8355649

THE UNITED STATES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME:

UNITED STATES DEPARTMENT OF COMMERCE

United States Patent and Trademark Office

March 15, 2023

THIS IS TO CERTIFY THAT ANNEXED IS A TRUE COPY FROM THE RECORDS OF THIS OFFICE OF THE FILE WRAPPER AND CONTENTS OF:

APPLICATION NUMBER: ***16/791,955***
FILING DATE: ***February 14, 2020***
PATENT NUMBER: ***10687743***
ISSUE DATE: ***June 23, 2020***

UNITED STATES PATENT AND TRADEMARK OFFICE · DEPARTMENT OF COMMERCE

Certified by

Performing the Functions and Duties of the
Under Secretary of Commerce
for Intellectual Property
and Director of the United States
Patent and Trademark Office

Doc Code: TRACK1.REQ
Document Description: TrackOne Request

PTO/AIA/424 (04-14)

CERTIFICATION AND REQUEST FOR PRIORITIZED EXAMINATION UNDER 37 CFR 1.102(e) (Page 1 of 1)

First Named Inventor:	Ammar Al-Ali	Nonprovisional Application Number (if known):	Unassigned
Title of Invention:	PHYSIOLOGICAL MEASUREMENT DEVICES, SYSTEMS, AND METHODS		

APPLICANT HEREBY CERTIFIES THE FOLLOWING AND REQUESTS PRIORITIZED EXAMINATION FOR THE ABOVE-IDENTIFIED APPLICATION.

1. The processing fee set forth in 37 CFR 1.17(i)(1) and the prioritized examination fee set forth in 37 CFR 1.17(c) have been filed with the request. The publication fee requirement is met because that fee, set forth in 37 CFR 1.18(d), is currently $0. The basic filing fee, search fee, and examination fee are filed with the request or have been already been paid. I understand that any required excess claims fees or application size fee must be paid for the application.

2. I understand that the application may not contain, or be amended to contain, more than four independent claims, more than thirty total claims, or any multiple dependent claims, and that any request for an extension of time will cause an outstanding Track I request to be dismissed.

3. The applicable box is checked below:

I. ☑ Original Application (Track One) - Prioritized Examination under § 1.102(e)(1)

i. (a) The application is an original nonprovisional utility application filed under 35 U.S.C. 111(a). This certification and request is being filed with the utility application via EFS-Web.

---OR---

(b) The application is an original nonprovisional plant application filed under 35 U.S.C. 111(a). This certification and request is being filed with the plant application in paper.

ii. An executed inventor's oath or declaration under 37 CFR 1.63 or 37 CFR 1.64 for each inventor, **or** the application data sheet meeting the conditions specified in 37 CFR 1.53(f)(3)(i) is filed with the application.

II. ☐ Request for Continued Examination - Prioritized Examination under § 1.102(e)(2)

i. A request for continued examination has been filed with, or prior to, this form.
ii. If the application is a utility application, this certification and request is being filed via EFS-Web.
iii. The application is an original nonprovisional utility application filed under 35 U.S.C. 111(a), or is a national stage entry under 35 U.S.C. 371.
iv. This certification and request is being filed prior to the mailing of a first Office action responsive to the request for continued examination.
v. No prior request for continued examination has been granted prioritized examination status under 37 CFR 1.102(e)(2).

Signature /Jarom Kesler/	Date 2020-02-14
Name (Print/Typed) Jarom D. Kesler	Practitioner Registration Number 57046

Note: *This form must be signed in accordance with 37 CFR 1.33. See 37 CFR 1.4(d) for signature requirements and certifications. Submit multiple forms if more than one signature is required.**

☑ *Total of 1 forms are submitted.

Privacy Act Statement

The **Privacy Act of 1974 (P.L. 93-579)** requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (*i.e.*, GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

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Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	MAS.1007C4
	Application Number	
Title of Invention	PHYSIOLOGICAL MEASUREMENT DEVICES, SYSTEMS, AND METHODS	

The application data sheet is part of the provisional or nonprovisional application for which it is being submitted. The following form contains the bibliographic data arranged in a format specified by the United States Patent and Trademark Office as outlined in 37 CFR 1.76.
This document may be completed electronically and submitted to the Office in electronic format using the Electronic Filing System (EFS) or the document may be printed and included in a paper filed application.

Secrecy Order 37 CFR 5.2:

☐ Portions or all of the application associated with this Application Data Sheet may fall under a Secrecy Order pursuant to 37 CFR 5.2 (Paper filers only. Applications that fall under Secrecy Order may not be filed electronically.)

Inventor Information:

Inventor 1 — Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Ammar		Al-Ali	

Residence Information (Select One) ● US Residency Non US Residency Active US Military Service

City	San Juan Capistrano	State/Province	CA	Country of Residence	US

Mailing Address of Inventor:

Address 1	30312 Via Bella		
Address 2			
City	San Juan Capistrano	State/Province	CA
Postal Code	92675	Country	US

All Inventors Must Be Listed - Additional Inventor Information blocks may be generated within this form by selecting the **Add** button. Add

Correspondence Information:

Enter either Customer Number or complete the Correspondence Information section below.
For further information see 37 CFR 1.33(a).

☐ **An Address is being provided for the correspondence Information of this application.**

Customer Number	64735		
Email Address	efiling@knobbe.com	Add Email	Remove Email

Application Information:

Title of the Invention	PHYSIOLOGICAL MEASUREMENT DEVICES, SYSTEMS, AND METHODS		
Attorney Docket Number	MAS.1007C4	Small Entity Status Claimed	☐
Application Type	Nonprovisional		
Subject Matter	Utility		
Total Number of Drawing Sheets (if any)	7	Suggested Figure for Publication (if any)	

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	MAS.1007C4
	Application Number	
Title of Invention	PHYSIOLOGICAL MEASUREMENT DEVICES, SYSTEMS, AND METHODS	

Filing By Reference:

Only complete this section when filing an application by reference under 35 U.S.C. 111(c) and 37 CFR 1.57(a). Do not complete this section if application papers including a specification and any drawings are being filed. Any domestic benefit or foreign priority information must be provided in the appropriate section(s) below (i.e., "Domestic Benefit/National Stage Information" and "Foreign Priority Information").

For the purposes of a filing date under 37 CFR 1.53(b), the description and any drawings of the present application are replaced by this reference to the previously filed application, subject to conditions and requirements of 37 CFR 1.57(a).

Application number of the previously filed application	Filing date (YYYY-MM-DD)	Intellectual Property Authority or Country

Publication Information:

☐ Request Early Publication (Fee required at time of Request 37 CFR 1.219)

☐ **Request Not to Publish.** I hereby request that the attached application not be published under 35 U.S.C. 122(b) and certify that the invention disclosed in the attached application **has not and will not** be the subject of an application filed in another country, or under a multilateral international agreement, that requires publication at eighteen months after filing.

Representative Information:

Representative information should be provided for all practitioners having a power of attorney in the application. Providing this information in the Application Data Sheet does not constitute a power of attorney in the application (see 37 CFR 1.32).
Either enter Customer Number or complete the Representative Name section below. If both sections are completed the customer Number will be used for the Representative Information during processing.

Please Select One:	● Customer Number	US Patent Practitioner	◯ Limited Recognition (37 CFR 11.9)
Customer Number	64735		

Domestic Benefit/National Stage Information:

This section allows for the applicant to either claim benefit under 35 U.S.C. 119(e), 120, 121, 365(c), or 386(c) or indicate National Stage entry from a PCT application. Providing benefit claim information in the Application Data Sheet constitutes the specific reference required by 35 U.S.C. 119(e) or 120, and 37 CFR 1.78.
When referring to the current application, please leave the "Application Number" field blank.

Prior Application Status	Pending		Remove
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)
	Continuation of	16/532061	2019-08-05

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	MAS.1007C4
	Application Number	
Title of Invention	PHYSIOLOGICAL MEASUREMENT DEVICES, SYSTEMS, AND METHODS	

Prior Application Status	Patented				Remove
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
16/532061	Continuation of	15/195199	2016-06-28	10448871	2019-10-22

Prior Application Status	Expired		Remove
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)
15/195199	Claims benefit of provisional	62/188430	2015-07-02

Additional Domestic Benefit/National Stage Data may be generated within this form by selecting the **Add** button. Add

Foreign Priority Information:

This section allows for the applicant to claim priority to a foreign application. Providing this information in the application data sheet constitutes the claim for priority as required by 35 U.S.C. 119(b) and 37 CFR 1.55. When priority is claimed to a foreign application that is eligible for retrieval under the priority document exchange program (PDX)[i] the information will be used by the Office to automatically attempt retrieval pursuant to 37 CFR 1.55(i)(1) and (2). Under the PDX program, applicant bears the ultimate responsibility for ensuring that a copy of the foreign application is received by the Office from the participating foreign intellectual property office, or a certified copy of the foreign priority application is filed, within the time period specified in 37 CFR 1.55(g)(1).

Remove

Application Number	Country[i]	Filing Date (YYYY-MM-DD)	Access Code[i] (if applicable)

Additional Foreign Priority Data may be generated within this form by selecting the **Add** button. Add

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications

☐ This application (1) claims priority to or the benefit of an application filed before March 16, 2013 and (2) also contains, or contained at any time, a claim to a claimed invention that has an effective filing date on or after March 16, 2013.
NOTE: By providing this statement under 37 CFR 1.55 or 1.78, this application, with a filing date on or after March 16, 2013, will be examined under the first inventor to file provisions of the AIA.

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	MAS.1007C4
	Application Number	
Title of Invention	PHYSIOLOGICAL MEASUREMENT DEVICES, SYSTEMS, AND METHODS	

Authorization or Opt-Out of Authorization to Permit Access:

When this Application Data Sheet is properly signed and filed with the application, applicant has provided written authority to permit a participating foreign intellectual property (IP) office access to the instant application-as-filed (see paragraph A in subsection 1 below) and the European Patent Office (EPO) access to any search results from the instant application (see paragraph B in subsection 1 below).

Should applicant choose not to provide an authorization identified in subsection 1 below, applicant **must opt-out** of the authorization by checking the corresponding box A or B or both in subsection 2 below.

NOTE: This section of the Application Data Sheet is **ONLY** reviewed and processed with the **INITIAL** filing of an application. After the initial filing of an application, an Application Data Sheet cannot be used to provide or rescind authorization for access by a foreign IP office(s). Instead, Form PTO/SB/39 or PTO/SB/69 must be used as appropriate.

1. Authorization to Permit Access by a Foreign Intellectual Property Office(s)

A. Priority Document Exchange (PDX) - Unless box A in subsection 2 (opt-out of authorization) is checked, the undersigned hereby **grants the USPTO authority** to provide the European Patent Office (EPO), the Japan Patent Office (JPO), the Korean Intellectual Property Office (KIPO), the State Intellectual Property Office of the People's Republic of China (SIPO), the World Intellectual Property Organization (WIPO), and any other foreign intellectual property office participating with the USPTO in a bilateral or multilateral priority document exchange agreement in which a foreign application claiming priority to the instant patent application is filed, access to: (1) the instant patent application-as-filed and its related bibliographic data, (2) any foreign or domestic application to which priority or benefit is claimed by the instant application and its related bibliographic data, and (3) the date of filing of this Authorization. See 37 CFR 1.14(h)(1).

B. Search Results from U.S. Application to EPO - Unless box B in subsection 2 (opt-out of authorization) is checked, the undersigned hereby **grants the USPTO authority** to provide the EPO access to the bibliographic data and search results from the instant patent application when a European patent application claiming priority to the instant patent application is filed. See 37 CFR 1.14(h)(2).

The applicant is reminded that the EPO's Rule 141(1) EPC (European Patent Convention) requires applicants to submit a copy of search results from the instant application without delay in a European patent application that claims priority to the instant application.

2. Opt-Out of Authorizations to Permit Access by a Foreign Intellectual Property Office(s)

☐ A. Applicant **DOES NOT** authorize the USPTO to permit a participating foreign IP office access to the instant application-as-filed. If this box is checked, the USPTO will not be providing a participating foreign IP office with any documents and information identified in subsection 1A above.

☐ B. Applicant **DOES NOT** authorize the USPTO to transmit to the EPO any search results from the instant patent application. If this box is checked, the USPTO will not be providing the EPO with search results from the instant application.

NOTE: Once the application has published or is otherwise publicly available, the USPTO may provide access to the application in accordance with 37 CFR 1.14.

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	MAS.1007C4
	Application Number	
Title of Invention	PHYSIOLOGICAL MEASUREMENT DEVICES, SYSTEMS, AND METHODS	

Applicant Information:

Providing assignment information in this section does not substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.

Applicant 1 Remove

If the applicant is the inventor (or the remaining joint inventor or inventors under 37 CFR 1.45), this section should not be completed. The information to be provided in this section is the name and address of the legal representative who is the applicant under 37 CFR 1.43; or the name and address of the assignee, person to whom the inventor is under an obligation to assign the invention, or person who otherwise shows sufficient proprietary interest in the matter who is the applicant under 37 CFR 1.46. If the applicant is an applicant under 37 CFR 1.46 (assignee, person to whom the inventor is obligated to assign, or person who otherwise shows sufficient proprietary interest) together with one or more joint inventors, then the joint inventor or inventors who are also the applicant should be identified in this section.

Clear

● Assignee	Legal Representative under 35 U.S.C. 117	Joint Inventor
Person to whom the inventor is obligated to assign.	Person who shows sufficient proprietary interest	

If applicant is the legal representative, indicate the authority to file the patent application, the inventor is:

Name of the Deceased or Legally Incapacitated Inventor:

If the Applicant is an Organization check here. ☒

Organization Name	MASIMO CORPORATION		
Mailing Address Information For Applicant:			
Address 1	52 Discovery		
Address 2			
City	Irvine	**State/Province**	CA
Country	US	Postal Code	92618
Phone Number		Fax Number	
Email Address			

Additional Applicant Data may be generated within this form by selecting the Add button. Add

Assignee Information including Non-Applicant Assignee Information:

Providing assignment information in this section does not substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	MAS.1007C4
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Assignee 1

Complete this section if assignee information, including non-applicant assignee information, is desired to be included on the patent application publication. An assignee-applicant identified in the "Applicant Information" section will appear on the patent application publication as an applicant. For an assignee-applicant, complete this section only if identification as an assignee is also desired on the patent application publication.

Remove

If the Assignee or Non-Applicant Assignee is an Organization check here. ☐

Prefix	**Given Name**	Middle Name	**Family Name**	Suffix

Mailing Address Information For Assignee including Non-Applicant Assignee:

Address 1			
Address 2			
City		**State/Province**	
Country i		Postal Code	
Phone Number		Fax Number	
Email Address			

Additional Assignee or Non-Applicant Assignee Data may be generated within this form by selecting the Add button. Add

Signature:

Remove

NOTE: This Application Data Sheet must be signed in accordance with 37 CFR 1.33(b). **However, if this Application Data Sheet is submitted with the INITIAL filing of the application and either box A or B is not checked in subsection 2 of the "Authorization or Opt-Out of Authorization to Permit Access" section, then this form must also be signed in accordance with 37 CFR 1.14(c).**

This Application Data Sheet **must** be signed by a patent practitioner if one or more of the applicants is a **juristic entity** (e.g., corporation or association). If the applicant is two or more joint inventors, this form must be signed by a patent practitioner, **all** joint inventors who are the applicant, or one or more joint inventor-applicants who have been given power of attorney (e.g., see USPTO Form PTO/AIA/81) on behalf of **all** joint inventor-applicants.

See 37 CFR 1.4(d) for the manner of making signatures and certifications.

Signature	/Jarom Kesler/			Date (YYYY-MM-DD)	2020-02-14
First Name	Jarom D.	Last Name	Kesler	Registration Number	57046

Additional Signature may be generated within this form by selecting the Add button. Add

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	MAS.1007C4
	Application Number	
Title of Invention	PHYSIOLOGICAL MEASUREMENT DEVICES, SYSTEMS, AND METHODS	

This collection of information is required by 37 CFR 1.76. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 23 minutes to complete, including gathering, preparing, and submitting the completed application data sheet form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

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3 A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent CooperationTreaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

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9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

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DECLARATION (37 CFR 1.63) FOR UTILITY OR DESIGN APPLICATION USING AN APPLICATION DATA SHEET (37 CFR 1.76)

Title of Invention	ADVANCED PULSE OXIMETRY SENSOR

As the below named inventor, I hereby declare that:

This declaration is directed to:

☐ The attached application, or

☒ United States application or PCT international application number 15/195199

filed on June 28, 2016.

The above-identified application was made or authorized to be made by me.

I believe that I am the original inventor or an original joint inventor of a claimed invention in the application.

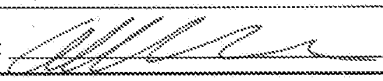
I hereby acknowledge that any willful false statement made in this declaration is punishable under 18 U.S.C. 1001 by fine or imprisonment of not more than five (5) years, or both.

WARNING:

Petitioner/applicant is cautioned to avoid submitting personal information in documents filed in a patent application that may contribute to identity theft. Personal information such as social security numbers, bank account numbers, or credit card numbers (other than a check or credit card authorization form PTO-2038 submitted for payment purposes) is never required by the USPTO to support a petition or an application. If this type of personal information is included in documents submitted to the USPTO, petitioners/applicants should consider redacting such personal information from the documents before submitting them to the USPTO. Petitioner/applicant is advised that the record of a patent application is available to the public after publication of the application (unless a non-publication request in compliance with 37 CFR 1.213(a) is made in the application) or issuance of a patent. Furthermore, the record from an abandoned application may also be available to the public if the application is referenced in a published application or an issued patent (see 37 CFR 1.14). Checks and credit card authorization forms PTO-2038 submitted for payment purposes are not retained in the application file and therefore are not publicly available.

LEGAL NAME OF INVENTOR

Inventor: Ammar Al-Ali Date (Optional): 8/2/19

Signature: 

Note: An application data sheet (PTO/SB/14 or equivalent), including naming the entire inventive entity, must accompany this form or must have been previously filed. Use an additional PTO/AIA/01 form for each additional inventor.

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Application Number	Unassigned
Filing Date	Filed herewith
First Named Inventor	Ammar Al-Ali
Title	PHYSIOLOGICAL MEASUREMENT DEVICES, SYSTEMS, AND METHODS
Art Unit	Unassigned
Examiner Name	Unassigned
Attorney Docket Number	MAS.1007C4

SIGNATURE of Applicant or Patent Practitioner

Signature	/Jarom Kesler/	Date (Optional)	2020-02-14
Name	Jarom D. Kesler	Registration Number	57046
Title (if Applicant is a juristic entity)			
Applicant Name (if Applicant is a juristic entity)			

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SIGNATURE of Applicant for Patent

Signature	/Thomas McClenahan/	Date	7/12/13
Name	Thomas McClenahan	Telephone	(949) 297-7000
Title and Company	Executive Vice President and General Counsel, Masimo Corporation		

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PHYSIOLOGICAL MEASUREMENT DEVICES, SYSTEMS, AND METHODS

INCORPORATION BY REFERENCE TO ANY PRIORITY APPLICATIONS

[0001] The present application is a continuation of U.S. Patent Application No. 16/532,061 filed August 5, 2019, which is a continuation of U.S. Patent Application No. 15/195,199 filed June 28, 2016, which claims priority benefit under 35 U.S.C. § 119(e) from U.S. Provisional Application No. 62/188,430, filed July 2, 2015, which is incorporated by reference herein. Any and all applications for which a foreign or domestic priority claim is identified in the Application Data Sheet as filed with the present application are hereby incorporated by reference under 37 CFR 1.57.

FIELD OF THE DISCLOSURE

[0002] The present disclosure relates to the field of non-invasive optical-based physiological monitoring sensors, and more particularly to systems, devices and methods for improving the non-invasive measurement accuracy of oxygen saturation, among other physiological parameters.

BACKGROUND

[0003] Spectroscopy is a common technique for measuring the concentration of organic and some inorganic constituents of a solution. The theoretical basis of this technique is the Beer-Lambert law, which states that the concentration c_i of an absorbent in solution can be determined by the intensity of light transmitted through the solution, knowing the pathlength d_λ, the intensity of the incident light $I_{0,\lambda}$, and the extinction coefficient $\varepsilon_{i,\lambda}$ at a particular wavelength λ.

[0004] In generalized form, the Beer-Lambert law is expressed as:

$$I_\lambda = I_{0,\lambda} e^{-d_\lambda \cdot \mu_{a,\lambda}} \quad (1)$$

$$\mu_{a,\lambda} = \sum_{i=1}^{n} \varepsilon_{i,\lambda} \cdot c_i \quad (2)$$

where $\mu_{\alpha,\lambda}$ is the bulk absorption coefficient and represents the probability of absorption per unit length. The minimum number of discrete wavelengths that are required to solve equations 1 and 2 is the number of significant absorbers that are present in the solution.

[0005] A practical application of this technique is pulse oximetry, which utilizes a noninvasive sensor to measure oxygen saturation and pulse rate, among other physiological parameters. Pulse oximetry relies on a sensor attached externally to the patient to output signals indicative of various physiological parameters, such as a patient's blood constituents and/or analytes, including for example a percent value for arterial oxygen saturation, among other physiological parameters. The sensor has an emitter that transmits optical radiation of one or more wavelengths into a tissue site and a detector that responds to the intensity of the optical radiation after absorption by pulsatile arterial blood flowing within the tissue site. Based upon this response, a processor determines the relative concentrations of oxygenated hemoglobin (HbO_2) and deoxygenated hemoglobin (Hb) in the blood so as to derive oxygen saturation, which can provide early detection of potentially hazardous decreases in a patient's oxygen supply.

[0006] A pulse oximetry system generally includes a patient monitor, a communications medium such as a cable, and/or a physiological sensor having one or more light emitters and a detector, such as one or more light-emitting diodes (LEDs) and a photodetector. The sensor is attached to a tissue site, such as a finger, toe, earlobe, nose, hand, foot, or other site having pulsatile blood flow which can be penetrated by light from the one or more emitters. The detector is responsive to the emitted light after attenuation or reflection by pulsatile blood flowing in the tissue site. The detector outputs a detector signal to the monitor over the communication medium. The monitor processes the signal to provide a numerical readout of physiological parameters such as oxygen saturation (SpO2) and/or pulse rate. A pulse oximetry sensor is described in U.S. Patent No. 6,088,607 entitled *Low Noise Optical Probe*; pulse oximetry signal processing is described in U.S. Patent Nos. 6,650,917 and 6,699,194 entitled *Signal Processing Apparatus* and *Signal Processing Apparatus and Method*, respectively; a pulse oximeter monitor is

described in U.S. Patent No. 6,584,336 entitled *Universal/Upgrading Pulse Oximeter*; all of which are assigned to Masimo Corporation, Irvine, CA, and each is incorporated by reference herein in its entirety.

[0007] There are many sources of measurement error introduced to pulse oximetry systems. Some such sources of error include the pulse oximetry system's electronic components, including emitters and detectors, as well as chemical and structural physiological differences between patients. Another source of measurement error is the effect of multiple scattering of photons as the photons pass through the patient's tissue (arterial blood) and arrive at the sensor's light detector.

SUMMARY

[0008] This disclosure describes embodiments of non-invasive methods, devices, and systems for measuring blood constituents, analytes, and/or substances such as, by way of non-limiting example, oxygen, carboxyhemoglobin, methemoglobin, total hemoglobin, glucose, proteins, lipids, a percentage thereof (*e.g.,* saturation), pulse rate, perfusion index, oxygen content, total hemoglobin, Oxygen Reserve Index™ (ORI™) or for measuring many other physiologically relevant patient characteristics. These characteristics can relate to, for example, pulse rate, hydration, trending information and analysis, and the like.

[0009] In an embodiment, an optical physiological measurement system includes an emitter configured to emit light of one or more wavelengths. The system also includes a diffuser configured to receive the emitted light, to spread the received light, and to emit the spread light over a larger tissue area than would otherwise be penetrated by the emitter directly emitting light at a tissue measurement site. The tissue measurement site can include, such as, for example, a finger, a wrist, or the like. The system further includes a concentrator configured to receive the spread light after it has been attenuated by or reflected from the tissue measurement site. The concentrator is also configured to collect and concentrate the received light and to emit the concentrated light to a detector. The detector is configured to detect the concentrated light and to transmit a signal indicative of the

detected light. The system also includes a processor configured to receive the transmitted signal indicative of the detected light and to determine, based on an amount of absorption, an analyte of interest, such as, for example, arterial oxygen saturation or other parameter, in the tissue measurement site.

[0010] In certain embodiments of the present disclosure, the diffuser comprises glass, ground glass, glass beads, opal glass, or a microlens-based, band-limited, engineered diffuser that can deliver efficient and uniform illumination. In some embodiments the diffuser is further configured to define a surface area shape by which the emitted spread light is distributed onto a surface of the tissue measurement site. The defined surface area shape can include, by way of non-limiting example, a shape that is substantially rectangular, square, circular, oval, or annular, among others.

[0011] According to some embodiments, the optical physiological measurement system includes an optical filter having a light-absorbing surface that faces the tissue measurement site. The optical filter also has an opening that is configured to allow the spread light, after being attenuated by the tissue measurement site, to be received by the concentrator. In an embodiment, the opening has dimensions, wherein the dimensions of the opening are similar to the defined surface area shape by which the emitted spread light is distributed onto the surface of the tissue measurement site. In an embodiment, the opening has dimensions that are larger than the defined surface area shape by which the emitted spread light is distributed onto the surface of the tissue measurement site. In other embodiments, the dimensions of the opening in the optical filter are not the same as the diffuser opening, but the dimensions are larger than the detector package.

[0012] In other embodiments of the present disclosure, the concentrator comprises glass, ground glass, glass beads, opal glass, or a compound parabolic concentrator. In some embodiments the concentrator comprises a cylindrical structure having a truncated circular conical structure on top. The truncated section is adjacent the detector. The light concentrator is structured to receive the emitted optical radiation, after reflection by the tissue measurement site, and to direct the reflected light to the detector.

[0013] In accordance with certain embodiments of the present disclosure, the processor is configured to determine an average level of the light detected by the detector. The average level of light is used to determine a physiological parameter in the tissue measurement site.

[0014] According to another embodiment, a method to determine a constituent or analyte in a patient's blood is disclosed. The method includes emitting, from an emitter, light of at least one wavelength; spreading, with a diffuser, the emitted light and emitting the spread light from the diffuser to a tissue measurement site; receiving, by a concentrator, the spread light after the spread light has been attenuated by the tissue measurement site; concentrating, by the concentrator, the received light and emitting the concentrated light from the concentrator to a detector; detecting, with the detector, the emitted concentrated light; transmitting, from the detector, a signal responsive to the detected light; receiving, by a processor, the transmitted signal responsive to the detected light; and processing, by the processor, the received signal responsive to the detected light to determine a physiological parameter.

[0015] In some embodiments, the method to determine a constituent or analyte in a patient's blood includes filtering, with a light-absorbing detector filter, scattered portions of the emitted spread light. According to an embodiment, the light-absorbing detector filter is substantially rectangular in shape and has outer dimensions in the range of approximately 1-5 cm in width and approximately 2-8 cm in length, and has an opening through which emitted light may pass, the opening having dimensions in the range of approximately 0.25-3 cm in width and approximately 1-7 cm in length. In another embodiment, the light-absorbing detector filter is substantially square in shape and has outer dimensions in the range of approximately 0.25-10 cm^2, and has an opening through which emitted light may pass, the opening having dimensions in the range of approximately 0.1-8cm^2. In yet another embodiment, the light-absorbing detector filter is substantially rectangular in shape and has outer dimensions of approximately 3 cm in width and approximately 6 cm in length, and has an opening through which emitted light may pass, the

opening having dimensions of approximately 1.5 cm in width and approximately 4 cm in length.

[0016] In still other embodiments of the method to determine a constituent or analyte in a patient's blood, spreading, with a diffuser, the emitted light and emitting the spread light from the diffuser to a tissue measurement site is performed by at least one of a glass diffuser, a ground glass diffuser, a glass bead diffuser, an opal glass diffuser, and an engineered diffuser. In some embodiments the emitted spread light is emitted with a substantially uniform intensity profile. And in some embodiments, emitting the spread light from the diffuser to the tissue measurement site includes spreading the emitted light so as to define a surface area shape by which the emitted spread light is distributed onto a surface of the tissue measurement site.

[0017] According to yet another embodiment, a pulse oximeter is disclosed. The pulse oximeter includes an emitter configured to emit light at one or more wavelengths. The pulse oximeter also includes a diffuser configured to receive the emitted light, to spread the received light, and to emit the spread light directed at a tissue measurement sight. The pulse oximeter also includes a detector configured to detect the emitted spread light after being attenuated by or reflected from the tissue measurement site and to transmit a signal indicative of the detected light. The pulse oximeter also includes a processor configured to receive the transmitted signal and to process the received signal to determine an average absorbance of a blood constituent or analyte in the tissue measurement site over a larger measurement site area than can be performed with a point light source or point detector. In some embodiments, the diffuser is further configured to define a surface area shape by which the emitted spread light is distributed onto a surface of the tissue measurement site, and the detector is further configured to have a detection area corresponding to the defined surface area shape by which the emitted spread light is distributed onto the surface of the tissue measurement site. According to some embodiments, the detector comprises an array of detectors configured to cover the detection area. In still other embodiments, the processor is further configured to determine an average of the detected light.

[0018] For purposes of summarizing, certain aspects, advantages and novel features of the disclosure have been described herein. It is to be understood that not necessarily all such advantages can be achieved in accordance with any particular embodiment of the systems, devices and/or methods disclosed herein. Thus, the subject matter of the disclosure herein can be embodied or carried out in a manner that achieves or optimizes one advantage or group of advantages as taught herein without necessarily achieving other advantages as can be taught or suggested herein.

BRIEF DESCRIPTION OF THE DRAWINGS

[0019] Throughout the drawings, reference numbers can be re-used to indicate correspondence between referenced elements. The drawings are provided to illustrate embodiments of the disclosure described herein and not to limit the scope thereof.

[0020] FIG. 1 illustrates a conventional approach to 2D pulse oximetry in which the emitter is configured to emit optical radiation as a point optical source.

[0021] FIG. 2 illustrates the disclosed 3D approach to pulse oximetry in which the emitted light irradiates a substantially larger volume of tissue as compared to the point source approach described with respect to FIG. 2A.

[0022] FIG. 3 illustrates schematically a side view of a 3D pulse oximetry sensor according to an embodiment of the present disclosure.

[0023] FIG. 4A is a top view of a portion of a 3D pulse oximetry sensor according to an embodiment of the present disclosure.

[0024] FIG. 4B illustrates the top view of a portion of the 3D pulse oximetry sensor shown in FIG. 4A, with the addition of a tissue measurement site in operational position.

[0025] FIG. 5 illustrates a top view of a 3D pulse oximetry sensor according to an embodiment of the present disclosure.

[0026] FIG. 6 illustrates a conventional 2D approach to reflective pulse oximetry in which the emitter is configured to emit optical radiation as a point optical source.

[0027] FIG. 7A is a simplified schematic side view illustration of a reflective 3D pulse oximetry sensor according to an embodiment of the present disclosure.

[0028] FIG. 7B is a simplified schematic top view illustration of the 3D reflective pulse oximetry sensor of FIG. 7A.

[0029] FIG. 8 illustrates a block diagram of an example pulse oximetry system capable of noninvasively measuring one or more blood analytes in a monitored patient, according to an embodiment of the disclosure.

DETAILED DESCRIPTION

[0030] FIG. 1 illustrates schematically a conventional pulse oximetry sensor having a two-dimensional (2D) approach to pulse oximetry. As illustrated, the emitter 104 is configured to emit optical radiation as a point optical source, *i.e.,* an optical radiation source that has negligible dimensions such that it may be considered as a point. This approach is referred to herein as "two-dimensional" pulse oximetry because it applies a two-dimensional analytical model to the three-dimensional space of the tissue measurement site 102 of the patient. Point optical sources feature a defined, freely selectable, and homogeneous light beam area. Light beams emitted from LED point sources often exhibit a strong focus which can produce a usually sharply-defined and evenly-lit illuminated spot often with high intensity dynamics. Illustratively, when looking at the surface of the tissue measurement site 102 (or "sample tissue"), which in this example is a finger, a small point-like surface area of tissue 204 is irradiated by a point optical source. In some embodiments, the irradiated circular area of the point optical source is in the range between 8 and 150 microns. Illustratively, the emitted point optical source of light enters the tissue measurement site 102 as a point of light. As the light penetrates the depth of the tissue 102, it does so as a line or vector, representing a two-dimensional construct within a three-dimensional structure, namely the patient's tissue 102.

[0031] Use of a point optical source is believed to reduce variability in light pathlength which would lead to more accurate oximetry measurements. However, in practice, photons do not travel in straight paths. Instead, the light particles scatter,

bouncing around between various irregular objects (such as, for example, red blood cells) in the patient's blood. Accordingly, photon pathlengths vary depending on, among other things, their particular journeys through and around the tissue at the measurement site 102. This phenomenon is referred to as "multiple scattering." In a study, the effects of multiple scattering were examined by comparing the results of photon diffusion analysis with those obtained using an analysis based on the Beer-Lambert law, which neglects multiple scattering in the determination of light pathlength. The study found that that the difference between the average lengths of the paths traveled by red and infrared photons makes the oximeter's calibration curve (based on measurements obtained from normal subjects) sensitive to the total attenuation coefficients of the tissue in the two wavelength bands used for pulse oximetry, as well as to absorption by the pulsating arterial blood.

