

Patent Owner Masimo Co Demonstratives For Trial

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Apple Inc. v. Masimo Corporation

IPR2020-01521 (Patent 10,292,628)

IPR2020-01714 (Patent 10,631,765)

IPR2020-01715 (Patent 10,631,765)

Patents-At-Issue

(12) **United States Patent**
Poeze et al. (10) **Patent No.:** US 10,631,765 B1
 (45) **Date of Patent:** *Apr. 28, 2020

(54) **MULTI-STREAM DATA COLLECTION SYSTEM FOR NONINVASIVE MEASUREMENT OF BLOOD CONSTITUENTS** (58) **Field of Classification Search**
 CPC A61B 5/1455; A61B 5/14551; A61B 5/14552; A61B 5/14553; A61B 5/14546; (Continued)

(71) Applicant: **Masimo Corporation**, Irvine, CA (US) (56) **References Cited**

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(*) Notice: Subject to any disclaimer patent is extended or ad U.S.C. 154(b) by 0 days This patent is subject to claimer

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A61B 5/00 (2006.01)
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(12) **United States Patent**
Poeze et al. (10) **Patent No.:** US 10,292,628 B1
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(54) **MULTI-STREAM DATA COLLECTION SYSTEM FOR NONINVASIVE MEASUREMENT OF BLOOD CONSTITUENTS** (58) **Field of Classification Search**
 CPC A61B 5/0205; A61B 5/1455; A61B 5/14551; A61B 5/14552; A61B 5/14553; (Continued)

(71) Applicant: **MASIMO CORPORATION**, Irvine, CA (US) (56) **References Cited**

(72) Inventors: **Jerome Poeze**, Rancho Santa Margarita, CA (US); **Marcelo Lamego**, Cupertino, CA (US); **Sean Merritt**, Lake Forest, CA (US); **Cristiano Dahi**, Lake Forest, CA (US); **Hung Vo**, Fountain Valley, CA (US); **Johannes Irlinoma**, Opeside (NL); **Ferdyan Lesmana**, Irvine, CA (US); **Masi Joe F. Kiani**, Laguna Niguel, CA (US); **Greg Olson**, Trabuco Canyon, CA (US)

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A61B 5/145 (2006.01)

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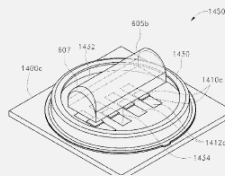
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(57) **ABSTRACT**

The present disclosure relates to noninvasive methods, devices, and systems for measuring various blood constituents or analytes, such as glucose. In an embodiment, a light source comprises LEDs and super-luminescent LEDs. The light source emits light at least wavelengths of about 1610 nm, about 1640 nm, and about 1665 nm. In an embodiment, the detector comprises a plurality of photodetectors arranged in a special geometry comprising one of a substantially linear substantially equal spaced geometry, a substantially linear substantially non-equal spaced geometry, and a substantially grid geometry.

30 Claims, 65 Drawing Sheets



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'765 Patent Claim 1

1. A physiological measurement system comprising:
a physiological sensor device comprising:
one or more emitters configured to emit light into tissue of a user;
at least four detectors, wherein each of the at least four detectors has a corresponding window that allows light to pass through to the detector;
a wall that surrounds at least the at least four detectors;
and
a cover comprising a protruding convex surface, wherein the protruding convex surface is above all of the at least four detectors, wherein at least a portion of the protruding convex surface is rigid, and wherein the cover operably connects to the wall; and
a handheld computing device in wireless communication with the physiological sensor device, wherein the handheld computing device comprises:

one or more pr
one or mor
device, the c
a physiolog
a touch-scre
interface, w
the user int
responsiv
parameter
an orientati
responsiv
a storage devic
at least th
parameter.

'765 Patent Claims 12, 1

12. The physiological measurement system wherein the protruding convex surface is between 1 millimeter and 3 millimeters.

18. The physiological measurement system wherein the protruding convex surface is greater than 2 millimeters and less than 3 millimeters.

29. The physiological measurement system wherein the protruding convex surface is greater than 2 millimeters and less than 3 millimeters.

'628 Patent Claim 1

1. A noninvasive optical physiological sensor comprising:
a plurality of emitters configured to emit light into the skin of a user;
a plurality of detectors configured to detect light that has been attenuated by tissue of the user, wherein the plurality of detectors comprise at least four detectors;
a housing configured to house at least the plurality of detectors; and
a light permeable cover configured to be located between the tissue of the user and the plurality of detectors when the noninvasive optical physiological sensor is worn by the user, wherein the cover comprises an outwardly protruding convex surface configured to cause tissue of the user to conform to at least a portion of the outwardly protruding convex surface when the noninvasive optical physiological sensor is worn by the user and during operation of the noninvasive optical physiological sensor, and wherein the plurality of detectors are configured to receive light passed through the outwardly protruding convex surface after attenuation by tissue of the user.

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