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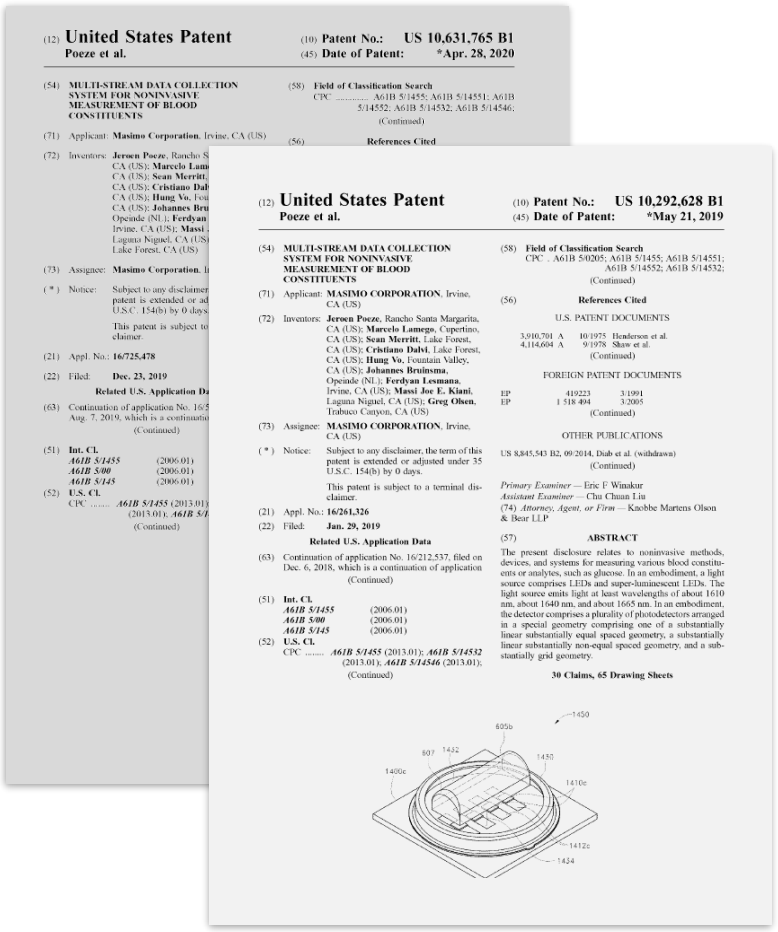
Apple Inc. v. Masimo Corporation
IPR2020-01521 (Patent 10,292,628)
IPR2020-01714 (Patent 10,631,765)
IPR2020-01715 (Patent 10,631,765)

Patents-At-Issue



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

(10) **Patent No.: US 10,631,765 B1**
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(54) **MULTI-STREAM DATA COLLECTION SYSTEM FOR NONINVASIVE MEASUREMENT OF BLOOD CONSTITUENTS**

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

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(73) Assignee: **Masimo Corporation**, I...

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This patent is subject to ... claimer.

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(51) **Int. Cl.**
A61B 5/1455 (2006.01)
A61B 5/00 (2006.01)
A61B 5/145 (2006.01)

(52) **U.S. Cl.**
CPC ..... ***A61B 5/1455*** (2013.01); ***A61B 5/...*** (2013.01); ***A61B 5/...***
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(12) **United States Patent**
Poeze et al.

(10) **Patent No.: US 10,292,628 B1**
(45) **Date of Patent: *May 21, 2019**

(54) **MULTI-STREAM DATA COLLECTION SYSTEM FOR NONINVASIVE MEASUREMENT OF BLOOD CONSTITUENTS**

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

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

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(52) **U.S. Cl.**
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(58) **Field of Classification Search**
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(Continued)

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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

- U.S.
  - IP
- U.S.
  - IP

’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
a physiolog
a touch-scree
interface, w
the user in
responsiv
paramete
an orientati
responsiv
a storage devi
at least th
parameter.

’765 Patent Claims 12, 1

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

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

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

’628 Patent Claim 1

1. A noninvasive optical physiological sensor com
a plurality of emitters configured to emit light int
of a user;
a plurality of detectors configured to detect light
been attenuated by tissue of the user, wher
plurality of detectors comprise at least four de
a housing configured to house at least the plur
detectors; and
a light permeable cover configured to be located b
tissue of the user and the plurality of detectors w
noninvasive optical physiological sensor is wor
user, wherein the cover comprises an outward
truding convex surface configured to cause tissu
user to conform to at least a portion of the ou
protruding convex surface when the noninvasi
cal physiological sensor is worn by the user and
operation of the noninvasive optical physiologi
sor, and wherein the plurality of detectors are
ured to receive light passed through the ou
protruding convex surface after attenuation by t
the user.

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