[0032] FIG. 2 illustrates schematically the disclosed systems, devices, and methods to implement three-dimensional (3D) pulse oximetry in which the emitted light irradiates a larger volume of tissue at the measurement site 102 as compared to the 2D point optical source approach described with respect to FIG. 1. In an embodiment, again looking at the surface of the tissue measurement site 102, the irradiated surface area 206 of the measurement site 102 is substantially rectangular in shape with dimensions in the range of approximately 0.25-3 cm in width and approximately 1-6 cm in length. In another embodiment, the irradiated surface area 206 of the measurement site 102 is substantially rectangular in shape and has dimensions of approximately 1.5 cm in width and approximately 2 cm in length. In another embodiment, the irradiated surface area 206 of the measurement site 102 is substantially rectangular in shape and has dimensions of approximately 0.5 cm in width and approximately 1 cm in length. In another embodiment, the irradiated surface area 206 of the measurement site 102 is substantially rectangular in shape has dimensions of approximately 1 cm in width and approximately 1.5 cm in length. In yet another embodiment, the irradiated surface area 206 of the measurement site 102 is substantially square in shape and has dimensions in a range of approximately 0.25-9 cm^2. In certain embodiments, the irradiated surface area 206 of the measurement site 102 is within a range of approximately 0.5-2 cm in width, and

approximately 1-4 cm in length. Of course a skilled artisan will appreciate that many other shapes and dimensions of irradiated surface area 206 can be used. Advantageously, by irradiating the tissue measurement site 102 with a surface area 206, the presently disclosed systems, devices, and methods apply a three-dimensional analytical model to the three-dimensional structure being measured, namely, the patient's sample tissue 102.

[0033] According to the Beer-Lambert law, the amount of light absorbed by a substance is proportional to the concentration of the light-absorbing substance in the irradiated solution (*i.e.*, arterial blood). Advantageously, by irradiating a larger volume of tissue 102, a larger sample size of light attenuated (or reflected) by the tissue 102 is measured. The larger, 3D sample provides a data set that is more representative of the complete interaction of the emitted light as it passes through the patient's blood as compared to the 2D point source approach described above with respect to FIG. 1. By taking an average of the detected light, as detected over a surface area substantially larger than a single point, the disclosed pulse oximetry systems, devices, and methods will yield a more accurate measurement of the emitted light absorbed by the tissue, which will lead to a more accurate oxygen saturation measurement.

[0034] FIG. 3 illustrates schematically a side view of a pulse oximetry 3D sensor 300 according to an embodiment of the present disclosure. In the illustrated embodiment, the 3D sensor 300 irradiates the tissue measurement site 102 and detects the emitted light, after being attenuated by the tissue measurement site 102. In other embodiments, for example, as describe below with respect to FIGS. 7A and 7B, the 3D sensor 300 can be arranged to detect light that is reflected by the tissue measurement site 102. The 3D sensor 300 includes an emitter 302, a light diffuser 304, a light-absorbing detector filter 306, a light concentrator 308, and a detector 310. In some optional embodiments, the 3D sensor 300 further includes a reflector 305. The reflector 305 can be a metallic reflector or other type of reflector. Reflector 305 can be a coating, film, layer or other type of reflector. The reflector 305 can serve as a reflector to prevent emitted light from emitting out of a top portion of the light diffuser 304 such that light from the emitter 302 is directed in the

tissue rather than escaping out of a side or top of the light diffuser 304. Additionally, the reflector 305 can prevent ambient light from entering the diffuser 304 which might ultimately cause errors within the detected light. The reflector 305 also prevent light piping that might occur if light from the detector 302 is able to escape from the light diffuser 304 and be pipped around a sensor securement mechanism to detector 310 without passing through the patient's tissue 102.

[0035] The emitter 302 can serve as the source of optical radiation transmitted towards the tissue measurement site 102. The emitter 302 can include one or more sources of optical radiation, such as LEDs, laser diodes, incandescent bulbs with appropriate frequency-selective filters, combinations of the same, or the like. In an embodiment, the emitter 302 includes sets of optical sources that are capable of emitting visible and near-infrared optical radiation. In some embodiments, the emitter 302 transmits optical radiation of red and infrared wavelengths, at approximately 650 nm and approximately 940 nm, respectively. In some embodiments, the emitter 302 includes a single source optical radiation.

[0036] The light diffuser 304 receives the optical radiation emitted from the emitter 302 and spreads the optical radiation over an area, such as the area 206 depicted in FIG. 2. In some embodiments, the light diffuser 304 is a beam shaper that can homogenize the input light beam from the emitter 302, shape the output intensity profile of the received light, and define the way (*e.g.,* the shape or pattern) the emitted light is distributed to the tissue measurement site 102. Examples of materials that can be used to realize the light diffuser 304 include, without limitation, a white surface, glass, ground glass, glass beads, polytetrafluoroethylene (also known as Teflon®, opal glass, and greyed glass, to name a few. Additionally, engineered diffusers can be used to realize the diffuser 304 by providing customized light shaping with respect to intensity and distribution. Such diffusers can, for example, deliver substantially uniform illumination over a specified target area (such as, for example, irradiated surface area 206) in an energy-efficient manner. Examples of engineered diffusers can include molded plastics with specific shapes, patterns or textures designed to diffuse the emitter light across the entirety of the patient's tissue surface.

[0037] Advantageously, the diffuser 304 can receive emitted light in the form of a point optical source and spread the light to fit a desired surface area on a plane defined by the surface of the tissue measurement site 102. In an embodiment, the diffuser 304 is made of ground glass which spreads the emitted light with a Gausian intensity profile. In another embodiment the diffuser 304 includes glass beads. In some embodiments, the diffuser 304 is constructed so as to diffuse the emitted light in a Lambertian pattern. A Lambertian pattern is one in which the radiation intensity is substantially constant throughout the area of dispersion. One such diffuser 304 is made from opal glass. Opal glass is similar to ground glass, but has one surface coated with a milky white coating to diffuse light evenly. In an embodiment, the diffuser 304 is capable of distributing the emitted light on the surface of a plane (*e.g.,* the surface of the tissue measurement site 102) in a predefined geometry (*e.g.,* a rectangle, square, or circle), and with a substantially uniform intensity profile and energy distribution. In some embodiments, the efficiency, or the amount of light transmitted by the diffuser 304, is greater than 70% of the light emitted by the emitter 302. In some embodiments, the efficiency is greater than 90% of the emitted light. Other optical elements known in the art may be used for the diffuser 304.

[0038] In an embodiment, the diffuser 304 has a substantially rectangular shape having dimensions within a range of approximately 0.5-2 cm in width and approximately 1-4 centimeters in length. In another embodiment, the substantially rectangular shape of the diffuser 304 has dimensions of approximately 0.5 cm in width and approximately 1 cm in length. In another embodiment, the diffuser's 304 substantially rectangular shape has dimensions of approximately 1 cm in width and approximately 1.5 cm in length. In yet another embodiment, the diffuser 304 has a substantially square shape with dimensions in the range of approximately 0.25-10 cm^2.

[0039] The light-absorbing detector filter 306, which is also depicted in FIG. 4A in a top view, is a planar surface having an opening 402 through which the emitted light may pass after being attenuated by the tissue measurement site 102. In the depicted embodiment, the opening 402 is rectangular-shaped, with

dimensions substantially similar to the irradiated surface area 206. According to an embodiment, the light-absorbing detector filter is substantially rectangular in shape and has outer dimensions of 4 cm in width and 8 cm in length, and has an opening through which emitted light may pass, the opening having dimensions of 2 cm in width and 5 cm in length. In another embodiment, the light-absorbing detector filter is substantially rectangular in shape and has outer dimensions in the range of 1-3 cm in width and 2-8 cm in length, and has an opening through which emitted light may pass, the opening having dimensions in the range of 0.25-2 cm in width and 1-4 cm in length. In yet another embodiment, the light-absorbing detector filter is substantially rectangular in shape and has outer dimensions of 3 cm in width and 6 cm in length, and has an opening through which emitted light may pass, the opening having dimensions of 1.5 cm in width and 4 cm in length.

[0040] The top surface of the light-absorbing filter 306 (facing the tissue measurement site 102 and the emitter 302) is coated with a material that absorbs light, such as, for example, black pigment. Many other types of light-absorbing materials are well known in the art and can be used with the detector filter 306. During operation, light emitted from the emitter 302 can reflect off of the tissue measurement site 102 (or other structures within the 3D sensor 300) to neighboring portions of the 3D sensor 300. If those neighboring portions of the 3D sensor 300 possess reflective surfaces, then the light can reflect back to the tissue measurement site 102, progress through the tissue and arrive at the detector 310. Such multiple scattering can result in detecting photons whose pathlengths are considerably longer than most of the light that is detected, thereby introducing variations in pathlength which will affect the accuracy of the measurements of the pulse oximetry 3D sensor 300. Advantageously, the light-absorbing filter 306 reduces or eliminates the amount of emitted light that is reflected in this manner because it absorbs such reflected light, thereby stopping the chain of scattering events. In certain embodiments, the sensor-facing surfaces of other portions of the 3D sensor 300 are covered in light-absorbing material to further decrease the effect of reflective multiple scattering.

[0041] The light concentrator 308 is a structure to receive the emitted optical radiation, after attenuation by the tissue measurement site 102, to collect and concentrate the dispersed optical radiation, and to direct the collected and concentrated optical radiation to the detector 310. In an embodiment, the light concentrator 308 is made of ground glass or glass beads. In some embodiments, the light concentrator 308 includes a compound parabolic concentrator.

[0042] As described above with respect to FIG. 1, the detector 310 captures and measures light from the tissue measurement site 102. For example, the detector 310 can capture and measure light transmitted from the emitter 302 that has been attenuated by the tissue in the measurement site 102. The detector 310 can output a detector signal responsive to the light captured or measured. The detector 310 can be implemented using one or more photodiodes, phototransistors, or the like. In addition, a plurality of detectors 310 can be arranged in an array with a spatial configuration corresponding to the irradiated surface area 206 to capture the attenuated or reflected light from the tissue measurement site.

[0043] Referring to FIG. 4A, a top view of a portion of the 3D sensor 300 is provided. The light-absorbing detector filter 306 is illustrated having a top surface coated with a light-absorbing material. The light-absorbing material can be a black opaque material or coating or any other dark color or coating configured to absorb light. Additionally, a rectangular opening 402 is positioned relative to the light concentrator 308 (shown in phantom) and the detector 310 such that light may pass through the rectangular opening 402, into the light concentrator 308, and to the detector 310. FIG. 4B illustrates the top view of a portion of the 3D sensor 300 as in FIG. 4A, with the addition of the tissue measurement site 102 in operational position. Accordingly, the rectangular opening 402, the light concentrator 308 and the detector 310 are shown in phantom as being under the tissue measurement site 102. In FIGS. 4A and 4B, the light concentrator 308 is shown to have dimensions significantly larger than the dimensions of the rectangular opening 402. In other embodiments, the dimensions of the light concentrator 308, the rectangular opening 402, and the irradiated surface area 206 are substantially similar.

[0044] FIG. 5 illustrates a top view of a 3D pulse oximetry sensor 500 according to an embodiment of the present disclosure. The 3D sensor 500 is configured to be worn on a patient's finger 102. The 3D sensor 500 includes an adhesive substrate 502 having front flaps 504 and rear flaps 506 extending outward from a center portion 508 of the 3D sensor 500. The center portion 508 includes components of the 3D pulse oximetry sensor 300 described with respect to FIGS. 3, 4A and 4B. On the front side of the adhesive substrate 502 the emitter 302 and the light diffuser 304 are positioned. On the rear side of the adhesive substrate 502 the light-absorbent detector filter 306, the light concentrator 308 and the detector 310 are positioned. In use, the patient's finger serving as the tissue measurement site 102 is positioned over the rectangular opening 402 such that when the front portion of the adhesive substrate is folded over on top of the patient's finger 102, the emitter 302 and the light diffuser 304 are aligned with the measurement site 102, the filter 306, the light concentrator 308 and the detector 310. Once alignment is established, the front and rear flaps 504, 506 can be wrapped around the finger measurement site 102 such that the adhesive substrate 502 provides a secure contact between the patient's skin and the 3D sensor 500. Fig. 5 also illustrates an example of a sensor connector cable 510 which is used to connect the 3D sensor 500 to a monitor 809, as described with respect to FIG. 8.

[0045] FIG. 6 is a simplified schematic illustration of a conventional, 2D approach to reflective pulse oximetry in which the emitter is configured to emit optical radiation as a point optical source. Reflective pulse oximetry is a method by which the emitter and detector are located on the same side of the tissue measurement site 102. Light is emitted into a tissue measurement site 102 and attenuated. The emitted light passes into the tissue 102 and is then reflected back to the same side of the tissue measurement site 102 as the emitter. As illustrated in FIG. 6, a depicted reflective 2D pulse oximetry sensor 600 includes an emitter 602, a light block 606, and a detector 610. The light block 606 is necessary because the emitter 602 and the detector 610 are located on the same side of the tissue measurement site 102. Accordingly, the light block 606 prevents incident emitter light, which did not enter the tissue measurement site 102, from arriving at the

detector 610. The depicted 2D pulse oximetry sensor 600 is configured to emit light as a point source. As depicted in FIG. 6, a simplified illustration of the light path 620 of the emitted light from the emitter 602, through the tissue measurement site 102, and to the detector 610 is provided. Notably, a point source of light is emitted, and a point source of light is detected. As discussed above with respect to FIG. 1, use of a point optical source can result in substantial measurement error due to pathlength variability resulting from the multiple scatter phenomenon. The sample space provided by a 2D point optical emitter source is not large enough to account for pathlength variability, which will skew measurement results.

[0046] FIGS. 7A and 7B are simplified schematic side and top views, respectively, of a 3D reflective pulse oximetry sensor 700 according to an embodiment of the present disclosure. In the illustrated embodiment, the 3D sensor 700 irradiates the tissue measurement site 102 and detects the emitted light that is reflected by the tissue measurement site 102. The 3D sensor 700 can be placed on a portion of the patient's body that has relatively flat surface, such as, for example a wrist, because the emitter 702 and detector 710 are on located the same side of the tissue measurement site 102. The 3D sensor 700 includes an emitter 702, a light diffuser 704, a light block 706, a light concentrator 708, and a detector 710.

[0047] As previously described, the emitter 702 can serve as the source of optical radiation transmitted towards the tissue measurement site 102. The emitter 702 can include one or more sources of optical radiation. Such sources of optical radiation can include LEDs, laser diodes, incandescent bulbs with appropriate frequency-selective filters, combinations of the same, or the like. In an embodiment, the emitter 702 includes sets of optical sources that are capable of emitting visible and near-infrared optical radiation. In some embodiments, the emitter 702 transmits optical radiation of red and infrared wavelengths, at approximately 650 nm and approximately 940 nm, respectively. In some embodiments, the emitter 702 includes a single source of optical radiation.

[0048] The light diffuser 704 receives the optical radiation emitted from the emitter 302 and homogenously spreads the optical radiation over a wide, donut-shaped area, such as the area outlined by the light diffuser 704 as depicted in FIG.

7B. Advantageously, the diffuser 704 can receive emitted light in the form of a 2D point optical source (or any other form) and spread the light to fit the desired surface area on a plane defined by the surface of the tissue measurement site 102. In an embodiment, the diffuser 704 is made of ground glass or glass beads. A skilled artisan will understand that may other materials can be used to make the light diffuser 704.

[0049] The light blocker 706 includes an annular ring having a cover portion 707 sized and shaped to form a light isolation chamber for the light concentrator 708 and the detector 710. (For purposes of illustration, the light block cover 707 is not illustrated in FIG. 7B.) The light blocker 706 and the cover 707 can be made of any material that optically isolates the light concentrator 708 and the detector 710. The light isolation chamber formed by the light blocker 706 and cover 708 ensures that the only light detected by the detector 710 is light that is reflected from the tissue measurement site.

[0050] The light concentrator 708 is a cylindrical structure with a truncated circular conical structure on top, the truncated section of which of which is adjacent the detector 710. The light concentrator 708 is structured to receive the emitted optical radiation, after reflection by the tissue measurement site 102, and to direct the reflected light to the detector 710. In an embodiment, the light concentrator 708 is made of ground glass or glass beads. In some embodiments, the light concentrator 708 includes a compound parabolic concentrator.

[0051] As previously described, the detector 710 captures and measures light from the tissue measurement site 102. For example, the detector 710 can capture and measure light transmitted from the emitter 702 that has been reflected from the tissue in the measurement site 102. The detector 710 can output a detector signal responsive to the light captured or measured. The detector 710 can be implemented using one or more photodiodes, phototransistors, or the like. In addition, a plurality of detectors 710 can be arranged in an array with a spatial configuration corresponding to the irradiated surface area depicted in FIG. 7B by the light concentrator 708 to capture the reflected light from the tissue measurement site.

[0052] Advantageously, the light path 720 illustrated in FIG. 7A depicts a substantial sample of reflected light that enter the light isolation chamber formed by the light blocker 706 and cover 707. As previously discussed, the large sample of reflected light (as compared to the reflected light collected using the 2D point optical source approach) provides the opportunity to take an average of the detected light, to derive a more accurate measurement of the emitted light absorbed by the tissue, which will lead to a more accurate oxygen saturation measurement.

[0053] Referring now to FIG. 7B, a top view of the 3D sensor 700 is illustrated with both the emitter 702 and the light blocker cover 707 removed for ease of illustration. The outer ring illustrates the footprint of the light diffuser 704. As light is emitted from the emitter 702 (not shown in FIG. 7B), it is diffused homogenously and directed to the tissue measurement site 102. The light blocker 706 forms the circular wall of a light isolation chamber to keep incident light from being sensed by the detector 710. The light blocker cover 707 blocks incidental light from entering the light isolation chamber from above. The light concentrator 710 collects the reflected light from the tissue measurement site 102 and funnels it upward toward the detector 710 at the center of the 3D sensor 700.

[0054] FIG. 8 illustrates an example of an optical physiological measurement system 800, which may also be referred to herein as a pulse oximetry system 800. In certain embodiments, the pulse oximetry system 800 noninvasively measures a blood analyte, such as oxygen, carboxyhemoglobin, methemoglobin, total hemoglobin, glucose, proteins, lipids, a percentage thereof (*e.g.,* saturation), pulse rate, perfusion index, oxygen content, total hemoglobin, Oxygen Reserve Index™ (ORI™) or many other physiologically relevant patient characteristics. These characteristics can relate to, for example, pulse rate, hydration, trending information and analysis, and the like. The system 800 can also measure additional blood analytes and/or other physiological parameters useful in determining a state or trend of wellness of a patient.

[0055] The pulse oximetry system 800 can measure analyte concentrations at least in part by detecting optical radiation attenuated by tissue at a

measurement site 102. The measurement site 102 can be any location on a patient's body, such as a finger, foot, earlobe, wrist, forehead, or the like.

[0056] The pulse oximetry system 800 can include a sensor 801 (or multiple sensors) that is coupled to a processing device or physiological monitor 809. In an embodiment, the sensor 801 and the monitor 809 are integrated together into a single unit. In another embodiment, the sensor 801 and the monitor 809 are separate from each other and communicate with one another in any suitable manner, such as via a wired or wireless connection. The sensor 801 and monitor 809 can be attachable and detachable from each other for the convenience of the user or caregiver, for ease of storage, sterility issues, or the like.

[0057] In the depicted embodiment shown in FIG. 8, the sensor 801 includes an emitter 804, a detector 806, and a front-end interface 808. The emitter 804 can serve as the source of optical radiation transmitted towards measurement site 102. The emitter 804 can include one or more sources of optical radiation, such as light emitting diodes (LEDs), laser diodes, incandescent bulbs with appropriate frequency-selective filters, combinations of the same, or the like. In an embodiment, the emitter 804 includes sets of optical sources that are capable of emitting visible and near-infrared optical radiation.

[0058] The pulse oximetry system 800 also includes a driver 811 that drives the emitter 804. The driver 111 can be a circuit or the like that is controlled by the monitor 809. For example, the driver 811 can provide pulses of current to the emitter 804. In an embodiment, the driver 811 drives the emitter 804 in a progressive fashion, such as in an alternating manner. The driver 811 can drive the emitter 804 with a series of pulses for some wavelengths that can penetrate tissue relatively well and for other wavelengths that tend to be significantly absorbed in tissue. A wide variety of other driving powers and driving methodologies can be used in various embodiments. The driver 811 can be synchronized with other parts of the sensor 801 to minimize or reduce jitter in the timing of pulses of optical radiation emitted from the emitter 804. In some embodiments, the driver 811 is capable of driving the emitter 804 to emit optical radiation in a pattern that varies by less than about 10 parts-per-million.

[0059] The detector 806 captures and measures light from the tissue measurement site 102. For example, the detector 806 can capture and measure light transmitted from the emitter 804 that has been attenuated or reflected from the tissue at the measurement site 102. The detector 806 can output a detector signal 107 responsive to the light captured and measured. The detector 806 can be implemented using one or more photodiodes, phototransistors, or the like. In some embodiments, a detector 806 is implemented in detector package to capture and measure light from the tissue measurement site 102 of the patient. The detector package can include a photodiode chip mounted to leads and enclosed in an encapsulant. In some embodiments, the dimensions of the detector package are approximately 2 square centimeters. In other embodiments, the dimensions of the detector package are approximately 1.5 centimeters in width and approximately 2 centimeters in length.

[0060] The front-end interface 808 provides an interface that adapts the output of the detectors 806, which is responsive to desired physiological parameters. For example, the front-end interface 808 can adapt the signal 807 received from the detector 806 into a form that can be processed by the monitor 809, for example, by a signal processor 810 in the monitor 809. The front-end interface 808 can have its components assembled in the sensor 801, in the monitor 809, in a connecting cabling (if used), in combinations of the same, or the like. The location of the front-end interface 808 can be chosen based on various factors including space desired for components, desired noise reductions or limits, desired heat reductions or limits, and the like.

[0061] The front-end interface 808 can be coupled to the detector 806 and to the signal processor 810 using a bus, wire, electrical or optical cable, flex circuit, or some other form of signal connection. The front-end interface 808 can also be at least partially integrated with various components, such as the detectors 806. For example, the front-end interface 808 can include one or more integrated circuits that are on the same circuit board as the detector 806. Other configurations can also be used.

[0062] As shown in FIG. 8, the monitor 909 can include the signal processor 810 and a user interface, such as a display 812. The monitor 809 can also include optional outputs alone or in combination with the display 812, such as a storage device 814 and a network interface 816. In an embodiment, the signal processor 810 includes processing logic that determines measurements for desired analytes based on the signals received from the detector 806. The signal processor 810 can be implemented using one or more microprocessors or sub-processors (*e.g.*, cores), digital signal processors, application specific integrated circuits (ASICs), field programmable gate arrays (FPGAs), combinations of the same, and the like.

[0063] The signal processor 810 can provide various signals that control the operation of the sensor 801. For example, the signal processor 810 can provide an emitter control signal to the driver 811. This control signal can be useful in order to synchronize, minimize, or reduce jitter in the timing of pulses emitted from the emitter 804. Accordingly, this control signal can be useful in order to cause optical radiation pulses emitted from the emitter 804 to follow a precise timing and consistent pattern. For example, when a transimpedance-based front-end interface 808 is used, the control signal from the signal processor 810 can provide synchronization with an analog-to-digital converter (ADC) in order to avoid aliasing, cross-talk, and the like. As also shown, an optional memory 813 can be included in the front-end interface 808 and/or in the signal processor 810. This memory 813 can serve as a buffer or storage location for the front-end interface 808 and/or the signal processor 810, among other uses.

[0064] The user interface 812 can provide an output, *e.g.*, on a display, for presentation to a user of the pulse oximetry system 800. The user interface 812 can be implemented as a touch-screen display, a liquid crystal display (LCD), an organic LED display, or the like. In alternative embodiments, the pulse oximetry system 800 can be provided without a user interface 812 and can simply provide an output signal to a separate display or system.

[0065] The storage device 814 and a network interface 816 represent other optional output connections that can be included in the monitor 809. The

storage device 814 can include any computer-readable medium, such as a memory device, hard disk storage, EEPROM, flash drive, or the like. The various software and/or firmware applications can be stored in the storage device 814, which can be executed by the signal processor 810 or another processor of the monitor 809. The network interface 816 can be a serial bus port (RS-232/RS-485), a Universal Serial Bus (USB) port, an Ethernet port, a wireless interface (*e.g.*, WiFi such as any 802.1x interface, including an internal wireless card), or other suitable communication device(s) that allows the monitor 809 to communicate and share data with other devices. The monitor 809 can also include various other components not shown, such as a microprocessor, graphics processor, or controller to output the user interface 812, to control data communications, to compute data trending, or to perform other operations.

[0066] Although not shown in the depicted embodiment, the pulse oximetry system 800 can include various other components or can be configured in different ways. For example, the sensor 801 can have both the emitter 804 and detector 806 on the same side of the tissue measurement site 102 and use reflectance to measure analytes.

[0067] Although the foregoing disclosure has been described in terms of certain preferred embodiments, many other variations than those described herein will be apparent to those of ordinary skill in the art.

[0068] Conditional language used herein, such as, among others, "can," "might," "may," "*e.g.*," and the like, unless specifically stated otherwise, or otherwise understood within the context as used, is generally intended to convey that certain embodiments include, while other embodiments do not include, certain features, elements and/or states. Thus, such conditional language is not generally intended to imply that features, elements and/or states are in any way required for one or more embodiments or that one or more embodiments necessarily include logic for deciding, with or without author input or prompting, whether these features, elements and/or states are included or are to be performed in any particular embodiment. The terms "comprising," "including," "having," and the like are synonymous and are used inclusively, in an open-ended fashion, and do not

exclude additional elements, features, acts, operations, and so forth. Also, the term "or" is used in its inclusive sense (and not in its exclusive sense) so that when used, for example, to connect a list of elements, the term "or" means one, some, or all of the elements in the list. Further, the term "each," as used herein, in addition to having its ordinary meaning, can mean any subset of a set of elements to which the term "each" is applied.

[0069] While the above detailed description has shown, described, and pointed out novel features as applied to various embodiments, it will be understood that various omissions, substitutions, and changes in the form and details of the systems, devices or algorithms illustrated can be made without departing from the spirit of the disclosure. As will be recognized, certain embodiments of the disclosure described herein can be embodied within a form that does not provide all of the features and benefits set forth herein, as some features can be used or practiced separately from others.

[0070] The term “and/or” herein has its broadest, least limiting meaning which is the disclosure includes A alone, B alone, both A and B together, or A or B alternatively, but does not require both A and B or require one of A or one of B. As used herein, the phrase “at least one of” A, B, “and” C should be construed to mean a logical A or B or C, using a non-exclusive logical or.

[0071] The apparatuses and methods described herein may be implemented by one or more computer programs executed by one or more processors. The computer programs include processor-executable instructions that are stored on a non-transitory tangible computer readable medium. The computer programs may also include stored data. Non-limiting examples of the non-transitory tangible computer readable medium are nonvolatile memory, magnetic storage, and optical storage. Although the foregoing disclosure has been described in terms of certain preferred embodiments, other embodiments will be apparent to those of ordinary skill in the art from the disclosure herein. Additionally, other combinations, omissions, substitutions and modifications will be apparent to the skilled artisan in view of the disclosure herein. Accordingly, the present invention is not intended to

be limited by the description of the preferred embodiments, but is to be defined by reference to claims.

[0072] Additionally, all publications, patents, and patent applications mentioned in this specification are herein incorporated by reference to the same extent as if each individual publication, patent, or patent application were specifically and individually indicated to be incorporated by reference.

WHAT IS CLAIMED IS:

1. A physiological measurement device configured to irradiate at least a portion of a wrist of a user and determine a physiological measurement responsive to detected attenuated light, the device comprising:

one or more emitters configured to emit light in an initial light pattern;

an optical transmission material positioned between the one or more emitters and a tissue measurement site, wherein the optical transmission material is configured to alter a direction of at least a portion of the light emitted from the one or more emitters before the light reaches the tissue measurement site to shape an output light pattern directed toward a surface of the tissue measurement site, wherein the output light pattern differs in geometric shape from the initial light pattern;

a plurality of detectors configured to detect the light after attenuation by tissue, the plurality of detectors further configured to output at least one signal responsive to the detected light;

a light block configured to prevent at least a portion of the light emitted from the one or more emitters from reaching the plurality of detectors without first reaching the tissue;

a surface comprising a dark-colored coating, the surface positioned between the plurality of detectors and the tissue, wherein an opening defined in the dark-colored coating is configured to allow at least a portion of light reflected from the tissue to pass through the surface; and

a processor configured to receive and process one or more signals responsive to the outputted at least one signal and determine a physiological parameter of the user responsive to the one or more signals.

2. A physiological measurement device comprising:

one or more emitters configured to emit light proximate a wrist of a user in an initially emitted pattern;

an optical transmission material positioned between the one or more emitters and a tissue measurement site, wherein the optical transmission material is configured to alter a direction of at least a portion of the light emitted from the one or

more emitters before the light reaches the tissue measurement site to shape an output light pattern projected toward a surface of the tissue measurement site that differs from the initially emitted pattern;

a light block having a circular shape;

a plurality of detectors configured to detect the light after the light passes through a portion of the tissue measurement site bounded by the light block, wherein the plurality of detectors are arranged in an array having a spatial configuration corresponding to a shape of the portion of the tissue measurement site bounded by the circular shaped light block, wherein the plurality of detectors are further configured to output at least one signal responsive to the detected light;

wherein the light block is configured to prevent at least a portion of light emitted from the one or more emitters from reaching the plurality of detectors without first reaching the tissue; and

a processor configured to receive and process one or more signals responsive to the outputted at least one signal and determine a physiological parameter of the user responsive to the one or more signals.

ABSTRACT OF THE DISCLOSURE

A non-invasive, optical-based physiological monitoring system is disclosed. One embodiment includes an emitter configured to emit light. A diffuser is configured to receive and spread the emitted light, and to emit the spread light at a tissue measurement site. The system further includes a concentrator configured to receive the spread light after it has been attenuated by or reflected from the tissue measurement site. The concentrator is also configured to collect and concentrate the received light and to emit the concentrated light to a detector. The detector is configured to detect the concentrated light and to transmit a signal representative of the detected light. A processor is configured to receive the transmitted signal and to determine a physiological parameter, such as, for example, arterial oxygen saturation, in the tissue measurement site.

