDING MATERIAL NEAR THE OUTER SURFACE OF THE INNER LAYER; AND

AT LEAST ONE WINDOW FORMED IN THE LAYER OF CLADDING MATERIAL THAT SERVES AS A LIGHT-GUIDING INTERFACE TO THE BODY OF THE SUBJECT, WHEREIN THE LIGHT TRANSMISSIVE MATERIAL IS IN OPTICAL COMMUNICATION WITH THE AT LEAST ONE OPTICAL EMITTER AND THE AT LEAST ONE OPTICAL DETECTOR, WHEREIN THE LIGHT TRANSMISSIVE MATERIAL IS CONFIGURED TO DELIVER LIGHT FROM THE AT LEAST ONE OPTICAL EMITTER TO THE BODY OF THE SUBJECT ALONG A FIRST DIRECTION AND TO COLLECT LIGHT FROM THE BODY OF THE SUBJECT AND DELIVER THE COLLECTED LIGHT IN A SECOND DIRECTION TO THE AT LEAST ONE OPTICAL DETECTOR, WHEREIN THE FIRST AND SECOND DIRECTIONS ARE SUBSTANTIALLY PARALLEL;

WHEREIN THE BASE COMPRISES A SIGNAL PROCESSOR CONFIGURED TO RECEIVE AND PROCESS SIGNALS PRODUCED BY THE AT LEAST ONE OPTICAL DETECTOR AND THE MOTION SENSOR TO (I) REDUCE FOOTSTEP MOTION ARTIFACTS FROM THE AT LEAST ONE OPTICAL DETECTOR DURING RUNNING BY THE SUBJECT AND (II) EXTRACT PHYSIOLOGICAL AND MOTION PARAMETERS.

U.S. PATENT No. 8,989,830 SUBSTITUTE CLAIM 30

CLAIM 30 – SUBSTITUTE FOR CLAIM 11

United States Patent
LeBoeuf et al.

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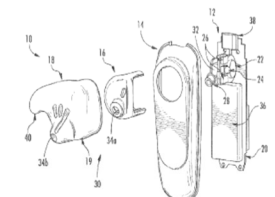
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(57) **ABSTRACT**

A monitoring device configured to be attached to the body of a subject includes an outer layer and an inner layer secured together. The inner layer includes light transmissive material and has inner and outer surfaces. A base is secured to at least one of the outer and inner layers, and includes an optical emitter and optical detector. A layer of cladding material is positioned near the outer surface of the inner layer, and at least one window is formed in the layer of cladding material that serves as a light-guiding interface to the body of the subject. The light transmissive material delivers light from the optical emitter to the body of the subject along a first direction and collects light from the body of the subject and delivers the collected light in a second direction to the optical detector. The first and second directions are substantially parallel.

20 Claims, 21 Drawing Sheets



A MONITORING DEVICE CONFIGURED TO BE ATTACHED TO THE BODY OF A SUBJECT, COMPRISING:

A FIRST LAYER COMPRISING LIGHT TRANSMISSIVE MATERIAL, THE FIRST LAYER HAVING INNER AND OUTER SURFACES;

A BASE SECURED TO THE FIRST LAYER AND COMPRISING AT LEAST ONE OPTICAL EMITTER AND AT LEAST ONE OPTICAL DETECTOR AND AT LEAST ONE MOTION SENSOR;

A LAYER OF CLADDING MATERIAL NEAR THE INNER AND OUTER SURFACES OF THE FIRST LAYER; AND

AT LEAST ONE WINDOW FORMED IN THE LAYER OF CLADDING MATERIAL THAT SERVES AS A LIGHT-GUIDING INTERFACE TO THE BODY OF THE SUBJECT, WHEREIN THE LIGHT TRANSMISSIVE MATERIAL IS IN OPTICAL COMMUNICATION WITH THE AT LEAST ONE OPTICAL EMITTER AND THE AT LEAST ONE OPTICAL DETECTOR, AND IS CONFIGURED TO DELIVER LIGHT FROM THE AT LEAST ONE OPTICAL EMITTER TO THE BODY OF THE SUBJECT ALONG A FIRST DIRECTION AND TO COLLECT LIGHT FROM THE BODY OF THE SUBJECT AND DELIVER THE COLLECTED LIGHT IN A SECOND DIRECTION TO THE AT LEAST ONE OPTICAL DETECTOR, WHEREIN THE FIRST AND SECOND DIRECTIONS ARE SUBSTANTIALLY PARALLEL;

WHEREIN THE BASE COMPRISES A SIGNAL PROCESSOR CONFIGURED TO RECEIVE AND PROCESS SIGNALS PRODUCED BY THE AT LEAST ONE OPTICAL DETECTOR AND THE MOTION SENSOR TO (I) REDUCE FOOTSTEP MOTION ARTIFACTS FROM THE AT LEAST ONE OPTICAL DETECTOR DURING RUNNING BY THE SUBJECT AND (II) EXTRACT PHYSIOLOGICAL AND MOTION PARAMETERS.

U.S. PATENT NO. 8,989,830

VALENCCELL'S MOTION TO AMEND SHOULD NOT BE DENIED

"BOTH BY STATUTE AND BY ITS OWN RULES, THE BOARD HAS ONLY LIMITED GROUNDS FOR DENYING A MOTION TO AMEND: (1) IF THE AMENDMENT 'DOES NOT RESPOND TO A GROUND OF UNPATENTABILITY INVOLVED IN THE TRIAL,' 37 C.F.R. § 42.121, OR (2) IF THE AMENDMENT 'SEEKS TO ENLARGE THE SCOPE OF THE CLAIMS OF THE PATENT OR INTRODUCE NEW SUBJECT MATTER,' ID."

AQUA PRODUCTS, INC. V. MATAL, 872 F.3D. 1290, 1306 (FED. CIR. 2017) .

- **VALENCCELL'S PROPOSED AMENDMENTS ARE RESPONSIVE TO A GROUND OF UNPATENTABILITY AND DO NOT ENLARGE THE SCOPE OF THE PATENT. VALENCCELL'S MOTION SHOULD BE GRANTED.**

U.S. PATENT NO. 8,989,830

**SUBSTITUTE CLAIMS 21-38 SATISFY THE SCOPE REQUIREMENT OF 37
C.F.R. § 42.121**

“[A] PROPOSED SUBSTITUTE CLAIM IS NOT RESPONSIVE TO AN ALLEGED GROUND OF UNPATENTABILITY OF A CHALLENGED CLAIM IF IT DOES NOT EITHER INCLUDE OR NARROW EACH FEATURE OF THE CHALLENGED CLAIM BEING REPLACED.”

IDLE FREE SYSTEMS, INC. V. BERGSTROM, INC., IPR2012-00027, FINAL WRITTEN DECISION, PAPER 26 (P.T.A.B. JUNE 11, 2013).

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