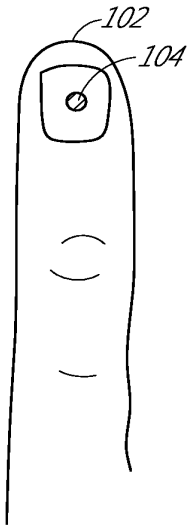


FIG. 1
(PRIOR ART)

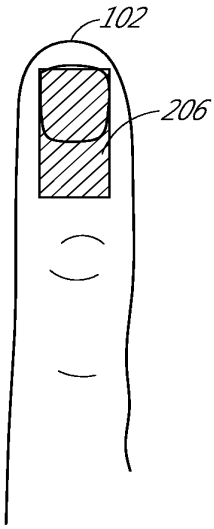


FIG. 2

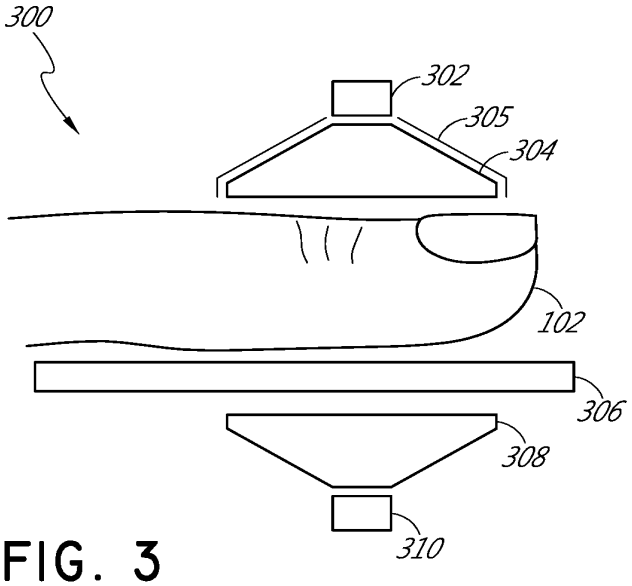


FIG. 3

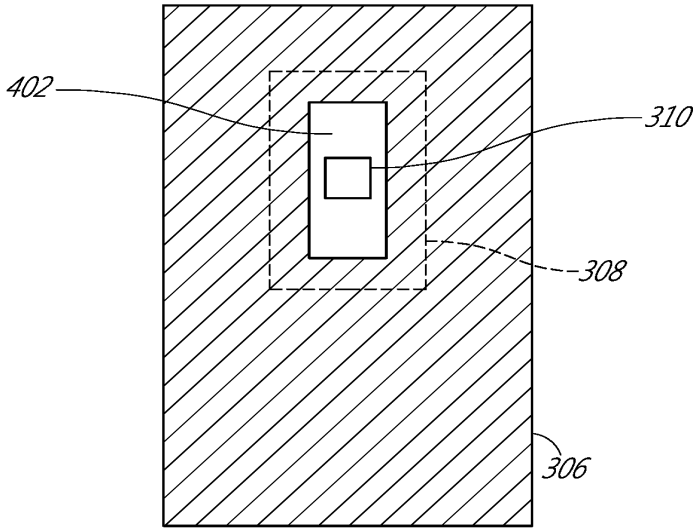


FIG. 4A

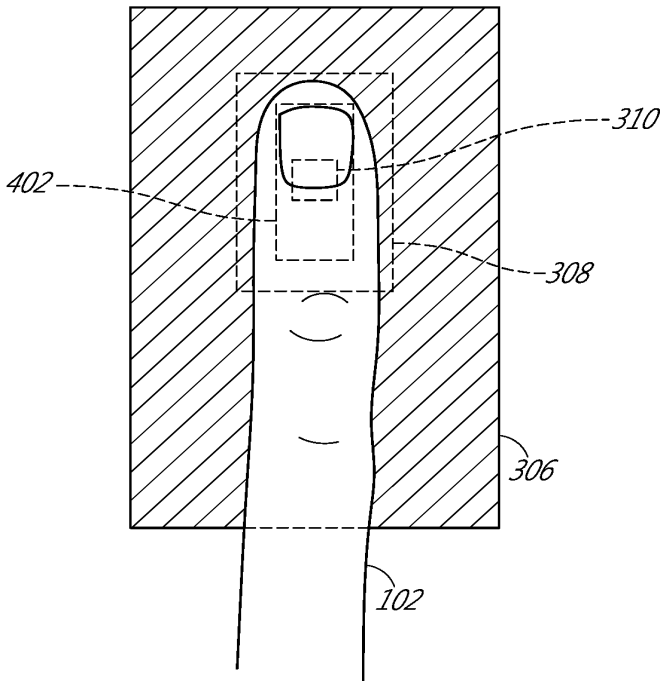


FIG. 4B

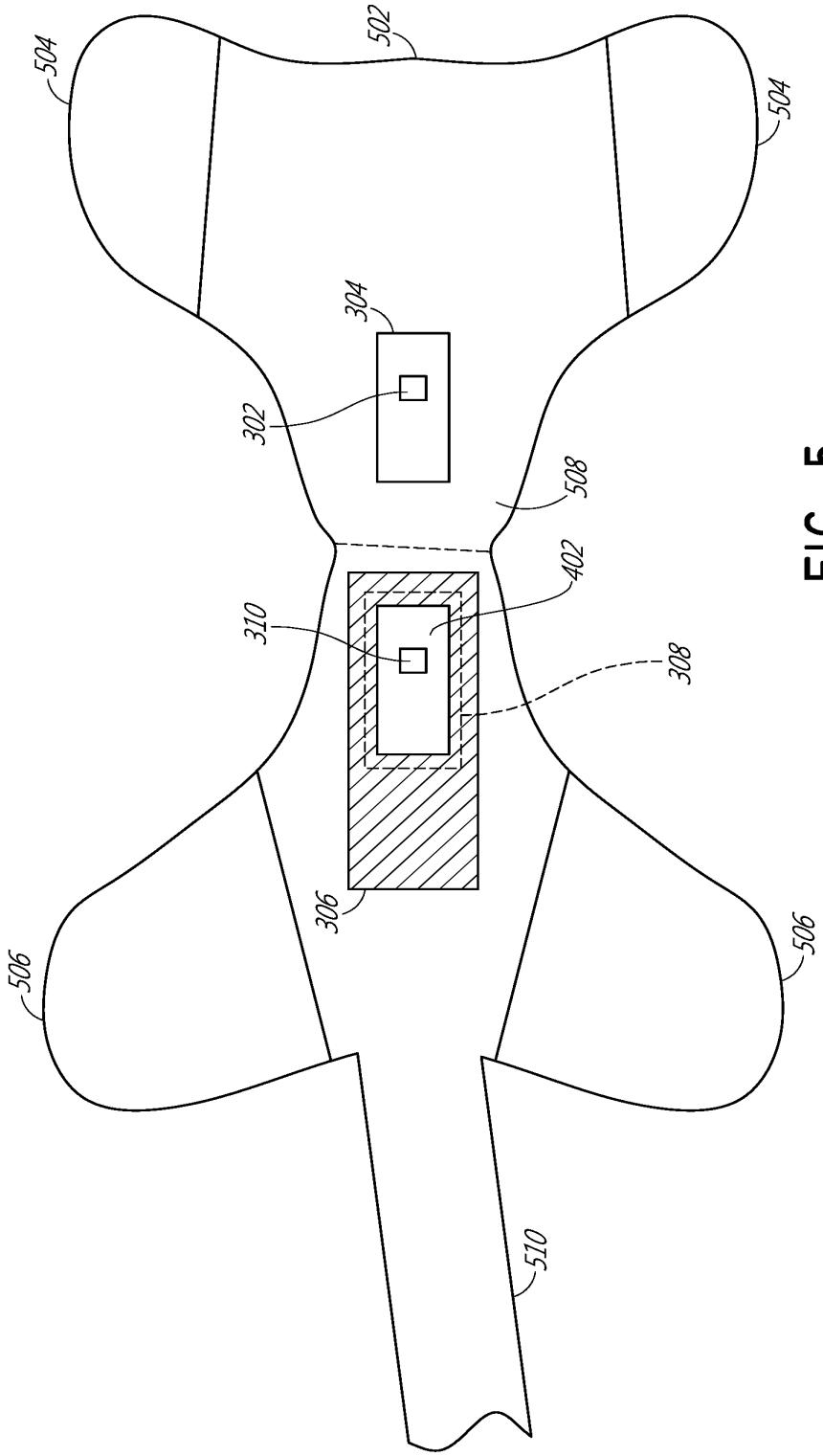


FIG. 5

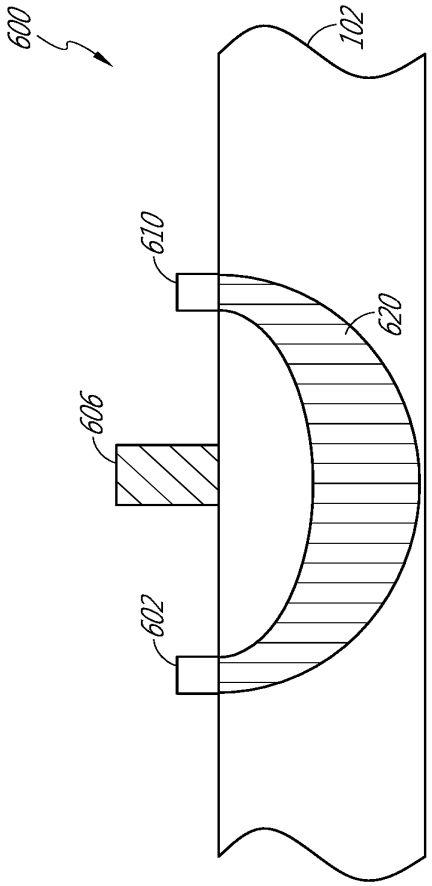


FIG. 6
(PRIOR ART)

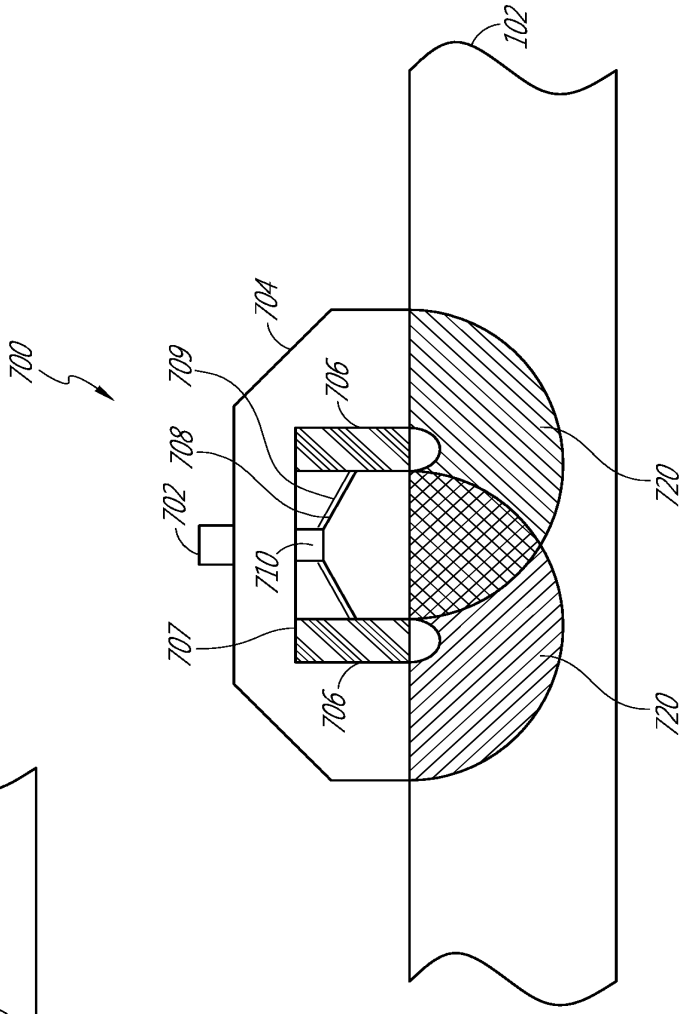


FIG. 7A

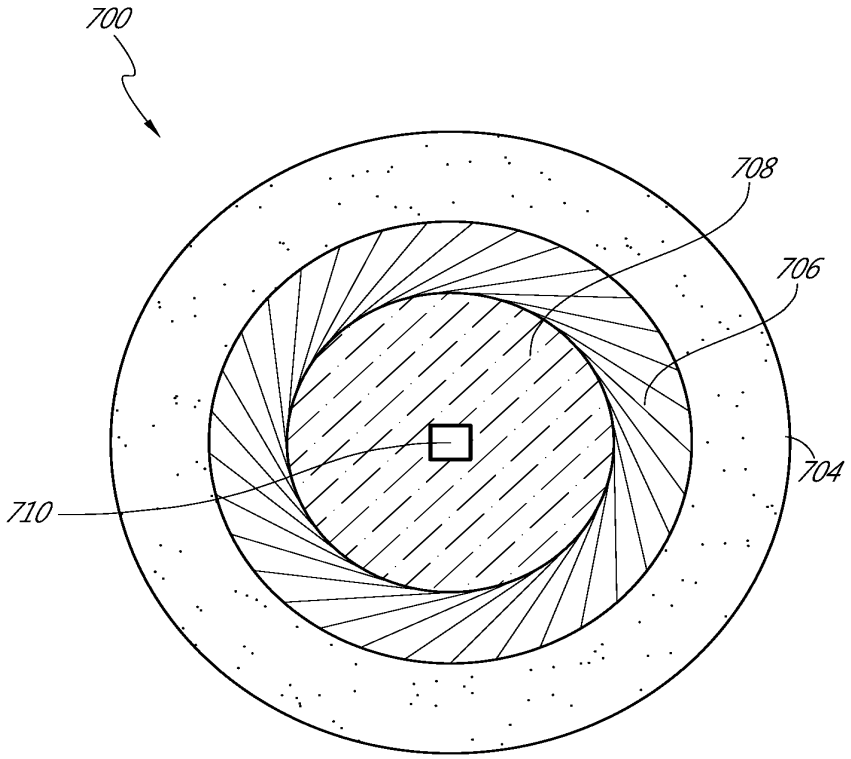


FIG. 7B

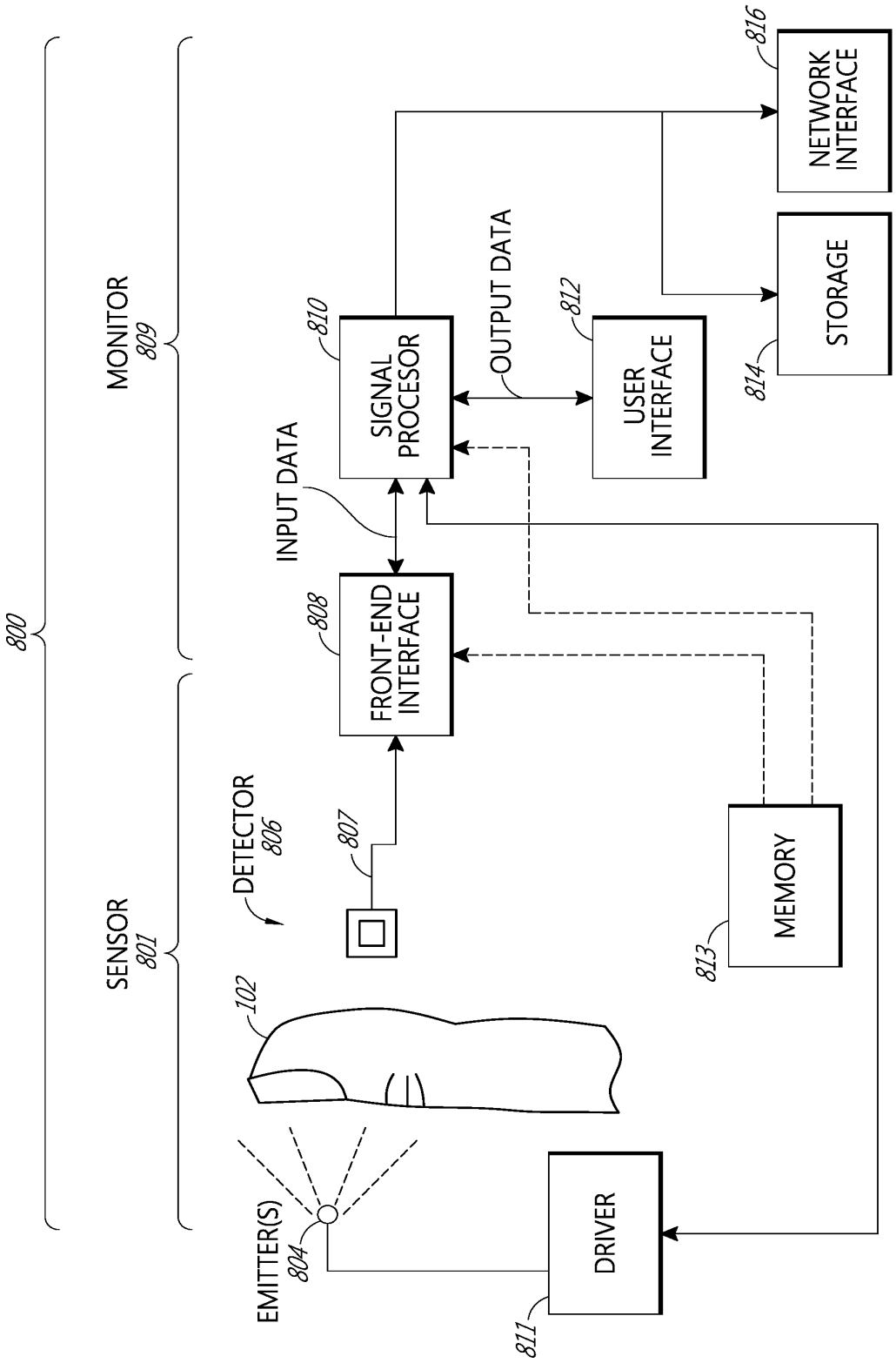

800
MONITOR
809
SENSOR
801
816
NETWORK INTERFACE
STORAGE
814
OUTPUT DATA
812
USER INTERFACE
810
SIGNAL PROCESOR
INPUT DATA
808
FRONT-END INTERFACE
DETECTOR
806
807
102
MEMORY
813
EMITTER(S)
804
DRIVER
811

FIG. 8

Electronic Patent Application Fee Transmittal	
Application Number:	
Filing Date:	
Title of Invention:	PHYSIOLOGICAL MEASUREMENT DEVICES, SYSTEMS, AND METHODS
First Named Inventor/Applicant Name:	Ammar Al-Ali
Filer:	Jarom D. Kesler/Daniel Escajeda
Attorney Docket Number:	MAS.1007C4
Filed as Large Entity	
Filing Fees for Track I Prioritized Examination - Nonprovisional Application under 35 USC 111(a)	

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
UTILITY APPLICATION FILING	1011	1	300	300
UTILITY SEARCH FEE	1111	1	660	660
UTILITY EXAMINATION FEE	1311	1	760	760
REQUEST FOR PRIORITIZED EXAMINATION	1817	1	4000	4000
Pages:				
Claims:				
Miscellaneous-Filing:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
PUBL. FEE- EARLY, VOLUNTARY, OR NORMAL	1504	1	0	0
PROCESSING FEE, EXCEPT PROV. APPLS.	1830	1	140	140
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Miscellaneous:				
		Total in USD ($)		**5860**

Electronic Acknowledgement Receipt	
EFS ID:	38597703
Application Number:	16791955
International Application Number:	
Confirmation Number:	3106
Title of Invention:	PHYSIOLOGICAL MEASUREMENT DEVICES, SYSTEMS, AND METHODS
First Named Inventor/Applicant Name:	Ammar Al-Ali
Customer Number:	64735
Filer:	Jarom D. Kesler/Jennifer Neat
Filer Authorized By:	Jarom D. Kesler
Attorney Docket Number:	MAS.1007C4
Receipt Date:	14-FEB-2020
Filing Date:	
Time Stamp:	18:33:54
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	CARD
Payment was successfully received in RAM	$5860
RAM confirmation Number	E20202DI35038458
Deposit Account	111410
Authorized User	Jennifer Neat
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows: 37 CFR 1.16 (National application filing, search, and examination fees) 37 CFR 1.17 (Patent application and reexamination processing fees)	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	TrackOne Request	TRACK1_MAS1007C4.pdf	113944 7b17cdeb480954e7d3c851b132aab8bf69b08430	no	2
Warnings:					
Information:					
2	Application Data Sheet	ADS_MAS1007C4.pdf	1256223 b7caa54f9541bdac29070a5a35f2ef7fa1066535	no	8
Warnings:					
Information:					
3	Oath or Declaration filed	DECS_MAS1007C4.pdf	1170600 f4bd3e0ba40c4476a10740a2ae70cc8e50dbc171	no	1
Warnings:					
Information:					
4	Power of Attorney	POA_MAS1007C4.pdf	392345 6f0759cec8ab3e14e90bf3892f2c94b86b181f04	no	3
Warnings:					
Information:					
5		APPLICATION_MAS1007C4.pdf	155063 70c8f0fa8312de3033d4091c5620a127eeea025e	yes	27

Multipart Description/PDF files in .zip description

Document Description	Start	End
Specification	1	24
Claims	25	26
Abstract	27	27

Warnings:					
Information:					
6	Drawings-only black and white line drawings	DRAWINGS_MAS1007C4.pdf	228448 05d1e773e6c0e4e7f6dccbe910ed9a0021fd8a3e	no	7
Warnings:					
Information:					
7	Fee Worksheet (SB06)	fee-info.pdf	40130 baf533f10ba215c090392849655fb7fff342ab23	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	3356753		

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<u>New Applications Under 35 U.S.C. 111</u>
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.
<u>National Stage of an International Application under 35 U.S.C. 371</u>
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.
<u>New International Application Filed with the USPTO as a Receiving Office</u>
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

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P.O. Box 1450
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APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY.DOCKET.NO	TOT CLAIMS	IND CLAIMS
16/791,955	02/14/2020	2875	1720	MAS.1007C4	2	2

CONFIRMATION NO. 3106

64735
KNOBBE, MARTENS, OLSON & BEAR, LLP
MASIMO CORPORATION (MASIMO)
2040 MAIN STREET
FOURTEENTH FLOOR
IRVINE, CA 92614

FILING RECEIPT

OC000000115142508

Date Mailed: 03/05/2020

Receipt is acknowledged of this non-provisional utility patent application. The application will be taken up for examination in due course. Applicant will be notified as to the results of the examination. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF FIRST INVENTOR, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection.

Please verify the accuracy of the data presented on this receipt. If an error is noted on this Filing Receipt, please submit a written request for a corrected Filing Receipt, including a properly marked-up ADS showing the changes with strike-through for deletions and underlining for additions. If you received a "Notice to File Missing Parts" or other Notice requiring a response for this application, please submit any request for correction to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections provided that the request is grantable.

Inventor(s)

Ammar Al-Ali, San Juan Capistrano, CA;

Applicant(s)

MASIMO CORPORATION, Irvine, CA;

Power of Attorney: The patent practitioners associated with Customer Number 64735

Domestic Priority data as claimed by applicant

This application is a CON of 16/532,061 08/05/2019
which is a CON of 15/195,199 06/28/2016 PAT 10448871
which claims benefit of 62/188,430 07/02/2015

Foreign Applications for which priority is claimed (You may be eligible to benefit from the **Patent Prosecution Highway** program at the USPTO. Please see http://www.uspto.gov for more information.) - None.
Foreign application information must be provided in an Application Data Sheet in order to constitute a claim to foreign priority. See 37 CFR 1.55 and 1.76.

Permission to Access Application via Priority Document Exchange: Yes

Permission to Access Search Results: Yes

Applicant may provide or rescind an authorization for access using Form PTO/SB/39 or Form PTO/SB/69 as appropriate.

If Required, Foreign Filing License Granted: 03/03/2020

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 16/791,955**

Projected Publication Date: 06/11/2020

Non-Publication Request: No

Early Publication Request: No

Title

PHYSIOLOGICAL MEASUREMENT DEVICES, SYSTEMS, AND METHODS

Preliminary Class

362

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications: No

PROTECTING YOUR INVENTION OUTSIDE THE UNITED STATES

Since the rights granted by a U.S. patent extend only throughout the territory of the United States and have no effect in a foreign country, an inventor who wishes patent protection in another country must apply for a patent in a specific country or in regional patent offices. Applicants may wish to consider the filing of an international application under the Patent Cooperation Treaty (PCT). An international (PCT) application generally has the same effect as a regular national patent application in each PCT-member country. The PCT process **simplifies** the filing of patent applications on the same invention in member countries, but **does not result** in a grant of "an international patent" and does not eliminate the need of applicants to file additional documents and fees in countries where patent protection is desired.

Almost every country has its own patent law, and a person desiring a patent in a particular country must make an application for patent in that country in accordance with its particular laws. Since the laws of many countries differ in various respects from the patent law of the United States, applicants are advised to seek guidance from specific foreign countries to ensure that patent rights are not lost prematurely.

Applicants also are advised that in the case of inventions made in the United States, the Director of the USPTO must issue a license before applicants can apply for a patent in a foreign country. The filing of a U.S. patent application serves as a request for a foreign filing license. The application's filing receipt contains further information and guidance as to the status of applicant's license for foreign filing.

Applicants may wish to consult the USPTO booklet, "General Information Concerning Patents" (specifically, the section entitled "Treaties and Foreign Patents") for more information on timeframes and deadlines for filing foreign patent applications. The guide is available either by contacting the USPTO Contact Center at 800-786-9199, or it can be viewed on the USPTO website at http://www.uspto.gov/web/offices/pac/doc/general/index.html.

For information on preventing theft of your intellectual property (patents, trademarks and copyrights), you may wish to consult the U.S. Government website, http://www.stopfakes.gov. Part of a Department of Commerce initiative, this website includes self-help "toolkits" giving innovators guidance on how to protect intellectual property in specific countries such as China, Korea and Mexico. For questions regarding patent enforcement issues, applicants may call the U.S. Government hotline at 1-866-999-HALT (1-866-999-4258).

LICENSE FOR FOREIGN FILING UNDER

Title 35, United States Code, Section 184

Title 37, Code of Federal Regulations, 5.11 & 5.15

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PATENT APPLICATION FEE DETERMINATION RECORD

Substitute for Form PTO-875

Application or Docket Number: 16/791,955

APPLICATION AS FILED - PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA	SMALL ENTITY RATE($)	SMALL ENTITY FEE($)	OR	OTHER THAN SMALL ENTITY RATE($)	OTHER THAN SMALL ENTITY FEE($)
BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A			N/A	300
SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A			N/A	660
EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A	760
TOTAL CLAIMS (37 CFR 1.16(i))	2 minus 20 =	*			OR	x 100 =	0.00
INDEPENDENT CLAIMS (37 CFR 1.16(h))	2 minus 3 =	*				x 460 =	0.00
APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).						0.00
MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))							0.00
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL			TOTAL	1720

APPLICATION AS AMENDED - PART II

		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	SMALL ENTITY RATE($)	SMALL ENTITY ADDITIONAL FEE($)	OR	OTHER THAN SMALL ENTITY RATE($)	OTHER THAN SMALL ENTITY ADDITIONAL FEE($)
AMENDMENT A	Total (37 CFR 1.16(i))	*	Minus	**	=	x =		OR	x =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	x =		OR	x =	
	Application Size Fee (37 CFR 1.16(s))									
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE($)	ADDITIONAL FEE($)	OR	RATE($)	ADDITIONAL FEE($)
AMENDMENT B	Total (37 CFR 1.16(i))	*	Minus	**	=	x =		OR	x =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	x =		OR	x =	
	Application Size Fee (37 CFR 1.16(s))									
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.

** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".

*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".

The "Highest Number Previously Paid For" (Total or Independent) is the highest found in the appropriate box in column 1.

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/791,955	02/14/2020	Ammar Al-Ali	MAS.1007C4	3106

64735 7590 03/05/2020

KNOBBE, MARTENS, OLSON & BEAR, LLP
MASIMO CORPORATION (MASIMO)
2040 MAIN STREET
FOURTEENTH FLOOR
IRVINE, CA 92614

EXAMINER	
ART UNIT	PAPER NUMBER
3791	

NOTIFICATION DATE	DELIVERY MODE
03/05/2020	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

efiling@knobbe.com
jayna.cartee@knobbe.com

Decision Granting Request for Prioritized Examination (Track I)	**Application No.** 16/791,955	**Applicant(s)** Al-Ali, Ammar	
	Examiner BRIAN W BROWN	**Art Unit** OPET	**AIA (FITF) Status** Yes

1. THE REQUEST FILED 14 February 2020 IS **GRANTED** .

The above-identified application has met the requirements for prioritized examination

A. ☑ for an original nonprovisional application (Track I).
B. ☐ for an application undergoing continued examination (RCE).

2. **The above-identified application will undergo prioritized examination**. The application will be accorded special status throughout its entire course of prosecution until one of the following occurs:

A. filing a **petition for extension of time** to extend the time period for filing a reply;

B. filing an **amendment to amend the application to contain more than four independent claims, more than thirty total claims** , or a multiple dependent claim;

C. filing a **request for continued examination** ;

D. filing a notice of appeal;

E. filing a request for suspension of action;

F. mailing of a notice of allowance;

G. mailing of a final Office action;

H. completion of examination as defined in 37 CFR 41.102; or

I. abandonment of the application.

Telephone inquiries with regard to this decision should be directed to BRIAN BROWN at (571)272-5338. In his/her absence, calls may be directed to Petition Help Desk at (571) 272-3282.

/BRIAN W BROWN/ Petitions Examiner, OPET	

To: jayna.cartee@knobbe.com,efiling@knobbe.com,
From: PAIR_eOfficeAction@uspto.gov
Cc: PAIR_eOfficeAction@uspto.gov
Subject: Private PAIR Correspondence Notification for Customer Number 64735

Mar 05, 2020 04:41:45 AM

Dear PAIR Customer:

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UNITED STATES

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Application	Document	Mailroom Date	Attorney Docket No.
16791955	APP.FILE.REC	03/05/2020	MAS.1007C4

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Mar 06, 2020 04:58:24 AM

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UNITED STATES

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Application	Document	Mailroom Date	Attorney Docket No.
16791955	TRACK1.GRANT	03/05/2020	MAS.1007C4

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If you have any questions, please email the Electronic Business Center (EBC) at EBC@uspto.gov with 'e-Office Action' on the subject line or call 1-866-217-9197 during the following hours:

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PATENT APPLICATION INFORMATION RETRIEVAL SYSTEM

Doc Code: DIST.E.FILE **Document Description: Electronic Terminal Disclaimer - Filed**	PTO/SB/25 PTO/SB/26 U.S. Patent and Trademark Office Department of Commerce

Electronic Petition Request	**TERMINAL DISCLAIMER TO OBVIATE A PROVISIONAL DOUBLE PATENTING REJECTION OVER A PENDING "REFERENCE" APPLICATION AND TERMINAL DISCLAIMER TO OBVIATE A DOUBLE PATENTING REJECTION OVER A "PRIOR" PATENT**
Application Number	16791955
Filing Date	14-Feb-2020
First Named Inventor	Ammar Al-Ali
Attorney Docket Number	MAS.1007C4
Title of Invention	PHYSIOLOGICAL MEASUREMENT DEVICES, SYSTEMS, AND METHODS

☒ Filing of terminal disclaimer does not obviate requirement for response under 37 CFR 1.111 to outstanding Office Action

☒ This electronic Terminal Disclaimer is not being used for a Joint Research Agreement.

Owner	Percent Interest
Masimo Corporation	100 %

The owner(s) of percent interest listed above in the instant application hereby disclaims, except as provided below, the terminal part of the statutory term of any patent granted on the instant application which would extend beyond the expiration date of the full statutory term of any patent granted on pending reference Application Number(s)

16532061 filed on 08/05/2019

16532065 filed on 08/05/2019

16791963 filed on 02/14/2020

as the term of any patent granted on said reference application may be shortened by any terminal disclaimer filed prior to the grant of any patent on the pending reference application. The owner hereby agrees that any patent so granted on the instant application shall be enforceable only for and during such period that it and any patent granted on the reference application are commonly owned. This agreement runs with any patent granted on the instant application and is binding upon the grantee, its successors or assigns.

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The owner(s) with percent interest listed above in the instant application hereby disclaims, except as provided below, the terminal part of the statutory term of any patent granted on the instant application which would extend beyond the expiration date of the full statutory term of prior patent number(s)

10448871

10470695

as the term of said prior patent is presently shortened by any terminal disclaimer. The owner hereby agrees that any patent so granted on the instant application shall be enforceable only for and during such period that it and the prior patent are commonly owned. This agreement runs with any patent granted on the instant application and is binding upon the grantee, its successors or assigns.

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- expires for failure to pay a maintenance fee;
- is held unenforceable;
- is found invalid by a court of competent jurisdiction;
- is statutorily disclaimed in whole or terminally disclaimed under 37 CFR 1.321;
- has all claims canceled by a reexamination certificate;
- is reissued; or
- is in any manner terminated prior to the expiration of its full statutory term as presently shortened by any terminal disclaimer.

◉ Terminal disclaimer fee under 37 CFR 1.20(d) is included with Electronic Terminal Disclaimer request.

○ I certify, in accordance with 37 CFR 1.4(d)(4), that the terminal disclaimer fee under 37 CFR 1.20(d) required for this terminal disclaimer has already been paid in the above-identified application.

Applicants claims the following fee status:

○ Small Entity

○ Micro Entity

◉ Regular Undiscounted

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further 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 Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

THIS PORTION MUST BE COMPLETED BY THE SIGNATORY OR SIGNATORIES

I certify, in accordance with 37 CFR 1.4(d)(4) that I am:

◉ An attorney or agent registered to practice before the Patent and Trademark Office who is of record in this application

Registration Number 57046

○ A sole inventor

○ A joint inventor; I certify that I am authorized to sign this submission on behalf of all of the inventors as evidenced by the power of attorney in the application

○ A joint inventor; all of whom are signing this request

Signature	/Jarom Kesler/
Name	Jarom D. Kesler

*Statement under 37 CFR 3.73(b) is required if terminal disclaimer is signed by the assignee (owner).
Form PTO/SB/96 may be used for making this certification. See MPEP § 324.

Electronic Patent Application Fee Transmittal	
Application Number:	16791955
Filing Date:	14-Feb-2020
Title of Invention:	PHYSIOLOGICAL MEASUREMENT DEVICES, SYSTEMS, AND METHODS
First Named Inventor/Applicant Name:	Ammar Al-Ali
Filer:	Jarom D. Kesler/Fabiola Esmerio
Attorney Docket Number:	MAS.1007C4
Filed as Large Entity	
Filing Fees for Utility under 35 USC 111(a)	

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
STATUTORY OR TERMINAL DISCLAIMER	1814	1	160	160
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Extension-of-Time:				
Miscellaneous:				
			Total in USD ($)	**160**

Doc Code: DISQ.E.FILE
Document Description: Electronic Terminal Disclaimer – Approved

Application No.: 16791955

Filing Date: 14-Feb-2020

Applicant/Patent under Reexamination: Al-Ali

Electronic Terminal Disclaimer filed on March 11, 2020

☒ APPROVED

This patent is subject to a terminal disclaimer

☐ DISAPPROVED

Approved/Disapproved by: Electronic Terminal Disclaimer automatically approved by EFS-Web

U.S. Patent and Trademark Office

Electronic Acknowledgement Receipt	
EFS ID:	38839973
Application Number:	16791955
International Application Number:	
Confirmation Number:	3106
Title of Invention:	PHYSIOLOGICAL MEASUREMENT DEVICES, SYSTEMS, AND METHODS
First Named Inventor/Applicant Name:	Ammar Al-Ali
Customer Number:	64735
Filer:	Jarom D. Kesler/Fabiola Esmerio
Filer Authorized By:	Jarom D. Kesler
Attorney Docket Number:	MAS.1007C4
Receipt Date:	11-MAR-2020
Filing Date:	14-FEB-2020
Time Stamp:	19:15:07
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	CARD
Payment was successfully received in RAM	$160
RAM confirmation Number	E20203AJ15035250
Deposit Account	111410
Authorized User	Fabiola Esmerio
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows: 37 CFR 1.16 (National application filing, search, and examination fees) 37 CFR 1.17 (Patent application and reexamination processing fees)	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Terminal Disclaimer-Filed (Electronic)	eTerminal-Disclaimer.pdf	38023 a8f7bb7b384f16de5e8ccd8721a91cda0749a124	no	3
Warnings:					
Information:					
2	Fee Worksheet (SB06)	fee-info.pdf	30398 055a24b7cb90315007bde871f61e740239418833	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	68421		

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.
National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.
New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Inventor	:	Ammar Al-Ali
App. No.	:	16/791955
Filed	:	February 14, 2020
For	:	PHYSIOLOGICAL MEASUREMENT DEVICES, SYSTEMS, AND METHODS
Examiner	:	Unknown
Art Unit	:	2875
Conf. No.	:	3106

PRELIMINARY AMENDMENT

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Commissioner:

Prior to examination of the above-identified application, please enter the amendments set forth herein.

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

Amendments to the Claims are reflected in the listing of claims which begins on page 5 of this paper.

Amendments to the Drawings begin on page 10. A "Replacement Sheet" for each sheet of drawings being amended can be found in the Appendix.

Remarks begin on page 11 of this paper.

AMENDMENTS TO THE SPECIFICATION

Please amend the originally filed specification as set forth below.

Please amend Paragraph [0020] as follows:

[0020] FIG. 1 illustrates a conventional approach to [[2D]]two-dimensional pulse oximetry in which the emitter is configured to emit optical radiation as a point optical source.

Please amend Paragraph [0021] as follows:

[0021] FIG. 2 illustrates the disclosed [[3D]]three-dimensional approach to pulse oximetry in which the emitted light irradiates a substantially larger volume of tissue as compared to the point source approach described with respect to ~~FIG. 2A~~FIG. 1.

Please amend Paragraph [0022] as follows:

[0022] FIG. 3 illustrates schematically a side view of a [[3D]]three-dimensional pulse oximetry sensor according to an embodiment of the present disclosure.

Please amend Paragraph [0023] as follows:

[0023] FIG. 4A is a top view of a portion of a [[3D]]three-dimensional pulse oximetry sensor according to an embodiment of the present disclosure.

Please amend Paragraph [0024] as follows:

[0024] FIG. 4B illustrates the top view of a portion of the [[3D]]three-dimensional pulse oximetry sensor shown in FIG. 4A, with the addition of a tissue measurement site in operational position.

Please amend Paragraph [0025] as follows:

[0025] FIG. 5 illustrates a top view of a [[3D]]three-dimensional pulse oximetry sensor according to an embodiment of the present disclosure.

Please amend Paragraph [0026] as follows:

[0026] FIG. 6 illustrates a conventional [[2D]]two-dimensional approach to reflective pulse oximetry in which the emitter is configured to emit optical radiation as a point optical source.

Please amend Paragraph [0027] as follows:

[0027] FIG. 7A is a simplified schematic side view illustration of a reflective [[3D]]three-dimensional pulse oximetry sensor according to an embodiment of the present disclosure.

Please amend Paragraph [0028] as follows:

[0028] FIG. 7B is a simplified schematic top view illustration of the [[3D]]three-dimensional reflective pulse oximetry sensor of FIG. 7A.

Please amend Paragraph [0048] as follows:

[0048] The light diffuser 704 receives the optical radiation emitted from the emitter [[302]]702 and homogenously spreads the optical radiation over a wide, donut-shaped area, such as the area outlined by the light diffuser 704 as depicted in FIG. 7B. Advantageously, the diffuser 704 can receive emitted light in the form of a 2D point optical source (or any other form) and spread the light to fit the desired surface area on a plane defined by the surface of the tissue measurement site 102. In an embodiment, the diffuser 704 is made of ground glass or glass beads. A skilled artisan will understand that may other materials can be used to make the light diffuser 704.

Please amend Paragraph [0049] as follows:

[0049] The light blocker 706 includes an annular ring having a cover portion 707 sized and shaped to form a light isolation chamber for the light concentrator 708 and the detector 710. (For purposes of illustration, the light block cover 707 is not illustrated in FIG. 7B.) The light blocker 706 and the cover 707 can be made of any material that optically isolates the light concentrator 708 and the detector 710. The light isolation chamber formed by the light blocker 706 and cover [[708]]707 ensures that the only light detected by the detector 710 is light that is reflected from the tissue measurement site.

Please amend Paragraph [0053] as follows:

[0053] Referring now to FIG. 7B, a top view of the 3D sensor 700 is illustrated with both the emitter 702 and the light blocker cover 707 removed for ease of illustration. The outer ring illustrates the footprint of the light diffuser 704. As light is emitted from the emitter 702 (not

shown in FIG. 7B), it is diffused homogenously and directed to the tissue measurement site 102. The light blocker 706 forms the circular wall of a light isolation chamber to keep incident light from being sensed by the detector 710. The light blocker cover 707 blocks incidental light from entering the light isolation chamber from above. The light concentrator ~~710~~708 collects the reflected light from the tissue measurement site 102 and funnels it upward toward the detector 710 at the center of the 3D sensor 700.

AMENDMENTS TO THE CLAIMS

A complete listing of all claims is presented below with insertions underlined (e.g., insertion), and deletions struck through or in double brackets (e.g., ~~deletion~~ or [[deletion]]).

1. **(Cancelled)**

2. **(Cancelled)**

3. **(New)** A physiological measurement device comprising:

one or more emitters configured to emit light in an initial light pattern;

an optical transmission material positioned between the one or more emitters and a tissue measurement site, wherein the optical transmission material is configured to alter a direction of at least a portion of the light emitted from the one or more emitters to shape an output light pattern by which the emitted light is directed toward a surface of the tissue measurement site, wherein the output light pattern comprises a different geometric shape than the initial light pattern;

a plurality of detectors configured to detect at least a portion of the light after passing through tissue, the plurality of detectors further configured to output at least one signal responsive to the detected light;

a light block configured to prevent at least a portion of the light emitted from the one or more emitters from reaching the plurality of detectors without first reaching the tissue;

a surface comprising a dark-colored coating, the surface positioned between the plurality of detectors and the tissue, wherein an opening defined in the dark-colored coating is configured to allow at least a portion of light reflected from the tissue to pass through the surface; and

a processor configured to receive and process one or more signals responsive to the outputted at least one signal and determine a physiological parameter of a user responsive to the one or more signals.

4. **(New)** The physiological measurement device of Claim 3, wherein the light block comprises an at least partially circular shape, and wherein the one or more emitters are positioned outside the light block and the plurality of detectors are positioned inside the light block.

5. **(New)** The physiological measurement device of Claim 3, wherein the optical transmission material comprises glass.

6. **(New)** The physiological measurement device of Claim 3, wherein the optical transmission material comprises plastic.

7. **(New)** The physiological measurement device of Claim 3, wherein the plurality of detectors are arranged in an array having a spatial configuration corresponding to a shape of a portion of the tissue measurement site bounded by the light block.

8. **(New)** The physiological measurement device of Claim 3, wherein the dark-colored coating comprises black pigment.

9. **(New)** The physiological measurement device of Claim 3, wherein the device is configured to wirelessly transmit physiological parameter data to a separate device.

10. **(New)** The physiological measurement device of Claim 3, further comprising a touch-screen display configured to present information related to the determined physiological parameter.

11. **(New)** The physiological measurement device of Claim 3, wherein the output light pattern comprises a width and a length, and wherein the width is different than the length.

12. **(New)** The physiological measurement device of Claim 3, wherein the output light pattern comprises an oval shape.

13. **(New)** The physiological measurement device of Claim 3, wherein the physiological parameter is oxygen saturation.

14. **(New)** The physiological measurement device of Claim 3, wherein the physiological parameter is pulse rate.

15. **(New)** The physiological measurement device of Claim 3, wherein the opening defined in the dark-colored coating comprises a width and a length, and wherein the width is larger than the length.

16. **(New)** A physiological measurement device comprising:

one or more optical sources configured to emit light of one or more wavelengths in an initial light pattern proximate a wrist of a user;

an optical transmission material positioned between the one or more optical sources and a tissue measurement site, wherein the optical transmission material is configured to alter a direction of at least a portion of the light emitted from the one or more optical sources to shape an output light pattern by which the emitted light is projected toward a surface of the tissue

measurement site, the output light pattern comprising a different geometric shape than the initial light pattern;

a plurality of detectors configured to detect at least a portion of the light after passing through tissue, the plurality of detectors further configured to output at least one signal responsive to the detected light, wherein the one or more optical sources and the plurality of detectors are arranged in a reflectance measurement configuration;

a light block configured to prevent at least a portion of light emitted from the one or more optical sources from reaching the plurality of detectors without first reaching the tissue;

a surface comprising a dark-colored coating, the surface positioned between the plurality of detectors and the tissue, wherein an opening defined in the dark-colored coating is configured to allow at least a portion of light reflected from the tissue to pass through the surface;

a processor configured to receive and process one or more signals responsive to the outputted at least one signal and determine a physiological parameter of the user responsive to the one or more signals; and

a touch-screen display configured to present information responsive to the determined physiological parameter;

wherein the physiological measurement device is configured to wirelessly transmit physiological parameter data to a separate device.

17. **(New)** The physiological measurement device of Claim 16, wherein the light block comprises an at least partially circular shape, and wherein the one or more optical sources are positioned outside the light block and the plurality of detectors are positioned inside the light block.

18. **(New)** The physiological measurement device of Claim 16, wherein the optical transmission material comprises at least one of glass and plastic.

19. **(New)** The physiological measurement device of Claim 16, wherein the output light pattern comprises a width and a length, and wherein the width is different than the length.

20. **(New)** The physiological measurement device of Claim 16, wherein the physiological parameter is oxygen saturation.

21. **(New)** The physiological measurement device of Claim 16, wherein the physiological parameter is pulse rate.

22. **(New)** The physiological measurement device of Claim 16, wherein the opening defined in the dark-colored coating comprises a width and a length, and wherein the width is larger than the length.

23. **(New)** The physiological measurement device of Claim 16, wherein the plurality of detectors are arranged in an array having a spatial configuration corresponding to a shape of a portion of the tissue measurement site bounded by the light block.

24. **(New)** A physiological measurement device comprising:

one or more emitters configured to emit light;

a diffuser positioned between the one or more emitters and a tissue measurement site;

a circular shaped light block;

a plurality of detectors configured to detect at least a portion of the light after the light passes through a portion of the tissue measurement site bounded by the light block, wherein the plurality of detectors are arranged in an array having a spatial configuration corresponding to a shape of the portion of the tissue measurement site bounded by the circular shaped light block, wherein the plurality of detectors are further configured to output at least one signal responsive to the detected light;

wherein the light block is configured to prevent at least a portion of light emitted from the one or more emitters from reaching the plurality of detectors without first reaching tissue; and

a processor configured to receive and process one or more signals responsive to the outputted at least one signal and determine a physiological parameter of the user responsive to the one or more signals.

25. **(New)** The physiological measurement device of Claim 24, wherein the one or more emitters are configured to emit the light in an initial light pattern, and wherein the diffuser comprises an optical transmission material configured to alter a direction of at least a portion of the light emitted from the one or more emitters to shape an output light pattern by which the emitted light is directed toward a surface of the tissue measurement site, and wherein the output light pattern comprises a different geometric shape than the initial light pattern.

26. **(New)** The physiological measurement device of Claim 24, wherein the physiological parameter is oxygen saturation.

27. **(New)** The physiological measurement device of Claim 24, wherein the physiological parameter is pulse rate.

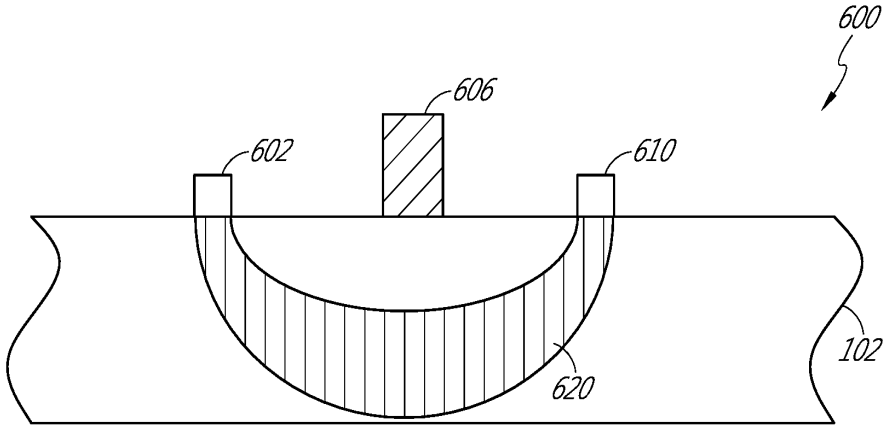


FIG. 6
(PRIOR ART)

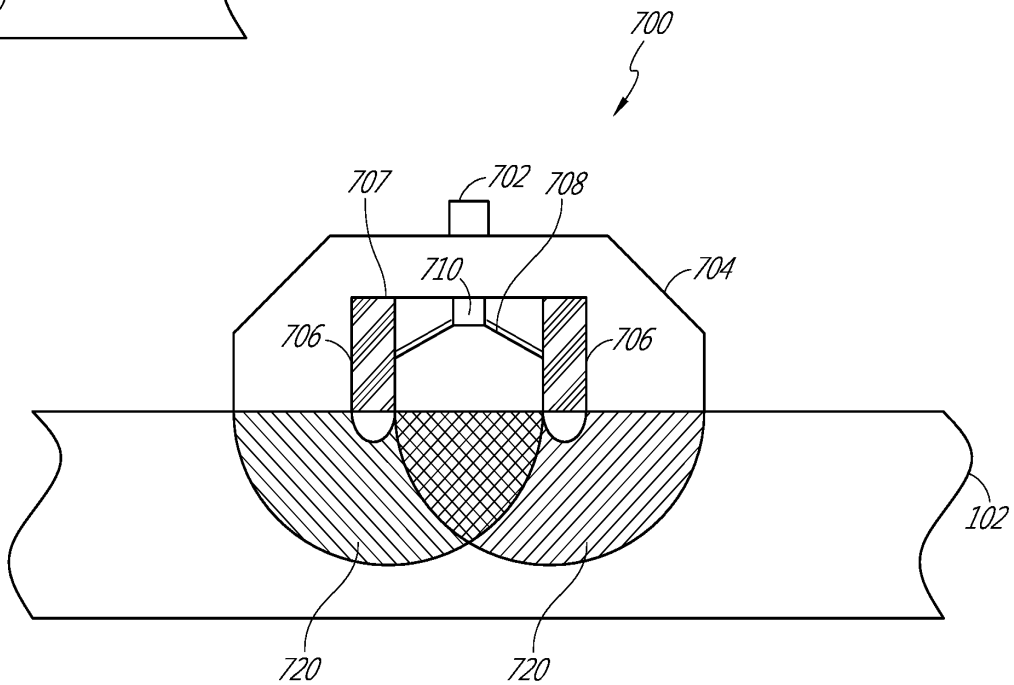


FIG. 7A

RESCISSION OF ANY PRIOR DISCLAIMERS AND REQUEST TO REVISIT ART

Inventor	:	Ammar Al-Ali
App. No.	:	16/791955
Filed	:	February 14, 2020
For	:	PHYSIOLOGICAL MEASUREMENT DEVICES, SYSTEMS, AND METHODS
Examiner	:	Unknown
Art Unit	:	2875
Conf. No.	:	3106

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

Dear Commissioner:

The claims of the present application are different and possibly broader in scope than the claims pursued in the parent application(s). To the extent any prior amendments or characterizations of the scope of any claim or referenced art could be construed as a disclaimer of any subject matter supported by the present disclosure, Applicant hereby rescinds and retracts such disclaimer. Accordingly, the references previously considered in the parent application(s) may need to be re-visited.

Please charge any additional fees, including any fees for additional extension of time, or credit overpayment to Deposit Account No. 11-1410.

Respectfully submitted,

Knobbe, Martens, Olson & Bear, LLP

Dated: March 11, 2020

/Jarom Kesler/
Jarom D. Kesler
Registration No. 57,046
Registered Practitioner
Customer No. 64735
(949) 760-0404

INFORMATION DISCLOSURE STATEMENT

First Inventor	:	Ammar Al-Ali
App. No.	:	16/791955
Filed	:	February 14, 2020
For	:	PHYSIOLOGICAL MEASUREMENT DEVICES, SYSTEMS, AND METHODS
Examiner	:	Unassigned
Art Unit	:	2875
Conf. No.	:	3106

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

References and Listing

Pursuant to 37 CFR 1.56, an Information Disclosure Statement listing references is provided herewith. References numbered 1-1219 and 1221-1339 are of record in U.S. patent application No. 16/532061, filed August 5, 2019, which is relied upon for an earlier filing date under 35 USC 120. Accordingly, copies of references 1-1219 and 1221-1339 are not submitted pursuant to 37 CFR 1.98(d).

No Disclaimers

To the extent that anything in the Information Disclosure Statement or the listed references could be construed as a disclaimer of any subject matter supported by the present application, Applicant hereby rescinds and retracts such disclaimer.

Timing of Disclosure

This Information Disclosure Statement is being filed within three months of the filing date or date of national phase entry, with an RCE or before receipt of a First Office Action after an RCE, and no fee is believed to be required.

The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment, to Account No. 11-1410.

Respectfully submitted,

KNOBBE, MARTENS, OLSON & BEAR, LLP

Dated: March 11, 2020

By: /Jarom Kesler/
Jarom D. Kesler
Registration No. 57,046
Registered Practitioner
Customer No. 64735
(949) 760-0404

PTO/SB/08 Equivalent

INFORMATION DISCLOSURE STATEMENT BY APPLICANT	Application No.	16/791955
	Filing Date	February 14, 2020
	First Named Inventor	Ammar Al-Ali
	Art Unit	2875
(Multiple sheets used when necessary)	Examiner	Unassigned
SHEET 1 OF 50	Attorney Docket No.	MAS.1007C4

U.S. PATENT DOCUMENTS					
Examiner Initials	Cite No.	Document Number *Number - Kind Code (if known)* Example: 1,234,567 B1	Publication Date MM-DD-YYYY	Name	Pages, Columns, Lines Where Relevant Passages or Relevant Figures Appear
	1	4,960,128	10/2/1990	Gordon et al.	
	2	4,964,408	10/23/1990	Hink et al.	
	3	5,041,187	8/20/1991	Hink et al.	
	4	5,069,213	12/3/1991	Polczynski	
	5	5,099,842	3/31/1992	Mannheimer et al.	
	6	5,158,091	10/27/1992	Butterfield et al.	
	7	5,163,438	11/17/1992	Gordon et al.	
	8	5,203,329	4/20/1993	Takatani et al.	
	9	5,228,449	7/20/1993	Christ et al.	
	10	5,319,355	6/7/1994	Russek	
	11	5,337,744	8/16/1994	Branigan	
	12	5,341,805	8/30/1994	Stavridi, et al.	
	13	5,377,676	1/3/1995	Vari, et al.	
	14	5,431,170	7/11/1995	Mathews	
	15	5,452,717	9/26/1995	Branigan et al.	
	16	5,456,252	10/10/1995	Vari, et al.	
	17	5,462,051	10/31/1995	Oka et al.	
	18	5,479,934	1/2/1996	Imran	
	19	5,482,036	1/9/1996	Diab et al.	
	20	5,490,505	2/13/1996	Diab et al.	
	21	5,494,043	2/27/1996	O'Sullivan et al.	
	22	5,497,771	3/12/1996	Rosenheimer	
	23	5,533,511	7/9/1996	Kaspari et al.	
	24	5,534,851	7/9/1996	Russek	
	25	5,561,275	10/1/1996	Savage, et al.	
	26	5,562,002	10/8/1996	Lalin	
	27	5,564,429	10/15/1996	Bornn et al.	
	28	5,584,296	12/17/1996	Cui et al.	
	29	5,590,649	1/7/1997	Caro et al.	

Examiner Signature	Date Considered
***Examiner:** Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.	

T[1] - Place a check mark in this area when an English language Translation is attached.

PTO/SB/08 Equivalent

INFORMATION DISCLOSURE STATEMENT BY APPLICANT	Application No.	16/791955
	Filing Date	February 14, 2020
	First Named Inventor	Ammar Al-Ali
	Art Unit	2875
(Multiple sheets used when necessary)	Examiner	Unassigned
SHEET 2 OF 50	Attorney Docket No.	MAS.1007C4

U.S. PATENT DOCUMENTS					
Examiner Initials	Cite No.	Document Number *Number - Kind Code (if known)* Example: 1,234,567 B1	Publication Date MM-DD-YYYY	Name	Pages, Columns, Lines Where Relevant Passages or Relevant Figures Appear
	30	5,601,079	2/11/1997	Wong et al.	
	31	5,602,924	2/11/1997	Durand et al.	
	32	5,623,925	4/29/1997	Swenson et al.	
	33	5,632,272	5/27/1997	Diab et al.	
	34	5,638,816	6/17/1997	Kiani-Azarbayjany et al.	
	35	5,638,818	6/17/1997	Diab et al.	
	36	5,645,440	7/8/1997	Tobler et al.	
	37	5,685,299	11/11/1997	Diab et al.	
	38	5,699,808	12/23/1997	John	
	39	5,729,203	3/17/1998	Oka et al.	
	40	5,743,262	4/28/1998	Lepper, Jr. et al.	
	41	5,758,644	6/2/1998	Diab et al.	
	42	5,760,910	6/2/1998	Lepper, Jr. et al.	
	43	5,769,785	6/23/1998	Diab et al.	
	44	5,782,757	7/21/1998	Diab et al.	
	45	5,785,659	7/28/1998	Caro et al.	
	46	5,791,347	8/11/1998	Flaherty et al.	
	47	5,792,052	8/11/1998	Isaacson et al.	
	48	5,800,349	9/1/1998	Isaacson et al.	
	49	5,810,734	9/22/1998	Caro et al.	
	50	5,823,950	10/20/1998	Diab et al.	
	51	5,830,131	11/3/1998	Caro et al.	
	52	5,830,137	11/3/1998	Scharf	
	53	5,833,618	11/10/1998	Caro et al.	
	54	5,860,919	1/19/1999	Kiani-Azarbayjany et al.	
	55	5,890,929	4/6/1999	Mills et al.	
	56	5,904,654	5/18/1999	Wohltmann et al.	
	57	5,919,134	7/6/1999	Diab	
	58	5,934,925	8/10/1999	Tobler et al.	

Examiner Signature	Date Considered
***Examiner:** Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.	

T[1] - Place a check mark in this area when an English language Translation is attached.

PTO/SB/08 Equivalent

INFORMATION DISCLOSURE STATEMENT BY APPLICANT	Application No.	16/791955
	Filing Date	February 14, 2020
	First Named Inventor	Ammar Al-Ali
	Art Unit	2875
(Multiple sheets used when necessary)	Examiner	Unassigned
SHEET 3 OF 50	Attorney Docket No.	MAS.1007C4

U.S. PATENT DOCUMENTS					
Examiner Initials	Cite No.	Document Number *Number - Kind Code (if known)* Example: 1,234,567 B1	Publication Date MM-DD-YYYY	Name	Pages, Columns, Lines Where Relevant Passages or Relevant Figures Appear
	59	5,940,182	8/17/1999	Lepper, Jr. et al.	
	60	5,987,343	11/16/1999	Kinast	
	61	5,995,855	11/30/1999	Kiani et al.	
	62	5,997,343	12/7/1999	Mills et al.	
	63	6,002,952	12/14/1999	Diab et al.	
	64	6,011,986	1/4/2000	Diab et al.	
	65	6,027,452	2/22/2000	Flaherty et al.	
	66	6,036,642	3/14/2000	Diab et al.	
	67	6,045,509	4/4/2000	Caro et al.	
	68	6,067,462	5/23/2000	Diab et al.	
	69	6,081,735	6/27/2000	Diab et al.	
	70	6,088,607	7/11/2000	Diab et al.	
	71	6,102,856	8/15/2000	Groff et al.	
	72	6,110,522	8/29/2000	Lepper, Jr. et al.	
	73	6,124,597	9/26/2000	Shehada	
	74	6,128,521	10/3/2000	Marro et al.	
	75	6,129,675	10/10/2000	Jay	
	76	6,144,868	11/7/2000	Parker	
	77	6,151,516	11/21/2000	Kiani-Azarbayjany et al.	
	78	6,152,754	11/28/2000	Gerhardt et al.	
	79	6,157,850	12/5/2000	Diab et al.	
	80	6,165,005	12/26/2000	Mills et al.	
	81	6,184,521	2/6/2001	Coffin, IV et al.	
	82	6,206,830	3/27/2001	Diab et al.	
	83	6,223,063	4/24/2001	Chaiken et al.	
	84	6,229,856	5/8/2001	Diab et al.	
	85	6,232,609	5/15/2001	Snyder, et al.	
	86	6,236,872	5/22/2001	Diab et al.	
	87	6,241,680	6/5/2001	Miwa	

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	First Named Inventor	Ammar Al-Ali
	Art Unit	2875
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U.S. PATENT DOCUMENTS					
Examiner Initials	Cite No.	Document Number *Number - Kind Code (if known)* Example: 1,234,567 B1	Publication Date MM-DD-YYYY	Name	Pages, Columns, Lines Where Relevant Passages or Relevant Figures Appear
	88	6,241,683	6/5/2001	Macklem, et al.	
	89	6,253,097	6/26/2001	Aronow et al.	
	90	6,256,523	7/3/2001	Diab et al.	
	91	6,263,222	7/17/2001	Diab et al.	
	92	6,278,522	8/21/2001	Lepper, Jr. et al.	
	93	6,280,213	8/28/2001	Tobler et al.	
	94	6,285,896	9/4/2001	Tobler et al.	
	95	6,301,493	10/9/2001	Marro et al.	
	96	6,308,089	10/23/2001	von der Ruhr et al.	
	97	6,317,627	11/13/2001	Ennen et al.	
	98	6,321,100	11/20/2001	Parker	
	99	6,325,761	12/4/2001	Jay	
	100	6,334,065	12/25/2001	Al-Ali et al.	
	101	6,343,223	1/29/2002	Chin et al.	
	102	6,343,224	1/29/2002	Parker	
	103	6,349,228	2/19/2002	Kiani et al.	
	104	6,356,203	3/12/2002	Halleck et al.	
	105	6,360,114	3/19/2002	Diab et al.	
	106	6,368,283	4/9/2002	Xu, et al.	
	107	6,371,921	4/16/2002	Caro et al.	
	108	6,377,829	4/23/2002	Al-Ali	
	109	6,388,240	5/14/2002	Schulz et al.	
	110	6,397,091	5/28/2002	Diab et al.	
	111	6,430,437	8/6/2002	Marro	
	112	6,430,525	8/6/2002	Weber et al.	
	113	6,463,311	10/8/2002	Diab	
	114	6,470,199	10/22/2002	Kopotic et al.	
	115	6,501,975	12/31/2002	Diab et al.	
	116	6,505,059	1/7/2003	Kollias, et al.	

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U.S. PATENT DOCUMENTS					
Examiner Initials	Cite No.	Document Number *Number - Kind Code (if known)* Example: 1,234,567 B1	Publication Date MM-DD-YYYY	Name	Pages, Columns, Lines Where Relevant Passages or Relevant Figures Appear
	117	6,515,273	2/4/2003	Al-Ali	
	118	6,519,487	2/11/2003	Parker	
	119	6,525,386	2/25/2003	Mills et al.	
	120	6,526,300	2/25/2003	Kiani et al.	
	121	6,541,756	4/1/2003	Schulz et al.	
	122	6,542,764	4/1/2003	Al-Ali et al.	
	123	6,580,086	6/17/2003	Schulz et al.	
	124	6,584,336	6/24/2003	Ali et al.	
	125	6,595,316	7/22/2003	Cybulski et al.	
	126	6,597,932	7/22/2003	Tian et al.	
	127	6,597,933	7/22/2003	Kiani et al.	
	128	6,606,511	8/12/2003	Ali et al.	
	129	6,632,181	10/14/2003	Flaherty et al.	
	130	6,639,668	10/28/2003	Trepagnier, Pierre	
	131	6,640,116	10/28/2003	Diab	
	132	6,643,530	11/4/2003	Diab et al.	
	133	6,650,917	11/18/2003	Diab et al.	
	134	6,654,624	11/25/2003	Diab et al.	
	135	6,658,276	12/2/2003	Kiani et al.	
	136	6,661,161	12/9/2003	Lanzo et al.	
	137	6,671,526	12/30/2003	Aoyagi et al.	
	138	6,671,531	12/30/2003	Al-Ali et al.	
	139	6,678,543	1/13/2004	Diab et al.	
	140	6,684,090	1/27/2004	Ali et al.	
	141	6,684,091	1/27/2004	Parker	
	142	6,697,656	2/24/2004	Al-Ali	
	143	6,697,657	2/24/2004	Shehada, et al.	
	144	6,697,658	2/24/2004	Al-Ali	
	145	6,699,194	3/2/2004	Diab et al.	

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U.S. PATENT DOCUMENTS					
Examiner Initials	Cite No.	Document Number *Number - Kind Code (if known)* Example: 1,234,567 B1	Publication Date MM-DD-YYYY	Name	Pages, Columns, Lines Where Relevant Passages or Relevant Figures Appear
	146	6,714,804	3/30/2004	Al-Ali et al.	
	147	6,721,582	4/13/2004	Trepagnier, et al.	
	148	6,721,585	4/13/2004	Parker	
	149	6,725,075	4/20/2004	Al-Ali	
	150	6,728,560	4/27/2004	Kollias, et al.	
	151	6,735,459	5/11/2004	Parker	
	152	6,745,060	6/1/2004	Diab et al.	
	153	6,760,607	7/6/2004	Al-Ali	
	154	6,770,028	8/3/2004	Ali et al.	
	155	6,771,994	8/3/2004	Kiani et al.	
	156	6,785,568	8/31/2004	Chance	
	157	6,792,300	9/14/2004	Diab et al.	
	158	6,801,799	10/5/2004	Mendelson	
	159	6,813,511	11/2/2004	Diab et al.	
	160	6,816,741	11/9/2004	Diab	
	161	6,822,564	11/23/2004	Al-Ali	
	162	6,826,419	11/30/2004	Diab et al.	
	163	6,830,711	12/14/2004	Mills et al.	
	164	6,831,266	12/14/2004	Paritsky et al.	
	165	6,850,787	2/1/2005	Weber et al.	
	166	6,850,788	2/1/2005	Al-Ali	
	167	6,852,083	2/8/2005	Caro et al.	
	168	6,861,639	3/1/2005	Al-Ali	
	169	6,898,452	5/24/2005	Al-Ali et al.	
	170	6,920,345	7/19/2005	Al-Ali et al.	
	171	6,931,268	8/16/2005	Kiani-Azarbayjany et al.	
	172	6,934,570	8/23/2005	Kiani et al.	
	173	6,939,305	9/6/2005	Flaherty et al.	
	174	6,943,348	9/13/2005	Coffin IV	

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U.S. PATENT DOCUMENTS					
Examiner Initials	Cite No.	Document Number *Number - Kind Code (if known)* Example: 1,234,567 B1	Publication Date MM-DD-YYYY	Name	Pages, Columns, Lines Where Relevant Passages or Relevant Figures Appear
	175	6,950,687	9/27/2005	Al-Ali	
	176	6,961,598	11/1/2005	Diab	
	177	6,970,792	11/29/2005	Diab	
	178	6,979,812	12/27/2005	Al-Ali	
	179	6,985,764	1/10/2006	Mason et al.	
	180	6,993,371	1/31/2006	Kiani et al.	
	181	6,996,427	2/7/2006	Ali et al.	
	182	6,999,904	2/14/2006	Weber et al.	
	183	7,003,338	2/21/2006	Weber et al.	
	184	7,003,339	2/21/2006	Diab et al.	
	185	7,015,451	3/21/2006	Dalke et al.	
	186	7,024,233	4/4/2006	Ali et al.	
	187	7,027,849	4/11/2006	Al-Ali	
	188	7,030,749	4/18/2006	Al-Ali	
	189	7,039,449	5/2/2006	Al-Ali	
	190	7,041,060	5/9/2006	Flaherty et al	
	191	7,044,918	5/16/2006	Diab	
	192	7,048,687	5/23/2006	Reuss et al.	
	193	7,060,963	6/13/2006	Maegawa et al.	
	194	7,067,893	6/27/2006	Mills et al.	
	195	7,096,052	8/22/2006	Mason et al.	
	196	7,096,054	8/22/2006	Abdul-Hafiz et al.	
	197	7,132,641	11/7/2006	Schulz et al.	
	198	7,142,901	11/28/2006	Kiani et al.	
	199	7,149,561	12/12/2006	Diab	
	200	7,186,966	3/6/2007	Al-Ali	
	201	7,190,261	3/13/2007	Al-Ali	
	202	7,215,984	5/8/2007	Diab	
	203	7,215,986	5/8/2007	Diab	

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U.S. PATENT DOCUMENTS					
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	204	7,221,971	5/22/2007	Diab	
	205	7,225,006	5/29/2007	Al-Ali et al.	
	206	7,225,007	5/29/2007	Al-Ali	
	207	7,227,156	6/5/2007	Colvin, Jr. et al.	
	208	7,239,905	7/3/2007	Kiani-Azarbayjany et al.	
	209	7,245,953	7/17/2007	Parker	
	210	7,254,429	8/7/2007	Schurman et al.	
	211	7,254,431	8/7/2007	Al-Ali	
	212	7,254,433	8/7/2007	Diab et al.	
	213	7,254,434	8/7/2007	Schulz et al.	
	214	7,272,425	9/18/2007	Al-Ali	
	215	7,274,955	9/25/2007	Kiani et al.	
	216	7,280,858	10/9/2007	Al-Ali et al.	
	217	7,289,835	10/30/2007	Mansfield et al.	
	218	7,292,883	11/6/2007	De Felice et al.	
	219	7,295,866	11/13/2007	Al-Ali	
	220	7,328,053	2/5/2008	Diab et al.	
	221	7,332,784	2/19/2008	Mills, et al.	
	222	7,340,287	3/4/2008	Mason et al.	
	223	7,341,559	3/11/2008	Schulz et al.	
	224	7,343,186	3/11/2008	Lamego et al.	
	225	7,355,512	4/8/2008	Al-Ali	
	226	7,356,365	4/8/2008	Schurman	
	227	7,371,981	5/13/2008	Abdul-Hafiz	
	228	7,373,193	5/13/2008	Al-Ali et al.	
	229	7,373,194	5/13/2008	Weber et al.	
	230	7,376,453	5/20/2008	Diab et al.	
	231	7,377,794	5/27/2008	Al Ali et al.	
	232	7,377,899	5/27/2008	Weber et al.	

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	233	7,383,070	6/3/2008	Diab et al.	
	234	7,415,297	8/19/2008	Al-Ali et al.	
	235	7,428,432	9/23/2008	Ali et al.	
	236	7,438,683	10/21/2008	Al-Ali et al.	
	237	7,440,787	10/21/2008	Diab	
	238	7,454,240	11/18/2008	Diab et al.	
	239	7,467,002	12/16/2008	Weber et al.	
	240	7,469,157	12/23/2008	Diab et al.	
	241	7,471,969	12/30/2008	Diab et al.	
	242	7,471,971	12/30/2008	Diab et al.	
	243	7,483,729	1/27/2009	Al-Ali et al.	
	244	7,483,730	1/27/2009	Diab et al.	
	245	7,489,958	2/10/2009	Diab et al.	
	246	7,496,391	2/24/2009	Diab et al.	
	247	7,496,393	2/24/2009	Diab et al.	
	248	7,499,741	3/3/2009	Diab et al.	
	249	7,499,835	3/3/2009	Weber et al.	
	250	7,500,950	3/10/2009	Al-Ali et al.	
	251	7,509,154	3/24/2009	Diab et al.	
	252	7,509,494	3/24/2009	Al-Ali	
	253	7,510,849	3/31/2009	Schurman et al.	
	254	7,519,327	4/14/2009	White	
	255	7,526,328	4/28/2009	Diab et al.	
	256	7,530,942	5/12/2009	Diab	
	257	7,530,949	5/12/2009	Al Ali et al.	
	258	7,530,955	5/12/2009	Diab et al.	
	259	7,563,110	7/21/2009	Al-Ali et al.	
	260	7,596,398	9/29/2009	Al-Ali et al.	
	261	7,601,123	10/13/2009	Tweed, et al.	

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U.S. PATENT DOCUMENTS					
Examiner Initials	Cite No.	Document Number *Number - Kind Code (if known)* Example: 1,234,567 B1	Publication Date MM-DD-YYYY	Name	Pages, Columns, Lines Where Relevant Passages or Relevant Figures Appear
	262	7,613,490	11/3/2009	Sarussi et al.	
	263	7,618,375	11/17/2009	Flaherty	
	264	7,647,083	1/12/2010	Al-Ali et al.	
	265	7,726,209	6/1/2010	Ruotoistenmäki	
	266	7,729,733	6/1/2010	Al-Ali et al.	
	267	7,734,320	6/8/2010	Al-Ali	
	268	7,740,588	6/22/2010	Sciarra	
	269	7,740,589	6/22/2010	Maschke et al.	
	270	7,761,127	7/20/2010	Al-Ali et al.	
	271	7,761,128	7/20/2010	Al-Ali et al.	
	272	7,764,982	7/27/2010	Dalke et al.	
	273	7,791,155	9/7/2010	Diab	
	274	7,801,581	9/21/2010	Diab	
	275	7,822,452	10/26/2010	Schurman et al.	
	276	7,844,313	11/30/2010	Kiani et al.	
	277	7,844,314	11/30/2010	Al-Ali	
	278	7,844,315	11/30/2010	Al-Ali	
	279	7,862,523	1/4/2011	Ruotoistenmaki	
	280	7,865,222	1/4/2011	Weber et al.	
	281	7,869,849	1/11/2011	Ollerdessen et al.	
	282	7,873,497	1/18/2011	Weber et al.	
	283	7,880,606	2/1/2011	Al-Ali	
	284	7,880,626	2/1/2011	Al-Ali et al.	
	285	7,891,355	2/22/2011	Al-Ali et al.	
	286	7,894,868	2/22/2011	Al-Ali et al.	
	287	7,899,507	3/1/2011	Al-Ali et al.	
	288	7,899,510	3/1/2011	Hoarau	
	289	7,899,518	3/1/2011	Trepagnier et al.	
	290	7,904,132	3/8/2011	Weber et al.	

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U.S. PATENT DOCUMENTS					
Examiner Initials	Cite No.	Document Number *Number - Kind Code (if known)* Example: 1,234,567 B1	Publication Date MM-DD-YYYY	Name	Pages, Columns, Lines Where Relevant Passages or Relevant Figures Appear
	291	7,909,772	3/22/2011	Popov et al.	
	292	7,910,875	3/22/2011	Al-Ali	
	293	7,919,713	4/5/2011	Al-Ali et al.	
	294	7,937,128	5/3/2011	Al-Ali	
	295	7,937,129	5/3/2011	Mason et al.	
	296	7,937,130	5/3/2011	Diab et al.	
	297	7,941,199	5/10/2011	Kiani	
	298	7,951,086	5/31/2011	Flaherty et al.	
	299	7,957,780	6/7/2011	Lamego et al.	
	300	7,962,188	6/14/2011	Kiani et al.	
	301	7,962,190	6/14/2011	Diab et al.	
	302	7,976,472	7/12/2011	Kiani	
	303	7,988,637	8/2/2011	Diab	
	304	7,990,382	8/2/2011	Kiani	
	305	7,991,446	8/2/2011	Al-Ali et al.	
	306	8,000,761	8/16/2011	Al-Ali	
	307	8,008,088	8/30/2011	Bellott et al.	
	308	8,019,400	9/13/2011	Diab et al.	
	309	8,028,701	10/4/2011	Al-Ali et al.	
	310	8,029,765	10/4/2011	Bellott et al.	
	311	8,036,727	10/11/2011	Schurman et al.	
	312	8,036,728	10/11/2011	Diab et al.	
	313	8,046,040	10/25/2011	Ali et al.	
	314	8,046,041	10/25/2011	Diab et al.	
	315	8,046,042	10/25/2011	Diab et al.	
	316	8,048,040	11/1/2011	Kiani	
	317	8,050,728	11/1/2011	Al-Ali et al.	
	318	8,071,935	12/6/2011	Besko et al.	
	319	8,118,620	2/21/2012	Al-Ali et al.	

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	320	8,126,528	2/28/2012	Diab et al.	
	321	8,128,572	3/6/2012	Diab et al.	
	322	8,130,105	3/6/2012	Al-Ali et al.	
	323	8,145,287	3/27/2012	Diab et al.	
	324	8,150,487	4/3/2012	Diab et al.	
	325	8,175,672	5/8/2012	Parker	
	326	8,180,420	5/15/2012	Diab et al.	
	327	8,182,443	5/22/2012	Kiani	
	328	8,185,180	5/22/2012	Diab et al.	
	329	8,190,223	5/29/2012	Al-Ali et al.	
	330	8,190,227	5/29/2012	Diab et al.	
	331	8,203,438	6/19/2012	Kiani et al.	
	332	8,203,704	6/19/2012	Merritt et al.	
	333	8,204,566	6/19/2012	Schurman et al.	
	334	8,219,172	7/10/2012	Schurman et al.	
	335	8,224,411	7/17/2012	Al-Ali et al.	
	336	8,228,181	7/24/2012	Al-Ali	
	337	8,229,533	7/24/2012	Diab et al.	
	338	8,233,955	7/31/2012	Al-Ali et al.	
	339	8,244,325	8/14/2012	Al-Ali et al.	
	340	8,255,026	8/28/2012	Al-Ali	
	341	8,255,027	8/28/2012	Al-Ali et al.	
	342	8,255,028	8/28/2012	Al-Ali et al.	
	343	8,260,577	9/4/2012	Weber et al.	
	344	8,265,723	9/11/2012	McHale et al.	
	345	8,274,360	9/25/2012	Sampath et al.	
	346	8,280,469	10/2/2012	Baker, Jr. et al.	
	347	8,280,473	10/2/2012	Al-Ali	
	348	8,289,130	10/16/2012	Nakajima et al.	

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	First Named Inventor	Ammar Al-Ali
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U.S. PATENT DOCUMENTS					
Examiner Initials	Cite No.	Document Number *Number - Kind Code (if known)* Example: 1,234,567 B1	Publication Date MM-DD-YYYY	Name	Pages, Columns, Lines Where Relevant Passages or Relevant Figures Appear
	349	8,301,217	10/30/2012	Al-Ali et al.	
	350	8,306,596	11/6/2012	Schurman et al.	
	351	8,310,336	11/13/2012	Muhsin et al.	
	352	8,315,683	11/20/2012	Al-Ali et al.	
	353	8,337,403	12/25/2012	Al-Ali et al.	
	354	8,346,330	1/1/2013	Lamego	
	355	8,353,842	1/15/2013	Al-Ali et al.	
	356	8,355,766	1/15/2013	MacNeish, III et al.	
	357	8,359,080	1/22/2013	Diab et al.	
	358	8,364,223	1/29/2013	Al-Ali et al.	
	359	8,364,226	1/29/2013	Diab et al.	
	360	8,364,389	1/29/2013	Dorogusker et al.	
	361	8,374,665	2/12/2013	Lamego	
	362	8,385,995	2/26/2013	Al-ali et al.	
	363	8,385,996	2/26/2013	Smith et al.	
	364	8,388,353	3/5/2013	Kiani et la.	
	365	8,399,822	3/19/2013	Al-Ali	
	366	8,401,602	3/19/2013	Kiani	
	367	8,405,608	3/26/2013	Al-Ali et al.	
	368	8,414,499	4/9/2013	Al-Ali et al.	
	369	8,418,524	4/16/2013	Al-Ali	
	370	8,423,106	4/16/2013	Lamego et al.	
	371	8,428,967	4/23/2013	Olsen et al.	
	372	8,430,817	4/30/2013	Al-Ali et al.	
	373	8,437,825	5/7/2013	Dalvi et al.	
	374	8,452,364	5/28/2013	Hannula et al.	
	375	8,455,290	6/4/2013	Siskavich	
	376	8,457,703	6/4/2013	Al-Ali	
	377	8,457,707	6/4/2013	Kiani	

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Examiner Initials	Cite No.	Document Number *Number - Kind Code (if known)* Example: 1,234,567 B1	Publication Date MM-DD-YYYY	Name	Pages, Columns, Lines Where Relevant Passages or Relevant Figures Appear
	378	8,463,349	6/11/2013	Diab et al.	
	379	8,466,286	6/18/2013	Bellot et al.	
	380	8,471,713	6/25/2013	Poeze et al.	
	381	8,473,020	6/25/2013	Kiani et al.	
	382	8,483,787	7/9/2013	Al-Ali et al.	
	383	8,489,364	7/16/2013	Weber et al.	
	384	8,496,595	7/30/2013	Jornod	
	385	8,498,684	0730//2013	Weber et al.	
	386	8,504,128	8/6/2013	Blank et al.	
	387	8,509,867	8/13/2013	Workman et al.	
	388	8,515,509	8/20/2013	Bruinsma et al.	
	389	8,515,515	8/20/2013	McKenna et al.	
	390	8,523,781	9/3/2013	Al-Ali	
	391	8,529,301	9/10/2013	Al-Ali et al.	
	392	8,532,727	9/10/2013	Ali et al.	
	393	8,532,728	9/10/2013	Diab et al.	
	394	8,547,209	10/1/2013	Kiani et al.	
	395	8,548,548	10/1/2013	Al-Ali	
	396	8,548,549	10/1/2013	Schurman et al.	
	397	8,548,550	10/1/2013	Al-Ali et al.	
	398	8,560,032	10/15/2013	Al-Ali et al.	
	399	8,560,034	10/15/2013	Diab et al.	
	400	8,570,167	10/29/2013	Al-Ali	
	401	8,570,503	10/29/2013	Vo et al.	
	402	8,571,617	10/29/2013	Reichgott et al.	
	403	8,571,618	10/29/2013	Lamego et al.	
	404	8,571,619	10/29/2013	Al-Ali et al.	
	405	8,577,431	11/5/2013	Lamego et al.	
	406	8,581,732	11/12/2013	Al-Ali et al.	

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	407	8,584,345	11/19/2013	Al-Ali et al.	
	408	8,588,880	11/19/2013	Abdul-Hafiz et al.	
	409	8,591,426	11/26/2013	Onoe et al.	
	410	8,600,467	12/3/2013	Al-Ali et al.	
	411	8,606,342	12/10/2013	Diab	
	412	8,615,290	12/24/2013	Lin et al.	
	413	8,626,255	1/7/2014	Al-Ali et al.	
	414	8,630,691	1/14/2014	Lamego et al.	
	415	8,634,889	1/21/2014	Al-Ali et al.	
	416	8,641,631	2/4/2014	Sierra et al.	
	417	8,652,060	2/18/2014	Al-Ali	
	418	8,655,004	2/18/2014	Prest et al.	
	419	8,663,107	3/4/2014	Kiani	
	420	8,666,468	3/4/2014	Al-Ali	
	421	8,667,967	3/11/2014	Al- Ali et al.	
	422	8,670,811	3/11/2014	O'Reilly	
	423	8,670,814	3/11/2014	Diab et al.	
	424	8,676,286	3/18/2014	Weber et al.	
	425	8,682,407	3/25/2014	Al-Ali	
	426	8,690,799	4/8/2014	Telfort et al.	
	427	8,700,111	4/15/2014	LeBoeuf et al.	
	428	8,700,112	4/15/2014	Kiani	
	429	8,702,627	4/22/2014	Telfort et al.	
	430	8,706,179	4/22/2014	Parker	
	431	8,712,494	4/29/2014	MacNeish, III et al.	
	432	8,715,206	5/6/2014	Telfort et al.	
	433	8,718,735	5/6/2014	Lamego et al.	
	434	8,718,737	5/6/2014	Diab et al.	
	435	8,718,738	5/6/2014	Blank et al.	

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	436	8,720,249	5/13/2014	Al-Ali	
	437	8,721,541	5/13/2014	Al-Ali et al.	
	438	8,721,542	5/13/2014	Al-Ali et al.	
	439	8,723,677	5/13/2014	Kiani	
	440	8,740,792	6/3/2014	Kiani et al.	
	441	8,754,776	6/17/2014	Poeze et al.	
	442	8,755,535	6/17/2014	Telfort et al.	
	443	8,755,856	6/17/2014	Diab et al.	
	444	8,755,872	6/17/2014	Marinow	
	445	8,760,517	6/24/2014	Sarwar et al.	
	446	8,761,850	6/24/2014	Lamego	
	447	8,764,671	7/1/2014	Kiani	
	448	8,768,423	7/1/2014	Shakespeare et al.	
	449	8,768,426	7/1/2014	Haisley et al.	
	450	8,771,204	7/8/2014	Telfort et al.	
	451	8,777,634	7/15/2014	Kiani et al.	
	452	8,781,543	7/15/2014	Diab et al.	
	453	8,781,544	7/15/2014	Al-Ali et al.	
	454	8,781,549	7/15/2014	Al-Ali et al.	
	455	8,788,003	7/22/2014	Schurman et al.	
	456	8,790,268	7/29/2014	Al-Ali	
	457	8,801,613	8/12/2014	Al-Ali et al.	
	458	8,821,397	9/2/2014	Al-Ali et al.	
	459	8,821,415	9/2/2014	Al-Ali et al.	
	460	8,830,449	9/9/2014	Lamego et al.	
	461	8,831,700	9/9/2014	Schurman et al.	
	462	8,838,210	9/16/2014	Wood et al.	
	463	8,840,549	9/23/2014	Al-Ali et al.	
	464	8,845,543	9/30/2014	Diab et al.	

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	465	8,847,740	9/30/2014	Kiani et al.	
	466	8,849,365	9/30/2014	Smith et al.	
	467	8,852,094	10/7/2014	Al-Ali et al.	
	468	8,852,994	10/7/2014	Wojtczuk et al.	
	469	8,868,147	10/21/2014	Stippick et al.	
	470	8,868,150	10/21/2014	Al-Ali et al.	
	471	8,870,792	10/28/2014	Al-Ali et al.	
	472	8,886,271	11/11/2014	Kiani et al.	
	473	8,888,539	11/18/2014	Al-Ali et al.	
	474	8,888,708	11/18/2014	Diab et al.	
	475	8,892,180	11/18/2014	Weber et al.	
	476	8,897,847	11/25/2014	Al-Ali	
	477	8,909,310	12/9/2014	Lamego et al.	
	478	8,911,377	12/16/2014	Al-Ali	
	479	8,912,909	12/16/2014	Al-Ali et al.	
	480	8,920,317	12/30/2014	Al-Ali et al.	
	481	8,920,332	12/30/2014	Hong et al.	
	482	8,921,699	12/30/2014	Al-Ali et al	
	483	8,922,382	12/30/2014	Al-Ali et al.	
	484	8,929,964	1/6/2015	Al-Ali et al.	
	485	8,942,777	1/27/2015	Diab et al.	
	486	8,948,834	2/3/2015	Diab et al.	
	487	8,948,835	2/3/2015	Diab	
	488	8,965,471	2/24/2015	Lamego	
	489	8,983,564	3/17/2015	Al-Ali	
	490	8,989,831	3/24/2015	Al-Ali et al.	
	491	8,996,085	3/31/2015	Kiani et al.	
	492	8,998,809	4/7/2015	Kiani	
	493	9,028,429	5/12/2015	Telfort et al.	

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	494	9,037,207	5/19/2015	Al-Ali et al.	
	495	9,060,721	6/23/2015	Reichgott et al.	
	496	9,066,666	6/30/2015	Kiani	
	497	9,066,680	6/30/2015	Al-Ali et al.	
	498	9,072,437	7/7/2015	Paalasmaa	
	499	9,072,474	7/7/2015	Al-Ali et al.	
	500	9,078,560	7/14/2015	Schurman et al.	
	501	9,081,889	7/14/2015	Ingrassia, Jr. et al.	
	502	9,084,569	7/21/2015	Weber et al.	
	503	9,095,316	8/4/2015	Welch et al.	
	504	9,106,038	8/11/2015	Telfort et al.	
	505	9,107,625	8/18/2015	Telfort et al.	
	506	9,107,626	8/18/2015	Al-Ali et al.	
	507	9,113,831	8/25/2015	Al-Ali	
	508	9,113,832	8/25/2015	Al-Ali	
	509	9,119,595	9/1/2015	Lamego	
	510	9,131,881	9/15/2015	Diab et al.	
	511	9,131,882	9/15/2015	Al-Ali et al.	
	512	9,131,883	9/15/2015	Al-Ali	
	513	9,131,917	9/15/2015	Telfort et al.	
	514	9,138,180	9/22/2015	Coverston et al.	
	515	9,138,182	9/22/2015	Al-Ali et al.	
	516	9,138,192	9/22/2015	Weber et al.	
	517	9,142,117	9/22/2015	Muhsin et al.	
	518	9,153,112	10/6/2015	Kiani et al.	
	519	9,153,121	10/6/2015	Kiani et al.	
	520	9,161,696	10/20/2015	Al-Ali et al.	
	521	9,161,713	10/20/2015	Al-Ali et al.	
	522	9,167,995	10/27/2015	Lamego et al.	

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	523	9,176,141	11/3/2015	Al-Ali et al.	
	524	9,186,102	11/17/2015	Bruinsma et al.	
	525	9,192,312	11/24/2015	Al-Ali	
	526	9,192,329	11/24/2015	Al-Ali	
	527	9,192,351	11/24/2015	Telfort et al.	
	528	9,195,385	11/24/2015	Al-Ali et al.	
	529	9,210,566	12/8/2015	Ziemianska et al.	
	530	9,211,072	12/15/2015	Kiani	
	531	9,211,095	12/15/2015	Al-Ali	
	532	9,218,454	12/22/2015	Kiani et al.	
	533	9,226,696	1/5/2016	Kiani	
	534	9,241,662	1/26/2016	Al-Ali et al.	
	535	9,245,668	1/26/2016	Vo et al.	
	536	9,259,185	2/16/2016	Abdul-Hafiz et al.	
	537	9,267,572	2/23/2016	Barker et al.	
	538	9,277,880	3/8/2016	Poeze et al.	
	539	9,289,167	3/22/2016	Diab et al.	
	540	9,295,421	3/29/2016	Kiani et al.	
	541	9,307,928	4/12/2016	Al-Ali et al.	
	542	9,311,382	4/12/2016	Varoglu et al.	
	543	9,323,894	4/26/2016	Kiani	
	544	9,326,712	5/3/2016	Kiani	
	545	9,333,316	5/10/2016	Kiani	
	546	9,339,220	5/17/2016	Lamego et al.	
	547	9,339,236	5/17/2016	Frix et al.	
	548	9,341,565	5/17/2016	Lamego et al.	
	549	9,351,673	5/31/2016	Diab et al.	
	550	9,351,675	5/31/2016	Al-Ali et al.	
	551	9,357,665	5/31/2016	Myers et al.	

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	552	9,364,181	6/14/2016	Kiani et al.	
	553	9,368,671	6/14/2016	Wojtczuk et al.	
	554	9,370,325	6/21/2016	Al-Ali et al.	
	555	9,370,326	6/21/2016	McHale et al.	
	556	9,370,335	6/21/2016	Al-ali et al.	
	557	9,375,185	6/28/2016	Ali et al.	
	558	9,386,953	7/12/2016	Al-Ali	
	559	9,386,961	7/12/2016	Al-Ali et al.	
	560	9,392,945	7/19/2016	Al-Ali et al.	
	561	9,397,448	7/19/2016	Al-Ali et al.	
	562	9,408,542	8/9/2016	Kinast et al.	
	563	9,436,645	9/6/2016	Al-Ali et al.	
	564	9,445,759	9/20/2016	Lamego et al.	
	565	9,466,919	10/11/2016	Kiani et al.	
	566	9,474,474	10/25/2016	Lamego et al.	
	567	9,480,422	11/1/2016	Al-Ali	
	568	9,480,435	11/1/2016	Olsen	
	569	9,489,081	11/8/2016	Anzures et al.	
	570	9,492,110	11/15/2016	Al-Ali et al.	
	571	9,497,534	11/15/2016	Prest et al.	
	572	9,510,779	12/6/2016	Poeze et al.	
	573	9,517,024	12/13/2016	Kiani et al.	
	574	9,526,430	12/27/2016	Srinivas et al.	
	575	9,532,722	1/3/2017	Lamego et al.	
	576	9,538,949	1/10/2017	Al-Ali et al.	
	577	9,538,980	1/10/2017	Telfort et al.	
	578	9,549,696	1/24/2017	Lamego et al.	
	579	9,553,625	1/24/2017	Hatanaka et al.	
	580	9,554,737	1/31/2017	Schurman et al.	

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Examiner Initials	Cite No.	Document Number *Number - Kind Code (if known)* Example: 1,234,567 B1	Publication Date MM-DD-YYYY	Name	Pages, Columns, Lines Where Relevant Passages or Relevant Figures Appear
	581	9,560,996	2/7/2017	Kiani	
	582	9,560,998	2/7/2017	Al-Ali et al.	
	583	9,566,019	2/14/2017	Al-Ali et al.	
	584	9,579,039	2/28/2017	Jansen et al.	
	585	9,591,975	3/14/2017	Dalvi et al.	
	586	9,593,969	3/14/2017	King	
	587	9,622,692	4/18/2017	Lamego et al.	
	588	9,622,693	4/18/2017	Diab	
	589	9,636,055	5/2/2017	Al-Ali et al.	
	590	9,636,056	5/2/2017	Al-Ali	
	591	9,649,054	5/16/2017	Lamego et al.	
	592	9,651,405	5/16/2017	Gowreesunker et al.	
	593	9,662,052	5/30/2017	Al-Ali et al.	
	594	9,668,676	6/6/2017	Culbert	
	595	9,668,679	6/6/2017	Schurman et al	
	596	9,668,680	6/6/2017	Bruinsma et al.	
	597	9,668,703	6/6/2017	Al-Ali	
	598	9,675,286	6/13/2017	Diab	
	599	9,681,812	6/20/2017	Presura	
	600	9,684,900	6/20/2017	Motoki et al.	
	601	9,687,160	6/27/2017	Kiani	
	602	9,693,719	7/4/2017	Al-Ali et al.	
	603	9,693,737	7/4/2017	Al-Ali	
	604	9,697,928	7/4/2017	Al-Ali et al.	
	605	9,699,546	7/4/2017	Qian et al.	
	606	9,716,937	7/25/2017	Qian et al.	
	607	9,717,425	8/1/2017	Kiani et al.	
	608	9,717,448	8/1/2017	Frix et al.	
	609	9,717,458	8/1/2017	Lamego et al.	

Examiner Signature	Date Considered
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PTO/SB/08 Equivalent

INFORMATION DISCLOSURE STATEMENT BY APPLICANT	Application No.	16/791955
	Filing Date	February 14, 2020
	First Named Inventor	Ammar Al-Ali
	Art Unit	2875
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U.S. PATENT DOCUMENTS					
Examiner Initials	Cite No.	Document Number *Number - Kind Code (if known)* Example: 1,234,567 B1	Publication Date MM-DD-YYYY	Name	Pages, Columns, Lines Where Relevant Passages or Relevant Figures Appear
	610	9,723,997	8/8/2017	Lamego	
	611	9,724,016	8/8/2017	Al-Ali et al.	
	612	9,724,024	8/8/2017	Al-Ali	
	613	9,724,025	8/8/2017	Kiani et al.	
	614	9,730,640	8/15/2017	Diab et al.	
	615	9,743,887	8/29/2017	Al-Ali et al.	
	616	9,749,232	8/29/2017	Sampath et al.	
	617	9,750,442	9/5/2017	Olsen	
	618	9,750,443	9/5/2017	Smith et al.	
	619	9,750,461	9/5/2017	Telfort	
	620	9,752,925	9/5/2017	Chu et al.	
	621	9,775,545	10/3/2017	Al-Ali et al.	
	622	9,775,546	10/3/2017	Diab et al.	
	623	9,775,570	10/3/2017	Al-Ali	
	624	9,778,079	10/3/2017	Al-Ali et al.	
	625	9,781,984	10/10/2017	Baranski et al.	
	626	9,782,077	10/10/2017	Lamego et al.	
	627	9,782,110	10/10/2017	Kiani	
	628	9,787,568	10/10/2017	Lamego et al.	
	629	9,788,735	10/17/2017	Al-Ali	
	630	9,788,768	10/17/2017	Al-Ali et al.	
	631	9,795,300	10/24/2017	Al-Ali	
	632	9,795,310	10/24/2017	Al-Ali	
	633	9,795,358	10/24/2017	Telfort et al.	
	634	9,795,739	10/24/2017	Al-Ali et al.	
	635	9,801,556	10/31/2017	Kiani	
	636	9,801,588	10/31/2017	Weber et al.	
	637	9,808,188	11/7/2017	Perea et al.	
	638	9,814,418	11/14/2017	Weber et al.	

Examiner Signature	Date Considered
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U.S. PATENT DOCUMENTS					
Examiner Initials	Cite No.	Document Number *Number - Kind Code (if known)* Example: 1,234,567 B1	Publication Date MM-DD-YYYY	Name	Pages, Columns, Lines Where Relevant Passages or Relevant Figures Appear
	639	9,820,691	11/21/2017	Kiani	
	640	9,833,152	12/5/2017	Kiani et al.	
	641	9,833,180	12/5/2017	Shakespeare et al.	
	642	9,838,775	12/5/2017	Qian et al.	
	643	9,839,379	12/12/2017	Al-Ali et al.	
	644	9,839,381	12/12/2017	Weber et al.	
	645	9,847,002	12/19/2017	Kiani et al.	
	646	9,847,749	12/19/2017	Kiani et al.	
	647	9,848,800	12/26/2017	Lee et al.	
	648	9,848,806	12/26/2017	Al-Ali et al.	
	649	9,848,807	12/26/2017	Lamego	
	650	9,848,823	12/26/2017	Raghuram et al.	
	651	9,861,298	1/9/2018	Eckerbom et al.	
	652	9,861,304	1/9/2018	Al-Ali et al.	
	653	9,861,305	1/9/2018	Weber et al.	
	654	9,866,671	1/9/2018	Thompson et al.	
	655	9,867,575	1/16/2018	Maani et al.	
	656	9,867,578	1/16/2018	Al-Ali et al.	
	657	9,872,623	1/23/2018	Al-Ali	
	658	9,876,320	1/23/2018	Coverston et al.	
	659	9,877,650	1/30/2018	Muhsin et al.	
	660	9,877,686	1/30/2018	Al-Ali et al.	
	661	9,891,079	2/13/2018	Dalvi	
	662	9,891,590	2/13/2018	Shim et al.	
	663	9,895,107	2/20/2018	Al-Ali et al.	
	664	9,898,049	2/20/2018	Myers et al.	
	665	9,913,617	3/13/2018	Al-Ali et al.	
	666	9,918,646	3/20/2018	Singh Alvarado et al.	
	667	9,924,893	3/27/2018	Schurman et al.	

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Examiner Initials	Cite No.	Document Number *Number - Kind Code (if known)* Example: 1,234,567 B1	Publication Date MM-DD-YYYY	Name	Pages, Columns, Lines Where Relevant Passages or Relevant Figures Appear
	668	9,924,897	3/27/2018	Abdul-Hafiz	
	669	9,936,917	4/10/2018	Poeze et al.	
	670	9,943,269	4/17/2018	Muhsin et al.	
	671	9,949,676	4/24/2018	Al-Ali	
	672	9,952,095	4/24/2018	Hotelling et al.	
	673	9,955,937	5/1/2018	Telfort	
	674	9,965,946	5/8/2018	Al-Ali	
	675	9,980,667	5/29/2018	Kiani et al.	
	676	9,986,919	6/5/2018	Lamego et al.	
	677	9,986,952	6/5/2018	Dalvi et al.	
	678	9,989,560	6/5/2018	Poeze et al.	
	679	9,993,207	6/12/2018	Al-Ali et al.	
	680	10,007,758	6/26/2018	Al-Ali et al.	
	681	10,010,276	7/3/2018	Al-Ali et al.	
	682	10,032,002	7/24/2018	Kiani et al.	
	683	10,039,080	7/31/2018	Miller et al.	
	684	10,039,482	8/7/2018	Al-Ali et al.	
	685	10,039,491	8/7/2018	Thompson et al.	
	686	10,052,037	8/21/2018	Kinast et al.	
	687	10,055,121	8/21/2018	Chaudhri et al.	
	688	10,058,275	8/28/2018	Al-Ali et al.	
	689	10,064,562	9/4/2018	Al-Ali	
	690	10,066,970	9/4/2018	Gowreesunker et al.	
	691	10,076,257	9/18/2018	Lin et al.	
	692	10,078,052	9/18/2018	Ness et al.	
	693	10,086,138	10/2/2018	Novak, Jr.	
	694	10,092,200	10/9/2018	Al-Ali et al.	
	695	10,092,244	10/9/2018	Chuang et al.	
	696	10,092,249	10/9/2018	Kiani et al.	

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U.S. PATENT DOCUMENTS					
Examiner Initials	Cite No.	Document Number *Number - Kind Code (if known)* Example: 1,234,567 B1	Publication Date MM-DD-YYYY	Name	Pages, Columns, Lines Where Relevant Passages or Relevant Figures Appear
	697	10,098,550	10/16/2018	Al-Ali et al.	
	698	10,098,591	10/16/2018	Al-Ali et al.	
	699	10,098,610	10/16/2018	Al-Ali et al.	
	700	10,117,587	11/6/2018	Han	
	701	10,123,726	11/13/2018	Al-Ali et al.	
	702	10,130,289	11/20/2018	Al-Ali et al.	
	703	10,130,291	11/20/2018	Schurman et al.	
	704	10,149,616	12/11/2018	Al-Ali et al.	
	705	10,154,815	12/18/2018	Al-Ali et al.	
	706	10,159,412	12/25/2018	Lamego et al.	
	707	10,165,954	1/1/2019	Lee	
	708	10,188,296	1/29/2019	Al-Ali et al.	
	709	10,188,331	1/29/2019	Al-Ali et al.	
	710	10,188,348	1/29/2019	Kiani et al.	
	711	10,194,847	2/5/2019	Al-Ali	
	712	10,194,848	2/5/2019	Kiani et al.	
	713	10,201,286	2/12/2019	Waydo	
	714	10,201,298	2/12/2019	Al-Ali et al.	
	715	10,205,272	2/12/2019	Kiani et al.	
	716	10,205,291	2/12/2019	Scruggs et al.	
	717	10,213,108	2/26/2019	Al-Ali	
	718	10,215,698	2/26/2019	Han et al.	
	719	10,219,706	3/5/2019	Al-Ali	
	720	10,219,746	3/5/2019	McHale et al.	
	721	10,219,754	3/5/2019	Lamego	
	722	10,226,187	3/12/2019	Al-Ali et al	
	723	10,226,576	3/12/2019	Kiani	
	724	10,231,657	3/19/2019	Al-Ali et al	
	725	10,231,670	3/19/2019	Blank et al.	

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Examiner Initials	Cite No.	Document Number *Number - Kind Code (if known)* Example: 1,234,567 B1	Publication Date MM-DD-YYYY	Name	Pages, Columns, Lines Where Relevant Passages or Relevant Figures Appear
	726	10,231,676	3/19/2019	Al-Ali et al	
	727	10,247,670	4/2/2019	Ness et al.	
	728	10,251,585	4/9/2019	Al-Ali et al.	
	729	10,251,586	4/9/2019	Lamego	
	730	10,255,994	4/9/2019	Sampath et al.	
	731	10,258,265	4/16/2019	Poeze et al.	
	732	10,258,266	4/16/2019	Poeze et al.	
	733	10,265,024	4/23/2019	Lee et al.	
	734	10,271,748	4/30/2019	Al-Ali	
	735	10,278,626	5/7/2019	Schurman et al.	
	736	10,278,648	5/7/2019	Al-Ali et al.	
	737	10,279,247	5/7/2019	Kiani	
	738	10,285,626	5/14/2019	Kestelli et al.	
	739	10,292,628	5/21/2019	Poeze et al.	
	740	10,292,657	5/21/2019	Abdul-Hafiz et al.	
	741	10,292,664	5/21/2019	Al-Ali	
	742	10,299,708	5/28/2019	Poeze et al.	
	743	10,299,709	5/28/2019	Perea et al.	
	744	10,305,775	5/28/2019	Lamego et al.	
	745	10,307,111	6/4/2019	Muhsin et al.	
	746	10,325,681	6/18/2019	Sampath et al.	
	747	10,327,337	6/18/2019	Triman et al.	
	748	10,390,716	8/27/2019	Shimuta	
	749	10,398,383	9/3/2019	van Dinther et al.	
	750	10,406,445	9/10/2019	Vock et al.	
	751	10,416,079	9/17/2019	Magnussen et al.	
	752	2002/0042558	4/11/2002	Mendelson	
	753	2003/0036690	2/20/2003	Geddes et al.	
	754	2004/0054290	3/18/2004	Chance	

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Examiner Initials	Cite No.	Document Number *Number - Kind Code (if known)* Example: 1,234,567 B1	Publication Date MM-DD-YYYY	Name	Pages, Columns, Lines Where Relevant Passages or Relevant Figures Appear
	755	2005/0277819	12/15/2005	Kiani et al.	
	756	2006/0009607	1/12/2006	Lutz et al.	
	757	2006/0161054	7/20/2006	Reuss et al.	
	758	2006/0182659	8/17/2006	Unlu et al.	
	759	2007/0282478	12/6/2007	Al-Ali et al.	
	760	2008/0030468	2/7/2008	Al-Ali et al.	
	761	2009/0177097	7/9/2009	Ma et al.	
	762	2009/0247984	10/1/2009	Lamego et al.	
	763	2009/0275813	11/5/2009	Davis	
	764	2009/0275844	11/5/2009	Al-Ali	
	765	2010/0004518	1/7/2010	Vo et al.	
	766	2010/0030040	2/4/2010	Poeze et al.	
	767	2010/0030043	2/4/2010	Kuhn	
	768	2010/0113948	5/6/2010	Yang et al.	
	769	2011/0004106	1/6/2011	Iwamiya et al.	
	770	2011/0082711	4/7/2011	Poeze et al.	
	771	2011/0085721	4/14/2011	Guyon et al.	
	772	2011/0105854	5/5/2011	Kiani et al.	
	773	2011/0125060	5/26/2011	Telfort et al.	
	774	2011/0208015	8/25/2011	Welch et al.	
	775	2011/0213212	9/1/2011	Al-Ali	
	776	2011/0230733	9/22/2011	Al-Ali	
	777	2011/0237969	9/29/2011	Eckerbom et al.	
	778	2011/0245697	10/6/2011	Miettinen	
	779	2011/0288383	11/24/2011	Diab	
	780	2011/0301444	12/8/2011	Al-Ali	
	781	2012/0041316	2/16/2012	Al-Ali et al.	
	782	2012/0046557	2/23/2012	Kiani	
	783	2012/0059267	3/8/2012	Lamego et al.	

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	784	2012/0088984	4/12/2012	Al-Ali et al.	
	785	2012/0150052	6/14/2012	Buchheim et al.	
	786	2012/0165629	6/28/2012	Merritt et al.	
	787	2012/0179006	7/12/2012	Jansen et al.	
	788	2012/0197093	8/2/2012	LeBoeuf et al.	
	789	2012/0197137	8/2/2012	Jeanne et al.	
	790	2012/0209082	8/16/2012	Al-Ali	
	791	2012/0209084	8/16/2012	Olsen et al.	
	792	2012/0283524	11/8/2012	Kiani et al.	
	793	2012/0296178	11/22/2012	Lamego et al.	
	794	2012/0319816	12/20/2012	Al-Ali	
	795	2012/0330112	12/27/2012	Lamego et al.	
	796	2013/0006076	1/3/2013	McHale	
	797	2013/0018233	1/17/2013	Cinbis et al.	
	798	2013/0023775	1/24/2013	Lamego et al.	
	799	2013/0041591	2/14/2013	Lamego	
	800	2013/0046204	2/21/2013	Lamego et al.	
	801	2013/0060147	3/7/2013	Welch et al.	
	802	2013/0085346	4/4/2013	Lin et al.	
	803	2013/0096405	4/18/2013	Garfio	
	804	2013/0096936	4/18/2013	Sampath et al.	
	805	2013/0131474	5/23/2013	Gu et al.	
	806	2013/0190581	7/25/2013	Al-Ali et al.	
	807	2013/0204112	8/8/2013	White et al.	
	808	2013/0211214	8/15/2013	Olsen	
	809	2013/0243021	9/19/2013	Siskavich	
	810	2013/0253334	9/26/2013	Al-Ali et al.	
	811	2013/0262730	10/3/2013	Al-Ali et al.	
	812	2013/0267804	10/10/2013	Al-Ali	

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	813	2013/0274572	10/17/2013	Al-Ali et al.	
	814	2013/0296672	11/7/2013	O'Neil et al.	
	815	2013/0296713	11/7/2013	Al-Ali et al.	
	816	2013/0317370	11/28/2013	Dalvi et al.	
	817	2013/0324808	12/5/2013	Al-Ali et al.	
	818	2013/0331660	12/12/2013	Al-Ali et al.	
	819	2013/0331670	12/12/2013	Kiani	
	820	2014/0012100	1/9/2014	Al-Ali et al.	
	821	2014/0034353	2/6/2014	Al-Ali et al.	
	822	2014/0051953	2/20/2014	Lamego et al.	
	823	2014/0051955	2/20/2014	Tiao et al.	
	824	2014/0066783	3/6/2014	Kiani et al.	
	825	2014/0073887	3/13/2014	Petersen et al.	
	826	2014/0073960	3/13/2014	Rodriguez-Llorente et al.	
	827	2014/0077956	3/20/2014	Sampath et al.	
	828	2014/0081100	3/20/2014	Muhsin et al.	
	829	2014/0081175	3/20/2014	Telfort	
	830	2014/0094667	4/3/2014	Schurman et al.	
	831	2014/0100434	4/10/2014	Diab et al.	
	832	2014/0107493	4/17/2014	Yuen et al.	
	833	2014/0114199	4/24/2014	Lamego et al.	
	834	2014/0120564	5/1/2014	Workman et al.	
	835	2014/0121482	5/1/2014	Merritt et al.	
	836	2014/0121483	5/1/2014	Kiani	
	837	2014/0127137	5/8/2014	Bellott et al.	
	838	2014/0129702	5/8/2014	Lamego et al.	
	839	2014/0135588	5/15/2014	Al-Ali et al.	
	840	2014/0142401	5/22/2014	Al-Ali et al.	
	841	2014/0163344	6/12/2014	Al-Ali	

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Examiner Initials	Cite No.	Document Number *Number - Kind Code (if known)* Example: 1,234,567 B1	Publication Date MM-DD-YYYY	Name	Pages, Columns, Lines Where Relevant Passages or Relevant Figures Appear
	842	2014/0163402	6/12/2014	Lamego et al.	
	843	2014/0166076	6/19/2014	Kiani et al.	
	844	2014/0171146	6/19/2014	Ma et al.	
	845	2014/0171763	6/19/2014	Diab	
	846	2014/0180038	6/26/2014	Kiani	
	847	2014/0180154	6/26/2014	Sierra et al.	
	848	2014/0180160	6/26/2014	Brown et al.	
	849	2014/0187973	7/3/2014	Brown et al.	
	850	2014/0192177	7/10/2014	Bartula et al.	
	851	2014/0194766	7/10/2014	Al-Ali et al.	
	852	2014/0206954	7/24/2014	Yuen et al.	
	853	2014/0206963	7/24/2014	Al-Ali	
	854	2014/0213864	7/31/2014	Abdul-Hafiz et al.	
	855	2014/0221854	8/7/2014	Wai	
	856	2014/0266790	9/18/2014	Al-Ali et al.	
	857	2014/0275808	9/18/2014	Poeze et al.	
	858	2014/0275835	9/18/2014	Lamego et al.	
	859	2014/0275871	9/18/2014	Lamego et al.	
	860	2014/0275872	9/18/2014	Merritt et al.	
	861	2014/0275881	9/18/2014	Lamego et al.	
	862	2014/0276013	9/18/2014	Muehlemann et al.	
	863	2014/0276115	9/18/2014	Dalvi et al.	
	864	2014/0276116	9/18/2014	Takahashi et al.	
	865	2014/0288400	9/25/2014	Diab et al.	
	866	2014/0303520	10/9/2014	Telfort et al.	
	867	2014/0316217	10/23/2014	Purdon et al.	
	868	2014/0316218	10/23/2014	Purdon et al.	
	869	2014/0316228	10/23/2014	Blank et al.	
	870	2014/0323825	10/30/2014	Al-Ali et al.	

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	871	2014/0323897	10/30/2014	Brown et al.	
	872	2014/0323898	10/30/2014	Purdon et al.	
	873	2014/0330092	11/6/2014	Al-Ali et al.	
	874	2014/0330098	11/6/2014	Merritt et al.	
	875	2014/0330099	11/6/2014	Al-Ali et al.	
	876	2014/0336481	11/13/2014	Shakespeare et al.	
	877	2014/0357966	12/4/2014	Al-Ali et al.	
	878	2014/0361147	12/11/2014	Fei	
	879	2014/0371548	12/28/2014	Al-Ali et al.	
	880	2014/0371632	12/18/2014	Al-Ali et al.	
	881	2014/0378784	12/25/2014	Kiani et al.	
	882	2014/0378844	12/25/2014	Fei	
	883	2015/0005600	1/1/2015	Blank et al.	
	884	2015/0011907	1/8/2015	Purdon et al.	
	885	2015/0012231	1/8/2015	Poeze et al.	
	886	2015/0018650	1/15/2015	Al-Ali et al.	
	887	2015/0025406	1/22/2015	Al-Ali	
	888	2015/0032029	1/29/2015	Al-Ali et al.	
	889	2015/0038859	2/5/2015	Dalvi et al.	
	890	2015/0045637	2/12/2015	Dalvi	
	891	2015/0045685	2/12/2015	Al-Ali et al.	
	892	2015/0051462	2/19/2015	Olsen	
	893	2015/0065889	3/5/2015	Gandelman et al.	
	894	2015/0080754	3/19/2015	Purdon et al.	
	895	2015/0087936	3/26/2015	Al-Ali et al.	
	896	2015/0094546	4/2/2015	Al-Ali	
	897	2015/0097701	4/9/2015	Al-Ali et al.	
	898	2015/0099324	4/9/2015	Wojtczuk et al.	
	899	2015/0099950	4/9/2015	Al-Ali et al.	

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	900	2015/0099951	4/9/2015	Al-Ali et al.	
	901	2015/0099955	4/9/2015	Al-Ali et al.	
	902	2015/0101844	4/16/2015	Al-Ali et al.	
	903	2015/0106121	4/16/2015	Muhsin et al.	
	904	2015/0112151	4/23/2015	Muhsin et al.	
	905	2015/0116076	4/30/2015	Al-Ali et al.	
	906	2015/0119725	4/30/2015	Martin et al.	
	907	2015/0126830	5/7/2015	Schurman et al.	
	908	2015/0133755	5/14/2015	Smith et al.	
	909	2015/0140863	5/21/2015	Al-Ali et al.	
	910	2015/0141781	5/21/2015	Weber et al.	
	911	2015/0165312	6/18/2015	Kiani	
	912	2015/0173671	6/25/2015	Paalasmaa et al.	
	913	2015/0196237	7/16/2015	Lamego	
	914	2015/0201874	7/23/2015	Diab	
	915	2015/0208966	7/30/2015	Al-Ali	
	916	2015/0216459	8/6/2015	Al-Ali et al.	
	917	2015/0230755	8/20/2015	Al-Ali et al.	
	918	2015/0238722	8/27/2015	Al-Ali	
	919	2015/0245773	9/3/2015	Lamego et al.	
	920	2015/0245793	9/2/2015	Al-Ali et al.	
	921	2015/0245794	9/3/2015	Al-Ali	
	922	2015/0255001	9/10/2015	Haughav et al.	
	923	2015/0257689	9/17/2015	Al-Ali et al.	
	924	2015/0272514	10/1/2015	Kiani et al.	
	925	2015/0281424	10/1/2015	Vock et al.	
	926	2015/0318100	11/5/2015	Rothkopf et al.	
	927	2015/0351697	12/10/2015	Weber et al.	
	928	2015/0351704	12/20/2015	Kiani et al.	

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	929	2015/0359429	12/17/2015	Al-Ali et al.	
	930	2015/0366472	12/24/2015	Kiani	
	931	2015/0366507	12/24/2015	Blank	
	932	2015/0374298	12/31/2015	Al-Ali et al.	
	933	2015/0380875	12/31/2015	Coverston et al.	
	934	2016/0000362	1/7/2016	Diab et al.	
	935	2016/0007930	1/14/2016	Weber et al.	
	936	2016/0019360	1/21/2016	PAHWA et al.	
	937	2016/0022160	1/28/2016	Pi et al.	
	938	2016/0023245	1/28/2016	Zadesky et al.	
	939	2016/0029932	2/4/2016	Al-Ali	
	940	2016/0029933	2/4/2016	Al-Ali et al.	
	941	2016/0038045	2/11/2016	Shapiro	
	942	2016/0041531	2/11/2016	Mackie et al.	
	943	2016/0045118	2/18/2016	Kiani	
	944	2016/0051157	2/25/2016	Waydo	
	945	2016/0051158	2/25/2016	Silva	
	946	2016/0051205	2/25/2016	Al-Ali et al.	
	947	2016/0058302	3/3/2016	Raghuram et al.	
	948	2016/0058309	3/3/2016	Han	
	949	2016/0058310	3/3/2016	Lijima	
	950	2016/0058312	3/3/2016	Han et al.	
	951	2016/0058338	3/3/2016	Schurman et al.	
	952	2016/0058347	3/3/2016	Reichgott et al.	
	953	2016/0058356	3/3/2016	RAGHURAM et al.	
	954	2016/0058370	3/3/2016	RAGHURAM et al.	
	955	2016/0066823	3/10/2016	Kind et al.	
	956	2016/0066824	3/10/2016	Al-Ali et al.	
	957	2016/0066879	3/10/2016	Telfort et al.	

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	958	2016/0071392	3/10/2016	Hankey et al.	
	959	2016/0072429	3/10/2016	Kiani et al.	
	960	2016/0073967	3/17/2016	Lamego et al.	
	961	2016/0081552	3/24/2016	Wojtczuk et al.	
	962	2016/0095543	4/7/2016	Telfort et al.	
	963	2016/0095548	4/7/2016	Al-Ali et al.	
	964	2016/0103598	4/14/2016	Al-Ali et al.	
	965	2016/0106367	4/21/2016	Jorov et al.	
	966	2016/0113527	4/28/2016	Al-Ali et al.	
	967	2016/0143548	5/26/2016	Al-Ali	
	968	2016/0154950	6/2/2016	NAKAJIMA et al.	
	969	2016/0157780	6/9/2016	RIMMINEN et al.	
	970	2016/0166182	6/16/2016	Al-Ali et al.	
	971	2016/0166183	6/16/2016	Poeze et al.	
	972	2016/0196388	7/7/2016	Lamego	
	973	2016/0197436	7/7/2016	Barker et al.	
	974	2016/0213281	7/28/2016	Eckerbom, et al.	
	975	2016/0213309	7/28/2016	SANNHOLM et al.	
	976	2016/0228043	8/11/2016	O'Neil et al.	
	977	2016/0233632	8/11/2016	Scruggs et al.	
	978	2016/0234944	8/11/2016	Schmidt et al.	
	979	2016/0256058	9/8/2016	Pham et al.	
	980	2016/0256082	9/8/2016	Ely et al.	
	981	2016/0267238	9/15/2016	Nag	
	982	2016/0270735	9/22/2016	Diab et al.	
	983	2016/0283665	9/29/2016	Sampath et al.	
	984	2016/0287090	10/6/2016	Al-Ali et al.	
	985	2016/0287107	10/6/2016	Szabados et al.	
	986	2016/0287181	10/6/2016	Han et al.	

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	987	2016/0287786	10/6/2016	Kiani	
	988	2016/0296169	10/13/2016	McHale et al.	
	989	2016/0296173	10/13/2016	Culbert	
	990	2016/0296174	10/13/2016	Isikman et al.	
	991	2016/0310027	10/27/2016	Han	
	992	2016/0310052	10/27/2016	Al-Ali et al.	
	993	2016/0314260	10/27/2016	Kiani	
	994	2016/0324488	11/10/2016	Olsen	
	995	2016/0327984	11/10/2016	Al-Ali et al.	
	996	2016/0331332	11/17/2016	Al-Ali	
	997	2016/0367173	12/22/2016	Dalvi et al.	
	998	2016/0378069	12/29/2016	Rothkopf	
	999	2016/0378071	12/29/2016	Rothkopf	
	1000	2017/0000394	1/5/2017	Al-Ali et al.	
	1001	2017/0007134	1/12/2017	Al-Ali et al.	
	1002	2017/0007183	1/12/2017	Dusan et al.	
	1003	2017/0007198	1/12/2017	Al-Ali et al.	
	1004	2017/0010858	1/12/2017	Prest et al.	
	1005	2017/0014083	1/19/2017	Diab et al.	
	1006	2017/0014084	1/19/2017	Al-Ali et al.	
	1007	2017/0024748	1/26/2017	Haider	
	1008	2017/0042488	2/16/2017	Muhsin	
	1009	2017/0055851	3/2/2017	Al-Ali	
	1010	2017/0055882	3/2/2017	Al-Ali et al.	
	1011	2017/0055887	3/2/2017	Al-Ali	
	1012	2017/0055896	3/2/2017	Al-Ali et al.	
	1013	2017/0074897	3/16/2017	Mermel et al.	
	1014	2017/0079594	3/23/2017	Telfort et al.	
	1015	2017/0084133	3/23/2017	Cardinali et al.	

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	1016	2017/0086689	3/30/2017	Shui et al.	
	1017	2017/0086723	3/30/2017	Al-Ali et al.	
	1018	2017/0086742	3/30/2017	Harrison-Noonan et al.	
	1019	2017/0086743	3/30/2017	Bushnell et al.	
	1020	2017/0094450	3/30/2017	Tu et al.	
	1021	2017/0143281	5/25/2017	Olsen	
	1022	2017/0147774	5/25/2017	Kiani	
	1023	2017/0156620	6/8/2017	Al-Ali et al.	
	1024	2017/0164884	6/15/2017	Culbert et al.	
	1025	2017/0172435	6/22/2017	Presura	
	1026	2017/0172476	6/22/2017	Schilthuizen	
	1027	2017/0173632	6/22/2017	Al-Ali	
	1028	2017/0187146	6/29/2017	Kiani et al.	
	1029	2017/0188919	7/6/2017	Al-Ali et al.	
	1030	2017/0196464	7/13/2017	Jansen et al.	
	1031	2017/0196470	7/13/2017	Lamego et al.	
	1032	2017/0202505	7/20/2017	Kirenko et al.	
	1033	2017/0209095	7/27/2017	Wagner et al.	
	1034	2017/0224262	8/10/2017	Al-Ali	
	1035	2017/0228516	8/10/2017	Sampath et al.	
	1036	2017/0245790	8/31/2017	Al-Ali et al.	
	1037	2017/0248446	8/31/2017	Gowreesunker et al.	
	1038	2017/0251974	9/7/2017	Shreim et al.	
	1039	2017/0251975	9/7/2017	Shreim et al.	
	1040	2017/0258403	9/14/2017	Abdul-Hafiz et al.	
	1041	2017/0273619	9/28/2017	Alvarado et al.	
	1042	2017/0281024	10/5/2017	Narasimhan et al.	
	1043	2017/0293727	10/12/2017	Klaassen et al.	
	1044	2017/0311851	11/2/2017	Schurman et al.	

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	1045	2017/0311891	11/2/2017	Kiani et al.	
	1046	2017/0325698	11/16/2017	Allec et al.	
	1047	2017/0325728	11/16/2017	Al-Ali et al.	
	1048	2017/0325744	11/16/2017	Allec et al.	
	1049	2017/0332976	11/23/2017	Al-Ali et al.	
	1050	2017/0340209	11/30/2017	Klaassen et al.	
	1051	2017/0340219	11/30/2017	Sullivan et al.	
	1052	2017/0340293	11/30/2017	Al-Ali et al.	
	1053	2017/0347885	12/7/2017	Tan et al.	
	1054	2017/0354332	12/14/2017	Lamego	
	1055	2017/0354795	12/14/2017	BLAHNIK et al.	
	1056	2017/0358239	12/14/2017	Arney et al.	
	1057	2017/0358240	12/14/2017	Blahnik et al.	
	1058	2017/0358242	12/14/2017	Thompson et al.	
	1059	2017/0360306	12/14/2017	Narasimhan et al.	
	1060	2017/0360310	12/21/2017	Kiani et al.	
	1061	2017/0366657	12/21/2017	Thompson et al.	
	1062	2017/0367632	12/28/2017	Al-Ali et al.	
	1063	2018/0008146	1/11/2018	Al-Ali et al.	
	1064	2018/0013562	1/11/2018	Haider et al.	
	1065	2018/0014752	1/18/2018	Al-Ali et al.	
	1066	2018/0014781	1/18/2018	Clavelle et al.	
	1067	2018/0025287	1/25/2018	Mathew et al.	
	1068	2018/0028124	2/1/2018	Al-Ali et al.	
	1069	2018/0042556	2/15/2018	SHAHPARNIA et al.	
	1070	2018/0049694	2/22/2018	Singh Alvarado et al.	
	1071	2018/0050235	2/22/2018	Tan et al.	
	1072	2018/0055375	3/1/2018	MARTINEZ et al.	
	1073	2018/0055385	3/1/2018	Al-Ali	

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	1074	2018/0055390	3/1/2018	Kiani et al.	
	1075	2018/0055430	3/1/2018	Diab et al.	
	1076	2018/0055439	3/1/2018	Pham et al.	
	1077	2018/0056129	1/1/2018	NARASIMHA RAO et al.	
	1078	2018/0064381	3/8/2018	Shakespeare et al.	
	1079	2018/0069776	3/8/2018	Lamego et al.	
	1080	2018/0070867	3/15/2018	Smith et al.	
	1081	2018/0078151	3/22/2018	ALLEC et al.	
	1082	2018/0078182	3/22/2018	CHEN et al.	
	1083	2018/0082767	3/22/2018	Al-Ali et al.	
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	1085	2018/0087937	3/29/2018	Al-Ali et al.	
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	1090	2018/0116575	5/3/2018	Perea et al.	
	1091	2018/0125368	5/10/2018	Lamego et al.	
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	1094	2018/0130325	5/10/2018	Kiani et al.	
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	1097	2018/0146901	5/31/2018	Al-Ali et al.	
	1098	2018/0146902	5/31/2018	Kiani et al.	
	1099	2018/0153418	6/7/2018	SULLIVAN et al.	
	1100	2018/0153442	6/7/2018	Eckerbom, et al.	
	1101	2018/0153446	6/7/2018	Kiani	
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	Filing Date	February 14, 2020
	First Named Inventor	Ammar Al-Ali
	Art Unit	2875
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Examiner Initials	Cite No.	Document Number *Number - Kind Code (if known)* Example: 1,234,567 B1	Publication Date MM-DD-YYYY	Name	Pages, Columns, Lines Where Relevant Passages or Relevant Figures Appear
	1103	2018/0153448	6/7/2018	Weber et al.	
	1104	2018/0161499	6/14/2018	Al-Ali et al.	
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	1106	2018/0168491	6/21/2018	Al-Ali et al.	
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	1109	2018/0182484	6/28/2018	Sampath et al.	
	1110	2018/0184917	7/5/2018	Kiani	
	1111	2018/0192924	7/12/2018	Al-Ali	
	1112	2018/0192953	7/12/2018	Shreim et al.	
	1113	2018/0192955	7/12/2018	Al-Ali et al.	
	1114	2018/0196514	7/12/2018	ALLEC et al.	
	1115	2018/0199871	7/19/2018	Pauley et al.	
	1116	2018/0206795	7/26/2018	Al-Ali	
	1117	2018/0206815	7/26/2018	Telfort	
	1118	2018/0213583	7/26/2018	Al-Ali	
	1119	2018/0214031	8/2/2018	Kiani et al.	
	1120	2018/0214090	8/2/2018	Al-Ali et al.	
	1121	2018/0218792	8/2/2018	Muhsin et al.	
	1122	2018/0225960	8/9/2018	Al-Ali et al.	
	1123	2018/0228414	8/16/2018	SHAO et al.	
	1124	2018/0238718	8/23/2018	Dalvi	
	1125	2018/0238734	8/23/2018	Hotelling et al.	
	1126	2018/0242853	8/30/2018	Al-Ali	
	1127	2018/0242921	8/30/2018	Muhsin et al.	
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U.S. PATENT DOCUMENTS					
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	1132	2018/0247712	8/30/2018	Muhsin et al.	
	1133	2018/0249933	9/6/2018	Schurman, et al.	
	1134	2018/0253947	9/6/2018	Muhsin et al.	
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	1139	2018/0289325	10/11/2018	Poeze et al.	
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	1141	2018/0296161	10/18/2018	Shreim et al.	
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	1143	2018/0310822	11/1/2018	Indorf et al.	
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U.S. PATENT DOCUMENTS					
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	1161	2019/0082979	3/21/2019	Al-Ali et al.	
	1162	2019/0090748	3/28/2019	Al-Ali	
	1163	2019/0090760	3/28/2019	Kinast et al.	
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	1165	2019/0104973	04-11.2019	Poeze et al.	
	1166	2019/0110719	4/18/2019	Poeze et al.	
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Examiner Initials	Cite No.	Foreign Patent Document *Country Code-Number-Kind Code* Example: JP 1234567 A1	Publication Date MM-DD-YYYY	Name	Pages, Columns, Lines Where Relevant Passages or Relevant Figures Appear	T[1]
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	1240	WO 1995/000070 A1	1/5/1995	INCREA OY		
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	1243	WO 1996/063883 A1	12/16/1999	SPO MEDICAL EQUIPMENT LTD		
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	1247	WO 2000/028892 A1	5/25/2000	MICROMEDICAL IND LIMITED		
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	1250	WO 2008/107238 A1	9/12/2008	UNIV BRETAGNE SUD, UNIV RENNES		X
	1251	WO 2009/001988 A1	12/31/2008	SILICONFILE TECHNOLOGIES INC		
	1252	WO 2009/137524 A1	11/12/2009	MASIMO CORP		
	1253	WO 2011/069122 A1	6/9/2011	MASIMO CORP		
	1254	WO 2013/030744 A1	3/7/2013	OXITONE MEDICAL LTD		
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	1256	WO 2013/181368 A1	12/5/2013	COVIDIEN LP		

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Examiner Initials	Cite No.	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T[1]
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	1271	Anliker et al., "AMON: a wearable multiparameter medical monitoring and alert system," in *IEEE Transactions on Information Technology in Biomedicine*, vol. 8, no. 4, Dec. 2004.	
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NON PATENT LITERATURE DOCUMENTS			
Examiner Initials	Cite No.	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T[1]
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(Multiple sheets used when necessary)	Examiner	Unassigned
SHEET 47 OF 50	Attorney Docket No.	MAS.1007C4

NON PATENT LITERATURE DOCUMENTS			
Examiner Initials	Cite No.	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T[1]
	1291	Kilbane, et al. "Design Considerations for Wrist-Wearable Heart Rate Monitors," Arrow Intelligent Systems, 2015.	
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	1293	Konstantas, et al. "Mobile Patient Monitoring: The MobiHealth System", Research Gate, 2004.	
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	1299	Lukowicz, et al. "AMON: a wearable medical computer for high risk patients," *Proceedings. Sixth International Symposium on Wearable Computers,* 2002.	
	1300	Lukowicz, et al. "THE WEARARM MODULAR, LOW-POWER COMPUTING CORE", IEEE Micro, 2001.	
	1301	Mapar "Wearable Sensor for Continuously Cigilant Blood Perfusion and Oxygenation", UCLA, 2012.	
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	1303	Mendelson et al., "A Mobile PDA-Based Wireless Pulse Oximeter," Proceedings of the IASTED International Conference Telehealth, July 19-21, 2005, pp. 1-6.	
	1304	Mendelson et al., "A Wearable Reflectance Pulse Oximeter for Remote Physiological Monitoring," Proceedings of the 28th IEEE EMBS Annual International Conference, August 30-September 3, 2006, pp. 912-915.	
	1305	Mendelson et al., "Accelerometery-Based Adaptive Noise Cancellation for Remote Physiological Monitoring by a Wearable Pulse Oximeter," Proceedings of the 3rd IASTED International Conference TELEHEALTH, May 31-June 1, 2007, pp. 28-33.	
	1306	Mendelson et al., "Measurement Site and Photodetector Size Considerations in Optimizing Power Consumption of a Wearable Reflectance Pulse Oximeter," Proceedings of the 25th Annual International Conference of the IEEE EMBS, September 17-21, 2003, pp. 3016-3019.	

Examiner Signature	Date Considered
***Examiner:** Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.	

T[1] - Place a check mark in this area when an English language Translation is attached.

PTO/SB/08 Equivalent

INFORMATION DISCLOSURE STATEMENT BY APPLICANT	Application No.	16/791955
	Filing Date	February 14, 2020
	First Named Inventor	Ammar Al-Ali
	Art Unit	2875
(Multiple sheets used when necessary)	Examiner	Unassigned
SHEET 48 OF 50	Attorney Docket No.	MAS.1007C4

NON PATENT LITERATURE DOCUMENTS			
Examiner Initials	Cite No.	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T[1]
	1307	Mendelson et al., "Minimization of LED Power Consumption in the Design of a Wearable Pulse Oximeter,"Proceedings of the lASTED International Conference Biomedical Engineering, June 25-27, 2003, 6 pages.	
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	1309	Pandian et al., "Smart Vest: Wearable Multi-Parameter Remote Physiological Monitoring System," Medical Engineering & Physics 30, 2008. pp. 466-477.	
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	1314	Renevey et al., "Wrist-Located Pulse Detection Using IR Signals, Activity and Nonlinear Artifact Cancellation," Proceedings of the 23rd Annual EMBS International Conference, October 25-28, 2001, pp. 3030-3033.	
	1315	Rhee et al. "Artifact-Resistant Power-Efficient Design of Finger-Ring Plethysmographic Sensors," IEEE Transactions on Biomedical Engineering, Vol. 48, No. 7, July 2001, pp. 795-805.	
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	1317	Rhee et al., "Design of a Artifact-Free Wearable Plethysmographic Sensor," 21st Annual International Conferemce IEEE Engineering in Medicine and Biology Society, October 13-16, 1999, p. 786.	
	1318	Rhee et al., "The Ring Sensor: a New Ambulatory Wearable Sensor for Twenty-Four Hour Patient Monitoring," Proceedings of the 20th Annual International Conference of the IEEE Engineering in Medicine and Biology Society, October 29-November 1 1998, 4 pages.	
	1319	Savage et al., "Optimizing Power Consumption in the Design of a Wearable Wireless Telesensor: Comparison of Pulse Oximeter Modes," Proceedings of IEEE 29th Annual Nonheust Bioengineering Conference, 2003, pp.150-151.	

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***Examiner:** Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.	

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT	Application No.	16/791955
	Filing Date	February 14, 2020
	First Named Inventor	Ammar Al-Ali
	Art Unit	2875
(Multiple sheets used when necessary)	Examiner	Unassigned
SHEET 49 OF 50	Attorney Docket No.	MAS.1007C4

NON PATENT LITERATURE DOCUMENTS			
Examiner Initials	Cite No.	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T[1]
	1320	Scully, et al. "Physiological Parameter Monitoring from Optical Recordings with a Mobile Phone", IEEE Trans Biomed Eng. ; 59(2): 303–306, 2012.	
	1321	Shaltis et al., "Novel Design for a Wearable, Rapidly Depolyable, Wireless Noninvasive Triage Sensor," Proceedings of the 2005 IEEE, Engineering in Medicine and Biology 27th Annual Conference, September 1-4, 2005, pp 3567-3570.	
	1322	Shin et al., "A Novel Headset with a Transmissive PPG Sensor for Heart Rate Measurement", ICBME 2008, Proceedings 23, pp. 519–522, 2009.	
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	1328	Tofs, et al. "Body-Heat Powered Autonomous Pulse Oximeter", IEEE SENSORS, 2006	
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	1330	Tura, et al., "A Medical Wearable Device with Wireless Bluetooth-based Data Transmission", MEASUREMENT SCIENCE REVIEW, Volume 3, Section 2, 2003.	
	1331	Vogel, et al. "In-Ear Vital Signs Monitoring Using a Novel Microoptic Reflective Sensor", IEEE TRANSACTIONS ON INFORMATION TECHNOLOGY IN BIOMEDICINE, VOL. 13, NO. 6, 2009.	
	1332	Warren, et al. "Designing Smart Health Care Technology into the Home of the Future", United States: N. p., 1999.	
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	1336	Yang, et al. "A Twenty-Four Hour Tele-Nursing System Using a Ring Sensor", Proc. of 1998 Int. Conf. on Robotics and Automation, 1998.	

Examiner Signature	Date Considered
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT	Application No.	16/791955
	Filing Date	February 14, 2020
	First Named Inventor	Ammar Al-Ali
	Art Unit	2875
(Multiple sheets used when necessary)	Examiner	Unassigned
SHEET 50 OF 50	Attorney Docket No.	MAS.1007C4

NON PATENT LITERATURE DOCUMENTS			
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	1337	Yang, et al. "Development Of The Ring Sensor For Healthcare Automation", Robotics and Autonomous Systems, 30, pages 273-281, 2000.	
	1338	Yang, et al. "SpO2 and Heart Rate Measurement with Wearable Watch Based on PPG", IEEE, 2015.	
	1339	Zhai, et al. "A Wireless Sensor Network for Hospital Patient Monitoring", University of Calgary, 2007.	

Examiner Signature	Date Considered
***Examiner:** Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.	

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Electronic Patent Application Fee Transmittal					
Application Number:	16791955				
Filing Date:	14-Feb-2020				
Title of Invention:	PHYSIOLOGICAL MEASUREMENT DEVICES, SYSTEMS, AND METHODS				
First Named Inventor/Applicant Name:	Ammar Al-Ali				
Filer:	Jarom D. Kesler/Daniel Escajeda				
Attorney Docket Number:	MAS.1007C4				
Filed as Large Entity					
Filing Fees for Utility under 35 USC 111(a)					
Description		**Fee Code**	**Quantity**	**Amount**	**Sub-Total in USD($)**
Basic Filing:					
Pages:					
Claims:					
CLAIMS IN EXCESS OF 20		1202	5	100	500
Miscellaneous-Filing:					
Petition:					
Patent-Appeals-and-Interference:					
Post-Allowance-and-Post-Issuance:					

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Extension-of-Time:				
Miscellaneous:				
			Total in USD ($)	**500**

Electronic Acknowledgement Receipt	
EFS ID:	38840089
Application Number:	16791955
International Application Number:	
Confirmation Number:	3106
Title of Invention:	PHYSIOLOGICAL MEASUREMENT DEVICES, SYSTEMS, AND METHODS
First Named Inventor/Applicant Name:	Ammar Al-Ali
Customer Number:	64735
Filer:	Jarom D. Kesler/Wendy Castorena
Filer Authorized By:	Jarom D. Kesler
Attorney Docket Number:	MAS.1007C4
Receipt Date:	11-MAR-2020
Filing Date:	14-FEB-2020
Time Stamp:	19:19:15
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	CARD
Payment was successfully received in RAM	$500
RAM confirmation Number	E20203AJ20005296
Deposit Account	111410
Authorized User	Wendy Castorena
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows: 37 CFR 1.16 (National application filing, search, and examination fees) 37 CFR 1.17 (Patent application and reexamination processing fees)	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		PRELIM_MAS1007C4.pdf	53756 7c714e237230db04cae3f6fb03760300636987d4	yes	11
	Multipart Description/PDF files in .zip description				
	Document Description		**Start**	**End**	
	Preliminary Amendment		1	1	
	Specification		2	4	
	Claims		5	9	
	Drawings-only black and white line drawings		10	10	
	Applicant Arguments/Remarks Made in an Amendment		11	11	
Warnings:					
Information:					
2	Drawings-only black and white line drawings	DRAWING_MAS1007C.PDF	62554 c4dc3a082ace834b17f69214b4b5672203d73b0a	no	1
Warnings:					
Information:					
3	Miscellaneous Incoming Letter	HAKIM-STMT_MAS1007C4.pdf	14560 ab0d9f17101bf6467681ad8ce89c0e011af45558	no	1
Warnings:					
Information:					
4		IDS_MAS1007C4.pdf	484997 346087a63a7ee1ad0210253c432eef25f7e6becf	yes	51

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Transmittal Letter	1	1
	Information Disclosure Statement (IDS) Form (SB08)	2	51

Warnings:					
Information:					
5	Fee Worksheet (SB06)	fee-info.pdf	30365 200131f6c51cf8b17020d8d592b555fced274cb9	no	2
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New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.
National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.
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AMENDMENTS TO THE DRAWINGS

Please replace Figure 7A with the enclosed *Replacement Sheet*.

REMARKS

Prior to examination, please amend the Specification, Drawings, and Claims as shown herein.

No Disclaimers or Disavowals

Although the present communication may include alterations to the application or claims, or characterizations of claim scope or referenced art, Applicant is not conceding in this application that previously pending claims are not patentable. Rather, any alterations or characterizations are being made to facilitate expeditious prosecution of this application. Applicant reserves the right to pursue at a later date any previously pending or other broader or narrower claims that capture any subject matter supported by the present disclosure, including subject matter found to be specifically disclaimed herein or by any prior prosecution. Accordingly, reviewers of this or any parent, child or related prosecution history shall not reasonably infer that Applicant has made any disclaimers or disavowals of any subject matter supported by the present application.

Please charge any additional fees, including any fees for additional extension of time, or credit overpayment to Deposit Account No. 11-1410.

Respectfully submitted,

KNOBBE, MARTENS, OLSON & BEAR, LLP

Dated: March 11, 2020

By: /Jarom Kesler/
Jarom D. Kesler
Registration No. 57,046
Registered Practitioner
Customer No. 64735
(949) 760-0404

PTO/SB/06 (09-11)
Approved for use through 1/31/2014. OMB 0651-0032
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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 16/791,955	Filing Date 02/14/2020	☐ To be Mailed

ENTITY: ☑ LARGE ☐ SMALL ☐ MICRO

APPLICATION AS FILED - PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA		RATE ($)	FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A		N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A		N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A		N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*		x $100 =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*		x $460 =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).				
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))					
* If the difference in column 1 is less than zero, enter "0" in column 2.				TOTAL	

APPLICATION AS AMENDED - PART II

		(Column 1)		(Column 2)	(Column 3)			
AMENDMENT	03/11/2020	CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	* 25	Minus	** 20	= 5		x $100 =	500
	Independent (37 CFR 1.16(h))	* 3	Minus	*** 3	= 0		x $460 =	0
	☐ Application Size Fee (37 CFR 1.16(s))							
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							
							TOTAL ADD'L FEE	500

		(Column 1)		(Column 2)	(Column 3)			
AMENDMENT		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	*	Minus	**	=		x $0 =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=		x $0 =	
	☐ Application Size Fee (37 CFR 1.16(s))							
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							
							TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.	LIE
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".	/MONICA D FRANCIS/
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".	
The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.	

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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NOTICE OF ALLOWANCE AND FEE(S) DUE

64735 7590 04/09/2020

KNOBBE, MARTENS, OLSON & BEAR, LLP
MASIMO CORPORATION (MASIMO)
2040 MAIN STREET
FOURTEENTH FLOOR
IRVINE, CA 92614

EXAMINER
FARDANESH, MARJAN

ART UNIT	PAPER NUMBER
3791	

DATE MAILED: 04/09/2020

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/791,955	02/14/2020	Ammar Al-Ali	MAS.1007C4	3106

TITLE OF INVENTION: PHYSIOLOGICAL MEASUREMENT DEVICES, SYSTEMS, AND METHODS

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	$1000	$0.00	$0.00	$1000	07/09/2020

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. PROSECUTION ON THE MERITS IS CLOSED. THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.

THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. THIS STATUTORY PERIOD CANNOT BE EXTENDED. SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE DOES NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM WILL BE CONSIDERED A REQUEST TO REAPPLY THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW DUE.

HOW TO REPLY TO THIS NOTICE:

I. Review the ENTITY STATUS shown above. If the ENTITY STATUS is shown as SMALL or MICRO, verify whether entitlement to that entity status still applies.

If the ENTITY STATUS is the same as shown above, pay the TOTAL FEE(S) DUE shown above.

If the ENTITY STATUS is changed from that shown above, on PART B - FEE(S) TRANSMITTAL, complete section number 5 titled "Change in Entity Status (from status indicated above)".

For purposes of this notice, small entity fees are 1/2 the amount of undiscounted fees, and micro entity fees are 1/2 the amount of small entity fees.

II. PART B - FEE(S) TRANSMITTAL, or its equivalent, must be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed and an extra copy of the form should be submitted. If an equivalent of Part B is filed, a request to reapply a previously paid issue fee must be clearly made, and delays in processing may occur due to the difficulty in recognizing the paper as an equivalent of Part B.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

IMPORTANT REMINDER: Maintenance fees are due in utility patents issuing on applications filed on or after Dec. 12, 1980. It is patentee's responsibility to ensure timely payment of maintenance fees when due. More information is available at www.uspto.gov/PatentMaintenanceFees.

PART B - FEE(S) TRANSMITTAL

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Alexandria, Virginia 22313-1450

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INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

64735 7590 04/09/2020

KNOBBE, MARTENS, OLSON & BEAR, LLP
MASIMO CORPORATION (MASIMO)
2040 MAIN STREET
FOURTEENTH FLOOR
IRVINE, CA 92614

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

Certificate of Mailing or Transmission

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being transmitted to the USPTO via EFS-Web or by facsimile to (571) 273-2885, on the date below.

(Typed or printed name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/791,955	02/14/2020	Ammar Al-Ali	MAS.1007C4	3106

TITLE OF INVENTION: PHYSIOLOGICAL MEASUREMENT DEVICES, SYSTEMS, AND METHODS

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	$1000	$0.00	$0.00	$1000	07/09/2020

EXAMINER	ART UNIT	CLASS-SUBCLASS
FARDANESH, MARJAN	3791	600-323000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

❑ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.

❑ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-09 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list
(1) The names of up to 3 registered patent attorneys or agents OR, alternatively,
(2) The name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

1_____
2_____
3_____

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document must have been previously recorded, or filed for recordation, as set forth in 37 CFR 3.11 and 37 CFR 3.81(a). Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE (B) RESIDENCE: (CITY and STATE OR COUNTRY)

Please check the appropriate assignee category or categories (will not be printed on the patent) : ❑ Individual ❑ Corporation or other private group entity ❑ Government

4a. Fees submitted: ❑Issue Fee ❑Publication Fee (if required) ❑Advance Order - # of Copies _____

4b. Method of Payment: *(Please first reapply any previously paid fee shown above)*

❑ Electronic Payment via EFS-Web ❑ Enclosed check ❑ Non-electronic payment by credit card (Attach form PTO-2038)

❑ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment to Deposit Account No. _____

5. **Change in Entity Status** (from status indicated above)

❑ Applicant certifying micro entity status. See 37 CFR 1.29

❑ Applicant asserting small entity status. See 37 CFR 1.27

❑ Applicant changing to regular undiscounted fee status.

NOTE: Absent a valid certification of Micro Entity Status (see forms PTO/SB/15A and 15B), issue fee payment in the micro entity amount will not be accepted at the risk of application abandonment.
NOTE: If the application was previously under micro entity status, checking this box will be taken to be a notification of loss of entitlement to micro entity status.
NOTE: Checking this box will be taken to be a notification of loss of entitlement to small or micro entity status, as applicable.

NOTE: This form must be signed in accordance with 37 CFR 1.31 and 1.33. See 37 CFR 1.4 for signature requirements and certifications.

Authorized Signature _____ Date _____

Typed or printed name _____ Registration No. _____

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
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P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/791,955	02/14/2020	Ammar Al-Ali	MAS.1007C4	3106

64735 7590 04/09/2020

KNOBBE, MARTENS, OLSON & BEAR, LLP
MASIMO CORPORATION (MASIMO)
2040 MAIN STREET
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IRVINE, CA 92614

EXAMINER	
FARDANESH, MARJAN	

ART UNIT	PAPER NUMBER
3791	

DATE MAILED: 04/09/2020

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)
(Applications filed on or after May 29, 2000)

The Office has discontinued providing a Patent Term Adjustment (PTA) calculation with the Notice of Allowance.

Section 1(h)(2) of the AIA Technical Corrections Act amended 35 U.S.C. 154(b)(3)(B)(i) to eliminate the requirement that the Office provide a patent term adjustment determination with the notice of allowance. See Revisions to Patent Term Adjustment, 78 Fed. Reg. 19416, 19417 (Apr. 1, 2013). Therefore, the Office is no longer providing an initial patent term adjustment determination with the notice of allowance. The Office will continue to provide a patent term adjustment determination with the Issue Notification Letter that is mailed to applicant approximately three weeks prior to the issue date of the patent, and will include the patent term adjustment on the patent. Any request for reconsideration of the patent term adjustment determination (or reinstatement of patent term adjustment) should follow the process outlined in 37 CFR 1.705.

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.

OMB Clearance and PRA Burden Statement for PTOL-85 Part B

The Paperwork Reduction Act (PRA) of 1995 requires Federal agencies to obtain Office of Management and Budget approval before requesting most types of information from the public. When OMB approves an agency request to collect information from the public, OMB (i) provides a valid OMB Control Number and expiration date for the agency to display on the instrument that will be used to collect the information and (ii) requires the agency to inform the public about the OMB Control Number's legal significance in accordance with 5 CFR 1320.5(b).

The information collected by PTOL-85 Part B is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 30 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450. Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Notice of Allowability	**Application No.** 16/791,955	**Applicant(s)** Al-Ali, Ammar	
	Examiner MARJAN FARDANESH	**Art Unit** 3791	**AIA (FITF) Status** Yes

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☑ This communication is responsive to claims filed on 03/11/2020.
   ☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

2. ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

3. ☑ The allowed claim(s) is/are 3-27 . As a result of the allowed claim(s), you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see **http://www.uspto.gov/patents/init_events/pph/index.jsp** or send an inquiry to **PPHfeedback@uspto.gov.**

4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

   Certified copies:

   a) ☐ All b) ☐ Some *c) ☐ None of the:

   1. ☐ Certified copies of the priority documents have been received.
   2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
   3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

   * Certified copies not received: _____ .

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
   ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____ .

   Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☑ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date 03/11/2020.
3. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material _____.
4. ☐ Interview Summary (PTO-413), Paper No./Mail Date. _____.
5. ☑ Examiner's Amendment/Comment
6. ☐ Examiner's Statement of Reasons for Allowance
7. ☐ Other _____.

/MARJAN FARDANESH/ Examiner, Art Unit 3791	/ERIC F WINAKUR/ Primary Examiner, Art Unit 3791

Notice of Pre-AIA or AIA Status

1. The present application, filed on or after March 16, 2013, is being examined under the first inventor to file provisions of the AIA.

EXAMINER'S AMENDMENT

2. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in an interview with Mr. Jarom Kesler on 03/30/2020.

The application has been amended as follows:

In claim 3, line 3, insert –configured to be—before "positioned".

In claim 16, line 4, insert –configured to be—before "positioned".

In claim 24, line 3, insert –configured to be—before "positioned".

Reasons for Allowance

3. The following is an examiner's statement of reasons for allowance: Fei (USPN 2014/0361147-cited by the Applicant) discloses a physiological measurement device (figures 1-2, 5A) comprising: one or more emitters configured to emit light proximate a wrist of a user (elements 232 figure 2, [0041]); an optical transmission material positioned between the one or more emitters and a tissue measurement site (lens 234 figure 5A, [0041]-[0042]), wherein the optical transmission material is configured to alter

a direction of at least a portion of the light emitted from the one or more emitters before the light reaches the tissue measurement site ([0041]-[0043]); a plurality of detectors configured to detect the light after attenuation by tissue, the plurality of detectors further configured to output a signal responsive to the detected light (optical detectors 240 figures 2, 5A, [0025], [0041], [0058]); a light block between the one or more emitters and the plurality of detectors and configured to prevent at least a portion of the light emitted from the one or more emitters from reaching the detector without first reaching the tissue (barrier 520 figures 5A, [0042], [0064]); and a processor configured to receive and process one or more signals responsive to the outputted signal and determine a physiological parameter of the user responsive to the one or more signals ([0032],[0049]-[0051]). However, Fei fails to disclose "shape an output light pattern by which the emitted light is directed toward a surface of the tissue measurement site, wherein the output light pattern comprises a different geometric shape than the initial light pattern", in combination with remaining claimed limitations. Scharf (USPN 5,830,137-cited by the Applicant) discloses a physiological measurement device (figures 3, 5) comprising: one or more emitters configured to emit light proximate a wrist of a user (elements 13 and 15 figure 3, Col.8 lines 29-50); an optical transmission material positioned between the one or more emitters and a tissue measurement site, wherein the optical transmission material is configured to alter a direction of at least a portion of the light emitted from the one or more emitters before the light reaches the tissue measurement site (elements 16 and 18 figures 3 and 6, discrete lenses to focus radiant energy from the LEDs onto the skin, Col.8 lines 51 -64); a detector configured to detect the light after attenuation by tissue, the detector further

configured to output a signal responsive to the detected light (Col.8 lines 29-65, photodiode 26 figure 3); a light block between the one or more emitters and the detector and configured to prevent at least a portion of the light emitted from the one or more emitters from reaching the detector without first reaching the tissue (light shield 87 figure 6, Col.8 lines 45-50); and a processor configured to receive and process one or more signals responsive to the outputted signal and determine a physiological parameter of the user responsive to the one or more signals (processor 30 figure 1, Col.5 lines 15-60, Col.8 lines 40-66). However, Scharf fails to disclose "shape an output light pattern by which the emitted light is directed toward a surface of the tissue measurement site, wherein the output light pattern comprises a different geometric shape than the initial light pattern", in combination with remaining claimed limitations.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MARJAN FARDANESH whose telephone number is (571)270-5508. The examiner can normally be reached on Monday-Friday 9:00-17:00.

Examiner interviews are available via telephone, in-person, and video conferencing using a USPTO supplied web-based collaboration tool. To schedule an interview, applicant is encouraged to use the USPTO Automated Interview Request (AIR) at http://www.uspto.gov/interviewpractice.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jacqueline Cheng can be reached on (571)272-5596. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see https://ppair-my.uspto.gov/pair/PrivatePair. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/ERIC F WINAKUR/
Primary Examiner, Art Unit 3791

/MARJAN FARDANESH/
Examiner, Art Unit 3791

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/791,955	Al-Ali, Ammar
	Examiner	**Art Unit**
	MARJAN FARDANESH	3791

CPC						
Symbol					**Type**	**Version**
A61B	/	5	/	14552	F	2013-01-01
A61B	/	5	/	14532	I	2013-01-01
A61B	/	5	/	02416	I	2013-01-01
A61B	/	5	/	0002	I	2013-01-01
A61B	/	5	/	6826	I	2013-01-01
A61B	/	5	/	14546	I	2013-01-01
A61B	/	5	/	742	I	2013-01-01
A61B	/	5	/	7278	I	2013-01-01
A61B	/	5	/	4875	I	2013-01-01
A61B	/	2562	/	04	A	2013-01-01

CPC Combination Sets							
Symbol					**Type**	**Set**	**Ranking**	**Version**
	/		/					

/MARJAN FARDANESH/ Examiner, Art Unit 3791	19 March 2020	**Total Claims Allowed:**	
(Assistant Examiner)	(Date)	24	
/ERIC F WINAKUR/ Primary Examiner, Art Unit 3791	01 April 2020	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	1

U.S. Patent and Trademark Office — Part of Paper No.: 20200319

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/791,955	Al-Ali, Ammar
	Examiner	Art Unit
	MARJAN FARDANESH	3791

INTERNATIONAL CLASSIFICATION					
CLAIMED					
A61B	/	5	/	1455	

NON-CLAIMED					
	/		/		

US ORIGINAL CLASSIFICATION	
CLASS	SUBCLASS

CROSS REFERENCES(S)						
CLASS	SUBCLASS (ONE SUBCLASS PER BLOCK)					

/MARJAN FARDANESH/ Examiner, Art Unit 3791	19 March 2020	Total Claims Allowed:	
(Assistant Examiner)	(Date)	24	
/ERIC F WINAKUR/ Primary Examiner, Art Unit 3791	01 April 2020	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	1

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/791,955	Al-Ali, Ammar
	Examiner	**Art Unit**
	MARJAN FARDANESH	3791

☑ Claims renumbered in the same order as presented by applicant ☐ CPA ☑ T.D. ☐ R.1.47

CLAIMS

Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original

/MARJAN FARDANESH/ Examiner, Art Unit 3791	19 March 2020	**Total Claims Allowed:**	
(Assistant Examiner)	(Date)	24	
/ERIC F WINAKUR/ Primary Examiner, Art Unit 3791	01 April 2020	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	1

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/791,955	Al-Ali, Ammar
	Examiner	Art Unit
	MARJAN FARDANESH	3791

CPC - Searched*		
Symbol	Date	Examiner
EAST-See Search history printout	03/19/2020	/mf/

CPC Combination Sets - Searched*		
Symbol	Date	Examiner

US Classification - Searched*			
Class	Subclass	Date	Examiner

* See search history printout included with this form or the SEARCH NOTES box below to determine the scope of the search.

Search Notes		
Search Notes	Date	Examiner
PALM inventor name search	03/19/2020	/mf/

Interference Search			
US Class/CPC Symbol	US Subclass/CPC Group	Date	Examiner
EAST-	See search history printout	03/19/2020	/mf/

/MARJAN FARDANESH/ Examiner, Art Unit 3791	

Bibliographic Data

Application No: 16/791,955

Foreign Priority claimed: ○ Yes ◉ No

35 USC 119 (a-d) conditions met: ☐ Yes ☑ No ☐ Met After Allowance

Verified and Acknowledged: /MARJAN FARDANESH/ Examiner's Signature | Initials

Title: PHYSIOLOGICAL MEASUREMENT DEVICES, SYSTEMS, AND METHODS

FILING or 371(c) DATE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.
02/14/2020	600	3791	MAS.1007C4
RULE			

APPLICANTS

MASIMO CORPORATION, Irvine, CA,

INVENTORS

Ammar Al-Ali San Juan Capistrano, CA, UNITED STATES

CONTINUING DATA

This application is a CON of 16532061 08/05/2019

16532061 is a CON of 15195199 06/28/2016 PAT 10448871

15195199 has PRO of 62188430 07/02/2015

FOREIGN APPLICATIONS

IF REQUIRED, FOREIGN LICENSE GRANTED**

03/03/2020

STATE OR COUNTRY

UNITED STATES

ADDRESS

KNOBBE, MARTENS, OLSON & BEAR, LLP
MASIMO CORPORATION (MASIMO)
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FOURTEENTH FLOOR
IRVINE, CA 92614
UNITED STATES

FILING FEE RECEIVED

$5,860

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
S1	1	JP-2005192879-$.did.	DERWENT	AND	ON	2011/01/04 11:01
S2	1	"2002111544".pn.	DERWENT	AND	ON	2011/01/04 11:14
S3	2	"2002111544".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2011/01/04 11:14
S4	2	"2005192879".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2011/01/04 11:15
S5	1	"2006509574".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2011/01/04 11:16
S6	2	"20060155174".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2011/01/04 11:18
S7	2	"2002146368".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2011/01/04 11:20
S8	2	"20020146368".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2011/01/04 11:21
S9	0	"2002198470".pn.	US-PGPUB; USPAT	AND	ON	2011/01/04 13:38
S10	0	"US 2002198470".pn.	US-PGPUB; USPAT	AND	ON	2011/01/04 13:38

S11	904	whitman.in.	US-PGPUB; USPAT	AND	ON	2011/01/04 13:38
S12	402	whitman michael.in.	US-PGPUB; USPAT	AND	ON	2011/01/04 13:39
S13	139	whitman michael.in. and "2002"	US-PGPUB; USPAT	AND	ON	2011/01/04 13:39
S14	0	whitman michael.in. @pd<="2002"	US-PGPUB; USPAT	AND	ON	2011/01/04 13:39
S15	402	whitman michael.in.	US-PGPUB; USPAT	AND	ON	2011/01/04 13:39
S16	1	"5993378".pn.	US-PGPUB; USPAT	AND	ON	2011/01/04 14:06
S17	0	"2004560166".pn.	US-PGPUB; USPAT	AND	ON	2011/01/04 16:00
S18	0	"2004560166".pn.	US-PGPUB; USPAT	AND	ON	2011/01/04 16:00
S19	0	"2004560166"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2011/01/04 16:00
S20	0	"2004560166".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2011/01/04 16:01
S21	0	JP 2004-560166	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2011/01/04 16:01
S22	6	("20020072784" | "20020111544" | "20020132226" | "20020146368" | "20020165444" | "20020198470").PN.	DERWENT	AND	ON	2011/01/04 16:56
S23	3	takizawa.in. and (600/309-310).ccls.	US-PGPUB; USPAT	AND	ON	2011/01/05 11:16
S24	4	kawano.in. and (600/309-310).ccls.	US-PGPUB; USPAT	AND	ON	2011/01/05 11:18
S25	3	uchiyama.in. and (600/309-310).ccls.	US-PGPUB; USPAT	AND	ON	2011/01/05 11:19
S26	2	segawa.in. and (600/309-310).ccls.	US-PGPUB; USPAT	AND	ON	2011/01/05 11:22
S27	3	homan.in. and (600/309-310).ccls.	US-PGPUB; USPAT	AND	ON	2011/01/05 11:24
S28	28	(600/309-310).ccls. and pill	US-PGPUB; USPAT	AND	ON	2011/01/05 11:26
S29	1	"4011538".pn.	US-PGPUB; USPAT	AND	ON	2011/01/05 12:36
S30	1597	(600/309,310,317,345,347,361).ccls. and (heat$3 or dry$3)	US-PGPUB; USPAT	AND	ON	2011/01/05 13:09

S31	545	(600/309,310,317,345,347,361).ccls. and (heat$3 or dry$3) and (recover$3 or restore$3 or reset$3)	US-PGPUB; USPAT	AND	ON	2011/01/05 13:10
S32	493	(600/309,310,317,345,347,361).ccls. and (heat$3 or dry$3) and (recover$3 or restore$3 or reset$3) and sensor	US-PGPUB; USPAT	AND	ON	2011/01/05 13:11
S33	472	(600/309,310,317,345,347,361).ccls. and (heat$3 or dry$3) and (recover$3 or restore$3 or reset$3) and sensor and (heat or thermal or temperature)	US-PGPUB; USPAT	AND	ON	2011/01/05 13:12
S34	94	(600/309,310,317,345,347,361).ccls. and (heat$3 or dry$3) and (recover$3 or restore$3 or reset$3) and sensor and (heat or thermal or temperature) and usage	US-PGPUB; USPAT	AND	ON	2011/01/05 13:15
S35	87	(600/309,310,317,345,347,361).ccls. and (heat$3 or dry$3) and (recover$3 or restore$3 or reset$3) and sensor same (heat or thermal or temperature) and usage	US-PGPUB; USPAT	AND	ON	2011/01/05 13:20
S36	1	(600/309,310,317,345,347,361).ccls. and (heat$3 or dry$3) same (recover$3 or restore$3 or reset$3) and sensor same (heat or thermal or temperature) and usage	US-PGPUB; USPAT	AND	ON	2011/01/05 13:21
S37	1	(600/309,310,317,345,347,361).ccls. and (heat$3 or dry$3) and (recover$3 or restore$3 or reset$3) and sensor same (heat or thermal or temperature) same usage	US-PGPUB; USPAT	AND	ON	2011/01/05 13:21
S38	87	(600/309,310,317,345,347,361).ccls. and (heat$3 or dry$3) and (recover$3 or restore$3 or reset$3) and sensor same (heat or thermal or temperature) and usage	US-PGPUB; USPAT	AND	ON	2011/01/05 13:22
S39	71	(600/309,310,317,345,347,361).ccls. and (heat$3 and dry$3) and (recover$3 or restore$3 or reset$3) and sensor same (heat or thermal or temperature) and usage	US-PGPUB; USPAT	AND	ON	2011/01/05 13:38
S40	0	(600/309,310,317,345,347,361).ccls. and (heat$3 same dry$3) and (recover$3 or restore$3 or reset$3) and sensor same (heat or thermal or temperature) and usage	US-PGPUB; USPAT	AND	ON	2011/01/05 13:39
S41	71	(600/309,310,317,345,347,361).ccls. and (heat$3 and dry$3) and (recover$3 or restore$3 or reset$3) and sensor same (heat or thermal or temperature) and usage	US-PGPUB; USPAT	AND	ON	2011/01/05 13:39
S42	1	("20040147822").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2018/11/02 17:24
S43	2284	stack$4 same sensor and A61B5/$.cpc.	US-PGPUB; USPAT	OR	OFF	2018/11/02 17:26
S44	281	stack$4 same sensor and A61B5/1455$.cpc.	US-PGPUB; USPAT	OR	OFF	2018/11/02 17:27
S45	190	("4494550" | "5584296" | "5638593" | "5676139" | "5830136" | "6112107").PN.	US-PGPUB; USPAT;	OR	OFF	2018/11/02 17:30

		OR ("6748254").URPN.	USOCR			
S53	5	"15859147"	US-PGPUB; USPAT	AND	ON	2018/11/05 10:51
S54	0	"2011137115"	US-PGPUB; USPAT	AND	ON	2018/11/05 16:05
S55	9	"2011137115"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2018/11/05 16:12
S56	3	"20120197093"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2018/11/05 16:23
S57	0	(emitter irradiator LED light) same (transmit$6) same reflect$4 and A61B5/$.cpc.	DERWENT	AND	ON	2018/11/06 15:20
S58	0	(emitter irradiator LED light) same (transmit$6) same reflect$4 and A61B5/$.cpc.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2018/11/06 15:20
S59	0	(emitter irradiator LED light) same (transmit$6) same refelect$4 and A61B5/$.cpc.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2018/11/06 15:21
S60	0	(emitter irradiator LED light) same (transmit$6) same reflect$4 and A61B5/$.cpc.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2018/11/06 15:21
S61	1	(emitter irradiator LED light) and (transmit$6) same reflect$4 and A61B5/$.cpc.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2018/11/06 15:21
S62	1	(emitter irradiator LED light) and (mov$4 switch$4) and (transmit$6) same reflect$4 and A61B5/$.cpc.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2018/11/06 15:21
S63	43778	Raman and SERS	US-PGPUB; USPAT; USOCR;	AND	ON	2018/11/06 16:42

			FPRS; EPO; JPO; DERWENT; IBM_TDB			
S64	22	Raman and SERS and SORS and A61B5/$.cpc.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2018/11/06 16:42
S65	1	("20090105564").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2018/11/14 17:52
S66	1	"13303815"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2018/11/16 09:27
S67	5	"20090105564"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2018/11/18 10:55
S68	5	"13544788"	US-PGPUB; USPAT	AND	ON	2018/12/03 10:22
S69	99	"8219172"	US-PGPUB; USPAT	AND	ON	2018/12/03 12:44
S70	1	"8219172".pn.	US-PGPUB; USPAT	AND	ON	2018/12/03 12:45
S71	1	"20020026108".pn.	US-PGPUB; USPAT	AND	ON	2018/12/03 13:43
S72	1	"20100041969"	US-PGPUB; USPAT	AND	ON	2018/12/03 14:06
S73	1	"14500129"	US-PGPUB; USPAT	AND	ON	2018/12/03 14:26
S74	0	"88383195"	US-PGPUB; USPAT	AND	ON	2018/12/03 15:44
S75	6	"8838195"	US-PGPUB; USPAT	AND	ON	2018/12/03 15:44
S76	1075	reference adj measurement same ratio$1	US-PGPUB; USPAT	AND	ON	2018/12/03 15:45
S77	483	reference adj measurement same ratio$1 and (variation$1 noise)	US-PGPUB; USPAT	AND	ON	2018/12/03 15:46
S78	184	reference adj measurement same ratio$1 and (variation$1 noise normaliz$4)	US-PGPUB; USPAT	AND	ON	2018/12/03 15:51
S79	2	"8219169"	US-PGPUB; USPAT	AND	ON	2018/12/03 16:03
S80	242	"6067463"	US-PGPUB; USPAT	AND	ON	2018/12/03 16:04
S81	1	"6067463".pn.	US-PGPUB; USPAT	AND	ON	2018/12/03 16:04
S82	1	("7450999").PN.	USPAT;	OR	OFF	2018/12/03

			USOCR			17:17
S83	2	"15083729"	US-PGPUB; USPAT	OR	OFF	2018/12/03 17:18
S84	1	"20040176672".pn.	US-PGPUB; USPAT	OR	OFF	2018/12/03 17:25
S85	4	"15083676"	US-PGPUB; USPAT	OR	OFF	2018/12/03 17:30
S86	1	"7450999".pn.	DERWENT	AND	ON	2018/12/05 15:05
S87	2	"20040176672".pn.	US-PGPUB; USPAT; DERWENT	AND	ON	2018/12/05 15:09
S88	3	"4881939".pn.	US-PGPUB; USPAT; DERWENT	AND	ON	2018/12/05 15:15
S89	2	"7450999".pn.	US-PGPUB; USPAT; DERWENT	AND	ON	2018/12/05 15:16
S90	6	(light) and diaphragm same (insert$4) with (artery vein vessel)	US-PGPUB; USPAT; DERWENT	AND	ON	2018/12/05 15:29
S91	0	(optic$4 oxygen oximeter oximetry) and diaphragm same (insert$4) with (artery vein vessel)	US-PGPUB; USPAT; DERWENT	AND	ON	2018/12/05 15:32
S92	0	(optic$4 oxygen oximeter oximetry) and diaphragm same (insert$4) with (artery vein vessel)	US-PGPUB; USPAT; DERWENT	AND	ON	2018/12/05 15:33
S93	503	(optic$4 oxygen oximeter oximetry) and diaphragm same (insert$4) with (artery vein vessel)	US-PGPUB; USPAT; DERWENT	OR	ON	2018/12/05 15:33
S94	455	(light) and diaphragm same (insert$4) with (artery vein vessel)	US-PGPUB; USPAT; DERWENT	OR	ON	2018/12/05 15:33
S95	516	(light emit$4 LED) and diaphragm same (insert$4) with (artery vein vessel)	US-PGPUB; USPAT; DERWENT	OR	ON	2018/12/05 15:34
S96	103	(light emit$4 LED) and diaphragm same (insert$4) with (artery vein vessel) and A61B5/$.cpc.	US-PGPUB; USPAT; DERWENT	OR	ON	2018/12/05 15:34
S97	97	(light emit$4 LED) and diaphragm and (light emit$4 LED) same (insert$4) with (artery vein vessel) and A61B5/$.cpc.	US-PGPUB; USPAT; DERWENT	OR	ON	2018/12/05 15:35
S98	64	(light emit$4 LED) and diaphragm same pressure and (light emit$4 LED) same (insert$4) with (artery vein vessel) and A61B5/$.cpc.	US-PGPUB; USPAT; DERWENT	OR	ON	2018/12/05 15:38
S99	87	(light emit$4 LED) and diaphragm and pressure and (light emit$4 LED) same (insert$4) with (artery vein vessel) and A61B5/$.cpc.	US-PGPUB; USPAT; DERWENT	OR	ON	2018/12/05 15:38
S100	6	(("4699376") or ("4583555") or ("8282579") or ("7785232") or ("6436058") or ("8341850")).PN.	USPAT; USOCR	OR	OFF	2018/12/05 16:54
S101	6	(("4699376") or ("4583555") or ("8282579") or ("7785232") or ("8436058") or ("8341850")).PN.	USPAT; USOCR	OR	OFF	2018/12/05 16:55

S102	5	(("20060064044") or ("20120226199") or ("20080132818") or ("20070043308") or ("20160000369")).PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2018/12/05 16:56
S103	1	("20020026108").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2018/12/06 07:32
S104	0	("13657706").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2018/12/06 08:18
S105	1	"13657706"	USPAT	OR	OFF	2018/12/06 08:18
S106	1	("20080146890").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2018/12/06 09:12
S107	1	("20140128697").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2018/12/07 14:32
S108	1	nellcor$4 with headband	US-PGPUB; USPAT	OR	OFF	2018/12/07 14:39
S109	0	nellcor$4 with headband and waterproof	US-PGPUB; USPAT	OR	OFF	2018/12/07 14:40
S110	0	nellcor$4 with headband and water	US-PGPUB; USPAT	OR	OFF	2018/12/07 14:40
S111	0	nellcor$4 with headband and water$7	US-PGPUB; USPAT	OR	OFF	2018/12/07 14:40
S112	46	nellcor$4.asn. and patch	US-PGPUB; USPAT	OR	OFF	2018/12/07 14:41
S113	2	"20140163392"	US-PGPUB; USPAT	OR	OFF	2018/12/07 14:47
S114	1	"15354623" and predetermined	US-PGPUB; USPAT	OR	OFF	2018/12/07 14:52
S115	1	("20130104288").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2018/12/07 15:22
S116	0	nellcor$4 and themistor and oximet$4	US-PGPUB; USPAT	OR	OFF	2018/12/07 15:23
S117	2044	thermistor same (face headband headwear)	US-PGPUB; USPAT	OR	OFF	2018/12/07 15:27
S118	73	thermistor same (face headband headwear) and (oximeter oximetry)	US-PGPUB; USPAT	OR	OFF	2018/12/07 15:29
S119	1	"7477924".pn.	US-PGPUB; USPAT	OR	OFF	2018/12/07 15:36
S120	1	"13853526" and slip and ambient	US-PGPUB; USPAT	OR	OFF	2018/12/07 15:47
S121	2	"13354623"	US-PGPUB; USPAT	OR	OFF	2018/12/07 15:56
S122	2	"13354623" and predetermined	US-PGPUB; USPAT	OR	OFF	2018/12/07 15:56
S123	1	"15354623" and predetermined	US-PGPUB; USPAT	OR	OFF	2018/12/07 15:56
S124	2	"9629560"	US-PGPUB; USPAT	OR	OFF	2018/12/07 16:03
S125	1	"20120029301".pn.	US-PGPUB; USPAT	OR	OFF	2018/12/07 16:43
S126	1	("7190994").PN.	USPAT;	OR	OFF	2018/12/17

			USOCR			13:47
S127	2	(("20140187883") or ("20110112387")).PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2018/12/18 14:08
S128	2	(("20120197153") or ("20040064066")).PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2020/01/15 14:59
S129	1	("20050175972").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2020/01/15 15:37
S130	0	stablizer and "15751733"	DERWENT	AND	ON	2020/01/16 11:01
S131	0	stablizer and "15751733"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2020/01/16 11:01
S132	2	"15751733"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2020/01/16 11:01
S133	0	"15759247"	DERWENT	AND	ON	2020/01/23 10:01
S134	3	"15759247"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2020/01/23 10:01
S135	2	(("5209231") or ("6885882")).PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2020/01/23 17:38
S136	0	("2003073884").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2020/01/24 11:54
S137	1	("20030073884").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2020/01/24 11:54
S138	1	"15759247"	US-PGPUB; USPAT	OR	OFF	2020/01/24 14:27
S139	1	("20040249290").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2020/01/27 13:21
S140	1	"15532283"	US-PGPUB; USPAT	OR	OFF	2020/01/27 13:52
S141	3	(("7826890") or ("9326686") or ("20140243625")).PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2020/01/27 16:44
S142	19231	(sens$4 measur$6 determin$4) same (during) with administration	US-PGPUB; USPAT	OR	OFF	2020/01/27 16:49
S143	3873	(sens$4 measur$6 determin$4) same (during) adj administration	US-PGPUB; USPAT	OR	OFF	2020/01/27 16:50

S144	856	(sens$4 measur$6 determin$4) same (during) adj administration and A61B5/$.cpc.	US-PGPUB; USPAT	OR	ON	2020/01/27 16:52
S145	713	(sens$4 measur$6 determin$4) same (during) adj administration and A61B5/$.cpc. not cpr	US-PGPUB; USPAT	OR	ON	2020/01/27 17:09
S146	713	(sens$4 measur$6 determin$4) same (during) adj administr$6 and A61B5/$.cpc. not cpr	US-PGPUB; USPAT	OR	ON	2020/01/27 17:10
S147	622	(sens$4 measur$6 determin$4) same (during) adj administr$6 and (light wavelength emitter optic$4) and A61B5/$.cpc. not cpr	US-PGPUB; USPAT	OR	ON	2020/01/27 17:11
S148	1	"15555664"	US-PGPUB; USPAT	OR	ON	2020/01/28 09:32
S149	0	(("201300338770") or ("201000204551") or ("200800269582")).PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2020/01/28 09:47
S150	3	(("20130338770") or ("20100204551") or ("20080269582")).PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2020/01/28 09:47
S151	1	"15751733" and stabilizer	US-PGPUB; USPAT	OR	OFF	2020/01/28 12:33
S152	13	(("9794653") or ("20150118636") or ("20150011898") or ("8929965") or ("8886269") or ("20140288436") or ("8788002") or ("20140114147") or ("8700111") or ("8652040") or ("8647270") or ("20120150052") or ("7736311")).PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2020/01/28 12:59
S153	2	(("20130267854") or ("20100217098")).PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2020/01/28 13:00
S154	42	fardanesh.xa. and 600/344.ccls.	US-PGPUB; USPAT	OR	OFF	2020/01/28 13:03
S155	675	("20010000790" | "20010009398" | "20020013538" | "20020042558" | "20020052539" | "20020084904" | "20020091335" | "20020095092" | "20020103445" | "20020109600" | "20020124295" | "20020139368" | "20020148470" | "20020151929" | "20020156354" | "20020161290" | "20020161309" | "20020173706" | "20020173708" | "20030004547" | "20030009119" | "20030009308" | "20030018243" | "20030023140" | "20030036685" | "20030065275" | "20030086156" | "20030120183" | "20030122706" | "20030125616" | "20030135127" | "20030144579" | "20030156288" | "20030176810" | "20030189492" | "20030216728" | "20030225323" | "20040002655" | "20040007585" | "20040030258" | "20040044545" | "20040054287" | "20040054291" | "20040064097" | "20040064165" | "20040082842" | "20040092919" | "20040100784" | "20040102931" | "20040117891" |	US-PGPUB; USPAT; USOCR	OR	OFF	2020/01/28 13:03

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		"20040173456" | "20040221370" |					
		"20040230116" | "20040231772" |					
		"20040236207" | "20040236242" |					
		"20040242981" | "20040254490" |					
		"20040254501" | "20040267145" |					
		"20050001728" | "20050020919" |					
		"20050027207" | "20050029432" |					
		"20050041531" | "20050043599" |					
		"20050043763" | "20050049465" |					
		"20050049501" | "20050059869" |					
		"20050070776" | "20050070778" |					
		"20050075550" | "20050080345" |					
		"20050085799" | "20050090754" |					
		"20050096557" | "20050101845" |					
		"20050102167" | "20050113650" |					
		"20050113703" | "20050114154" |					
		"20050171576" | "20050182458" |					
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		"20050197548" | "20050206518" |					
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		"20050234317" | "20050234518" |					
		"20050240087" | "20050256523" |					
		"20050261594" | "20050268916" |					
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S163	1	"15850755"	US-PGPUB; USPAT	OR	OFF	2020/01/28 14:20
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S165	1	InGaAs with translucent	US-PGPUB; USPAT	OR	OFF	2020/01/28 14:24
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S167	1	("20010035503").PN.	US-PGPUB; USPAT;	OR	OFF	2020/01/28 16:07

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S168	1	("6587701").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2020/01/28 16:43
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S171	4	(("9947201") or ("9504430") or ("7022072") or ("20150205930")).PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2020/01/28 17:00
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S175	1	"15892551"	US-PGPUB; USPAT	OR	OFF	2020/01/29 11:55
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S178	0	("200200165559").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2020/01/29 13:53
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S181	1166	("4605730" | "4633861" | "4892244" | "5133739" | "5415334" | "5441193" | "5468253" | "5503638" | "5597107" | "5702409" | "5752965" | "5810855" | "5817109" | "5895412" | "5902312" | "5964774" | "6241139" | "6273897" | "6325810").PN. OR ("6592597").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2020/01/29 14:01
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S183	128	grant.in. and implant.clm.	US-PGPUB; USPAT	OR	OFF	2020/01/29 14:02
S184	352	grant.in. and fiber.clm.	US-PGPUB; USPAT	OR	OFF	2020/01/29 14:02
S185	4	grant.in. and fiber and implant and effector.clm.	US-PGPUB; USPAT	OR	OFF	2020/01/29 14:02
S186	5	grant.in. and fiber same implant.clm.	US-PGPUB; USPAT	OR	OFF	2020/01/29 14:03
S187	0	richard with grant.in. and fiber same implant.clm.	US-PGPUB; USPAT	OR	OFF	2020/01/29 14:04

S188	0	(richard with grant).in. and fiber.clm. and implant.clm.	US-PGPUB; USPAT	OR	OFF	2020/01/29 14:05
S189	0	(richard with grant).in. and fiber.clm. and implant$4.clm.	US-PGPUB; USPAT	OR	OFF	2020/01/29 14:05
S190	10	grant.in. and fiber.clm. and implant$4.clm.	US-PGPUB; USPAT	OR	OFF	2020/01/29 14:05
S191	1	"20120145767".pn.	US-PGPUB; USPAT	OR	OFF	2020/01/29 14:13
S192	80	grant.in. and implant$8 and parameter$1 and fiber and optic$4 and sens$4	US-PGPUB; USPAT	OR	OFF	2020/01/29 15:02
S193	111	grant.in. and implant$8 and parameter$1 and fiber and optic$4 and sens$4	US-PGPUB; USPAT	OR	ON	2020/01/29 15:02
S194	30	endo-surgery.asn. and implant$8 and parameter$1 and fiber and optic$4 and sens$4	US-PGPUB; USPAT	OR	ON	2020/01/29 15:56
S195	1871	implant$4 same optic$4 same fiber same sens$4	US-PGPUB; USPAT	OR	ON	2020/01/29 16:00
S196	433	implant$4 same optic$4 same fiber same sens$4 and (core sheath) and A61B5/$.cpc.	US-PGPUB; USPAT	OR	ON	2020/01/29 16:00
S197	194	implant$4 same (waveguide conduit optical-fiber(optic$4 adj fiber)) same wireless$4 and (core sheath) and A61B5/$.cpc.	US-PGPUB; USPAT	OR	ON	2020/01/29 16:18
S198	1	("7022072").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2020/01/29 18:21
S199	1	("7702374").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2020/02/02 12:43
S201	4218	apple.asn. and watch	US-PGPUB; USPAT	OR	OFF	2020/02/03 09:25
S202	0	fitibit.asn.	US-PGPUB; USPAT	OR	OFF	2020/02/03 09:26
S203	439	fitbit.asn.	US-PGPUB; USPAT	OR	OFF	2020/02/03 09:38
S204	592	mesh same (optic$4 with (fiber waveguide guide conduit)) and implant$4	US-PGPUB; USPAT	OR	ON	2020/02/03 11:38
S205	21	fardanesh.xa. and mesh	US-PGPUB; USPAT	OR	ON	2020/02/03 12:25
S206	2	"20160213288"	US-PGPUB; USPAT	OR	ON	2020/02/03 12:32
S207	0	(WO-2018023186-$).did.	US-PGPUB; USPAT	OR	ON	2020/02/03 13:22
S208	2	(WO-2018023186-$).did.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2020/02/03 13:22
S209	9	"2012012062"	US-PGPUB; USPAT; USOCR; FPRS;	OR	ON	2020/02/03 14:04

			EPO; JPO; DERWENT; IBM_TDB			
S210	34	"9001119"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2020/02/03 14:05
S211	63	"2004001567"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2020/02/03 14:06
S212	1	("20040249290").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2020/02/03 16:30
S213	1	("20130338770").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2020/02/04 11:39
S214	1	("20180035982").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2020/02/04 15:59
S215	33	(PPG photoplethys$6) same perfusion same hemoglobin	US-PGPUB; USPAT	OR	OFF	2020/02/04 16:04
S216	67	(PPG photoplethys$6) same hemoglobin adj concentration	US-PGPUB; USPAT	OR	ON	2020/02/04 16:08
S217	1	("20100317943").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2020/02/05 14:45
S218	1	"15935335"	US-PGPUB; USPAT	OR	OFF	2020/02/05 15:45
S219	394	winakur.xp. and (cuff bladder)	US-PGPUB; USPAT	OR	OFF	2020/02/05 15:56
S220	134	("4437470" | "5131391" | "5638818" | "5782757" | "5827181" | "5833602" | "5860919" | "6115621").PN. OR ("6400971").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2020/02/05 16:02
S221	139	("4927264" | "5638816" | "6018673" | "6213952" | "6222189").PN. OR ("7263395").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2020/02/05 16:06
S222	1	("20030109772").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2020/02/10 08:38
S223	711	(flex flexible) with circuit$4 and liquid adj metal	US-PGPUB; USPAT	OR	OFF	2020/02/10 09:50
S224	44	(flex flexible) with circuit$4 and liquid adj metal and A61B5/$.cpc.	US-PGPUB; USPAT	OR	OFF	2020/02/10 09:51
S225	1	("20060063988").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2020/02/10 12:54
S226	3	"14280294"	US-PGPUB; USPAT	OR	OFF	2020/02/10 13:02
S227	2	(("5209231") or ("6885882")).PN.	US-PGPUB;	OR	OFF	2020/02/10

			USPAT; USOCR			13:51
S229	9	(flex flexible) with circuit$4 same liquid adj metal and A61B5/$.cpc.	US-PGPUB; USPAT	OR	OFF	2020/02/10 16:54
S230	29	liquid adj metal same circuit$4 and A61B5/$.cpc.	US-PGPUB; USPAT	OR	OFF	2020/02/10 16:56
S231	28	liquid adj metal same print$6 and A61B5/$.cpc.	US-PGPUB; USPAT	OR	OFF	2020/02/10 17:09
S232	255	liquid adj metal same print$6 same circuit$6	US-PGPUB; USPAT	OR	OFF	2020/02/10 17:11
S233	1	"15761189"	US-PGPUB; USPAT	OR	OFF	2020/02/12 12:56
S234	1	("20120029304").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2020/02/12 13:50
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S236	13	("20040220485" | "20050049474" | "20100033303" | "20110112793" | "20120179067" | "20120247179" | "20130324860" | "5517987" | "6519487" | "6699199" | "7324841" | "8250796" | "8263986").PN. OR ("10292654").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2020/02/12 13:54
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S240	28530	(GMR (((guided-mode) guided adj mode) adj resonance))	US-PGPUB; USPAT	OR	OFF	2020/02/12 16:19
S241	825	(GMR (((guided-mode) guided adj mode) adj resonance)) and A61B5/$.cpc.	US-PGPUB; USPAT	OR	OFF	2020/02/12 16:20

S242	413	(GMR (((guided-mode) guided adj mode) adj resonance)) and A61B5/$.cpc. and glucose	US-PGPUB; USPAT	OR	OFF	2020/02/12 16:20
S243	9	(GMR (((guided-mode) guided adj mode) adj resonance)) and A61B5/$.cpc. and glucose and grating	US-PGPUB; USPAT	OR	OFF	2020/02/12 16:20
S244	3	(((guided-mode) guided adj mode) adj resonance) and A61B5/$.cpc. and glucose	US-PGPUB; USPAT	OR	OFF	2020/02/12 16:24
S245	3	(((guided-mode) guided adj mode) adj resonance) and A61B5/$.cpc.	US-PGPUB; USPAT	OR	OFF	2020/02/12 16:24
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S247	30	(((guided-mode) guided adj mode) adj resonance) and glucose	US-PGPUB; USPAT	OR	OFF	2020/02/12 16:25
S248	22	(((guided-mode) guided adj mode) adj resonance) and glucose and grating	US-PGPUB; USPAT	OR	OFF	2020/02/12 16:25
S249	2	arrayed adj waveguide adj grating with raman and glucose	US-PGPUB; USPAT	OR	OFF	2020/02/12 16:48
S250	24	arrayed adj waveguide adj grating with raman	US-PGPUB; USPAT	OR	OFF	2020/02/12 16:49
S251	20	arrayed adj waveguide adj grating with raman and awg	US-PGPUB; USPAT	OR	OFF	2020/02/12 16:52
S252	2	arrayed adj waveguide adj grating same raman and awg and glucose	US-PGPUB; USPAT	OR	OFF	2020/02/12 16:54
S253	1	("20130324865").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2020/02/26 11:17
S254	78	PPG and actuat$4 and neural and tension and orientation and A61B5/$.cpc.	US-PGPUB; USPAT	OR	OFF	2020/02/26 11:23
S255	56	PPG and actuat$4 and neural adj network and tension and orientation and A61B5/$.cpc.	US-PGPUB; USPAT	OR	OFF	2020/02/26 11:29
S256	134	IMU and PPG	US-PGPUB; USPAT	OR	OFF	2020/02/26 16:40
S257	930	neural adj network and PPG	US-PGPUB; USPAT	OR	OFF	2020/02/26 17:27
S258	136	neural adj network and PPG same quality	US-PGPUB; USPAT	OR	OFF	2020/02/26 17:27
S259	1	"15859395"	US-PGPUB; USPAT	OR	OFF	2020/02/27 08:38
S260	787	(hydration water) same hematocrit and A61B5/$.cpc.	US-PGPUB; USPAT	OR	OFF	2020/02/27 11:07
S261	445	(hydration water) with hematocrit and A61B5/$.cpc.	US-PGPUB; USPAT	OR	OFF	2020/02/27 11:08
S262	144	(hydration) with hematocrit and A61B5/$.cpc.	US-PGPUB; USPAT	OR	OFF	2020/02/27 17:30
S263	1	("20180317786").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2020/02/28 09:50
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S265	1	"15882305"	US-PGPUB; USPAT	OR	OFF	2020/02/28 10:52

S266	4	betchel$4.in.	US-PGPUB; USPAT	OR	OFF	2020/02/28 10:54
S267	347	fardanesh.xa.	US-PGPUB; USPAT	OR	OFF	2020/02/28 10:55
S268	1	("6735458").PN. OR ("9186112").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2020/02/28 11:02
S269	1080	bechtel.in.	US-PGPUB; USPAT; USOCR	OR	OFF	2020/02/28 11:05
S270	0	bechtel.in. and A61B5/$.cpc	US-PGPUB; USPAT; USOCR	OR	OFF	2020/02/28 11:06
S271	84	bechtel.in. and A61B5/$.cpc.	US-PGPUB; USPAT; USOCR	OR	OFF	2020/02/28 11:06
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S273	1	("20160310049").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2020/02/28 15:00
S274	4	(("4539994") or ("6343223") or ("5131391") or ("4926867")).PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2020/03/02 08:18
S275	1	("20180146855").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2020/03/02 09:54
S276	9	(("7299079") or ("8452359") or ("9554735") or ("20170143210") or ("20130237797") or ("20040092804") or ("20080045820") or ("20080045821") or ("20130261406")).PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2020/03/02 10:10
S277	1	("20070027383").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2020/03/03 12:45
S278	1	("8747429").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2020/03/03 14:03
S279	2	(("20120046532") or ("20090171176")).PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2020/03/04 14:02
S280	1	"15849126"	US-PGPUB; USPAT	OR	OFF	2020/03/04 14:04
S281	1	("20060129037").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2020/03/05 12:11
S282	2	(("20080081968") or ("20150157262")).PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2020/03/05 12:14
S283	1	("20140206960").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2020/03/05 17:13
S284	1	("20130190589").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2020/03/05 17:16
S285	1	("20160238439").PN.	US-PGPUB;	OR	OFF	2020/03/05

			USPAT; USOCR			17:39
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S287	0	("2013324859").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2020/03/09 15:12
S288	1	("20130324859").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2020/03/09 15:13
S289	1	("6383145").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2020/03/09 19:44
S290	5	(("6498942") or ("6751490") or ("8108022") or ("20020137996") or ("20110118576")).PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2020/03/10 11:00
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S295	1	("20150112165").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2020/03/10 16:20
S296	1	("20070027383").PN.	US-PGPUB; USPAT;	OR	OFF	2020/03/10 16:35

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S299	2	("20140235973").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2020/03/12 16:27
S300	1	"15524408"	US-PGPUB; USPAT	OR	OFF	2020/03/13 14:04
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S302	1	("6939299").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2020/03/13 14:16
S303	1	("4819646").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2020/03/14 12:41
S304	1	("20150112164").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2020/03/14 15:15
S305	9	"2005015163"	US-PGPUB; USPAT	OR	OFF	2020/03/14 15:20
S306	35	"2005015163"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2020/03/14 15:20
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S310	1	("20150112164").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2020/03/14 15:58
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S313	16	(("20150230743") or ("20160081603") or ("20160287108") or ("20170325698") or ("8823944") or ("8958860") or ("8986207") or ("9901261") or ("20140213862") or ("20150238098") or ("20150141774") or ("20150374245") or ("20160120411") or ("20170135617") or ("20170265753") or ("20180055389")).PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2020/03/15 20:15
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S315	4	"14658528"	US-PGPUB; USPAT	OR	OFF	2020/03/18 13:31
S316	1	("20130041235").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2020/03/18 15:07
S317	1	("5209231").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2020/03/19 12:47
S318	3	(("20090240125") or ("4651741") or ("20090163784")).PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2020/03/19 14:16

EAST Search History (Interference)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
S46	13	calibrat$4 same glucose same optical same electrochemical.clm.	US-PGPUB; USPAT	OR	OFF	2018/11/02 14:49
S47	397	calibrat$4 same glucose same optical same electrochemical and A61B5/$.cpc.	US-PGPUB; USPAT	OR	OFF	2018/11/02 14:49
S48	3	"14261011"	US-PGPUB; USPAT	OR	OFF	2018/11/02 14:55
S49	3	"14188634"	US-PGPUB; USPAT	OR	OFF	2018/11/02 15:03
S50	3	"13761839"	US-PGPUB; USPAT	OR	OFF	2018/11/02 15:36
S51	1	"20100024526".pn.	US-PGPUB; USPAT	OR	OFF	2018/11/02 15:47
S52	3	"13347142"	US-PGPUB; USPAT	OR	OFF	2018/11/02 15:51

3/19/2020 5:42:30 PM
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PTO/SB/08 Equivalent

INFORMATION DISCLOSURE STATEMENT BY APPLICANT	Application No.	16/791955
	Filing Date	February 14, 2020
	First Named Inventor	Ammar Al-Ali
	Art Unit	2875
(Multiple sheets used when necessary)	Examiner	Unassigned
SHEET 1 OF 50	Attorney Docket No.	MAS.1007C4

U.S. PATENT DOCUMENTS					
Examiner Initials	Cite No.	Document Number *Number - Kind Code (if known)* Example: 1,234,567 B1	Publication Date MM-DD-YYYY	Name	Pages, Columns, Lines Where Relevant Passages or Relevant Figures Appear
	1	4,960,128	10/2/1990	Gordon et al.	
	2	4,964,408	10/23/1990	Hink et al.	
	3	5,041,187	8/20/1991	Hink et al.	
	4	5,069,213	12/3/1991	Polczynski	
	5	5,099,842	3/31/1992	Mannheimer et al.	
	6	5,158,091	10/27/1992	Butterfield et al.	
	7	5,163,438	11/17/1992	Gordon et al.	
	8	5,203,329	4/20/1993	Takatani et al.	
	9	5,228,449	7/20/1993	Christ et al.	
	10	5,319,355	6/7/1994	Russek	
	11	5,337,744	8/16/1994	Branigan	
	12	5,341,805	8/30/1994	Stavridi, et al.	
	13	5,377,676	1/3/1995	Vari, et al.	
	14	5,431,170	7/11/1995	Mathews	
	15	5,452,717	9/26/1995	Branigan et al.	
	16	5,456,252	10/10/1995	Vari, et al.	
	17	5,462,051	10/31/1995	Oka et al.	
	18	5,479,934	1/2/1996	Imran	
	19	5,482,036	1/9/1996	Diab et al.	
	20	5,490,505	2/13/1996	Diab et al.	
	21	5,494,043	2/27/1996	O'Sullivan et al.	
	22	5,497,771	3/12/1996	Rosenheimer	
	23	5,533,511	7/9/1996	Kaspari et al.	
	24	5,534,851	7/9/1996	Russek	
	25	5,561,275	10/1/1996	Savage, et al.	
	26	5,562,002	10/8/1996	Lalin	
	27	5,564,429	10/15/1996	Bornn et al.	
	28	5,584,296	12/17/1996	Cui et al.	
	29	5,590,649	1/7/1997	Caro et al.	

Examiner Signature	/MARJAN FARDANESH/	Date Considered	03/19/2020

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	First Named Inventor	Ammar Al-Ali
	Art Unit	2875
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U.S. PATENT DOCUMENTS					
Examiner Initials	Cite No.	Document Number *Number - Kind Code (if known)* Example: 1,234,567 B1	Publication Date MM-DD-YYYY	Name	Pages, Columns, Lines Where Relevant Passages or Relevant Figures Appear
	30	5,601,079	2/11/1997	Wong et al.	
	31	5,602,924	2/11/1997	Durand et al.	
	32	5,623,925	4/29/1997	Swenson et al.	
	33	5,632,272	5/27/1997	Diab et al.	
	34	5,638,816	6/17/1997	Kiani-Azarbayjany et al.	
	35	5,638,818	6/17/1997	Diab et al.	
	36	5,645,440	7/8/1997	Tobler et al.	
	37	5,685,299	11/11/1997	Diab et al.	
	38	5,699,808	12/23/1997	John	
	39	5,729,203	3/17/1998	Oka et al.	
	40	5,743,262	4/28/1998	Lepper, Jr. et al.	
	41	5,758,644	6/2/1998	Diab et al.	
	42	5,760,910	6/2/1998	Lepper, Jr. et al.	
	43	5,769,785	6/23/1998	Diab et al.	
	44	5,782,757	7/21/1998	Diab et al.	
	45	5,785,659	7/28/1998	Caro et al.	
	46	5,791,347	8/11/1998	Flaherty et al.	
	47	5,792,052	8/11/1998	Isaacson et al.	
	48	5,800,349	9/1/1998	Isaacson et al.	
	49	5,810,734	9/22/1998	Caro et al.	
	50	5,823,950	10/20/1998	Diab et al.	
	51	5,830,131	11/3/1998	Caro et al.	
	52	5,830,137	11/3/1998	Scharf	
	53	5,833,618	11/10/1998	Caro et al.	
	54	5,860,919	1/19/1999	Kiani-Azarbayjany et al.	
	55	5,890,929	4/6/1999	Mills et al.	
	56	5,904,654	5/18/1999	Wohltmann et al.	
	57	5,919,134	7/6/1999	Diab	
	58	5,934,925	8/10/1999	Tobler et al.	

Examiner Signature	/MARJAN FARDANESH/	Date Considered	03/19/2020

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	59	5,940,182	8/17/1999	Lepper, Jr. et al.	
	60	5,987,343	11/16/1999	Kinast	
	61	5,995,855	11/30/1999	Kiani et al.	
	62	5,997,343	12/7/1999	Mills et al.	
	63	6,002,952	12/14/1999	Diab et al.	
	64	6,011,986	1/4/2000	Diab et al.	
	65	6,027,452	2/22/2000	Flaherty et al.	
	66	6,036,642	3/14/2000	Diab et al.	
	67	6,045,509	4/4/2000	Caro et al.	
	68	6,067,462	5/23/2000	Diab et al.	
	69	6,081,735	6/27/2000	Diab et al.	
	70	6,088,607	7/11/2000	Diab et al.	
	71	6,102,856	8/15/2000	Groff et al.	
	72	6,110,522	8/29/2000	Lepper, Jr. et al.	
	73	6,124,597	9/26/2000	Shehada	
	74	6,128,521	10/3/2000	Marro et al.	
	75	6,129,675	10/10/2000	Jay	
	76	6,144,868	11/7/2000	Parker	
	77	6,151,516	11/21/2000	Kiani-Azarbayjany et al.	
	78	6,152,754	11/28/2000	Gerhardt et al.	
	79	6,157,850	12/5/2000	Diab et al.	
	80	6,165,005	12/26/2000	Mills et al.	
	81	6,184,521	2/6/2001	Coffin, IV et al.	
	82	6,206,830	3/27/2001	Diab et al.	
	83	6,223,063	4/24/2001	Chaiken et al.	
	84	6,229,856	5/8/2001	Diab et al.	
	85	6,232,609	5/15/2001	Snyder, et al.	
	86	6,236,872	5/22/2001	Diab et al.	
	87	6,241,680	6/5/2001	Miwa	

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	Art Unit	2875
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SHEET 4 OF 50	Attorney Docket No.	MAS.1007C4

U.S. PATENT DOCUMENTS					
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	88	6,241,683	6/5/2001	Macklem, et al.	
	89	6,253,097	6/26/2001	Aronow et al.	
	90	6,256,523	7/3/2001	Diab et al.	
	91	6,263,222	7/17/2001	Diab et al.	
	92	6,278,522	8/21/2001	Lepper, Jr. et al.	
	93	6,280,213	8/28/2001	Tobler et al.	
	94	6,285,896	9/4/2001	Tobler et al.	
	95	6,301,493	10/9/2001	Marro et al.	
	96	6,308,089	10/23/2001	von der Ruhr et al.	
	97	6,317,627	11/13/2001	Ennen et al.	
	98	6,321,100	11/20/2001	Parker	
	99	6,325,761	12/4/2001	Jay	
	100	6,334,065	12/25/2001	Al-Ali et al.	
	101	6,343,223	1/29/2002	Chin et al.	
	102	6,343,224	1/29/2002	Parker	
	103	6,349,228	2/19/2002	Kiani et al.	
	104	6,356,203	3/12/2002	Halleck et al.	
	105	6,360,114	3/19/2002	Diab et al.	
	106	6,368,283	4/9/2002	Xu, et al.	
	107	6,371,921	4/16/2002	Caro et al.	
	108	6,377,829	4/23/2002	Al-Ali	
	109	6,388,240	5/14/2002	Schulz et al.	
	110	6,397,091	5/28/2002	Diab et al.	
	111	6,430,437	8/6/2002	Marro	
	112	6,430,525	8/6/2002	Weber et al.	
	113	6,463,311	10/8/2002	Diab	
	114	6,470,199	10/22/2002	Kopotic et al.	
	115	6,501,975	12/31/2002	Diab et al.	
	116	6,505,059	1/7/2003	Kollias, et al.	

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SHEET 5 OF 50	Attorney Docket No.	MAS.1007C4

U.S. PATENT DOCUMENTS					
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	117	6,515,273	2/4/2003	Al-Ali	
	118	6,519,487	2/11/2003	Parker	
	119	6,525,386	2/25/2003	Mills et al.	
	120	6,526,300	2/25/2003	Kiani et al.	
	121	6,541,756	4/1/2003	Schulz et al.	
	122	6,542,764	4/1/2003	Al-Ali et al.	
	123	6,580,086	6/17/2003	Schulz et al.	
	124	6,584,336	6/24/2003	Ali et al.	
	125	6,595,316	7/22/2003	Cybulski et al.	
	126	6,597,932	7/22/2003	Tian et al.	
	127	6,597,933	7/22/2003	Kiani et al.	
	128	6,606,511	8/12/2003	Ali et al.	
	129	6,632,181	10/14/2003	Flaherty et al.	
	130	6,639,668	10/28/2003	Trepagnier, Pierre	
	131	6,640,116	10/28/2003	Diab	
	132	6,643,530	11/4/2003	Diab et al.	
	133	6,650,917	11/18/2003	Diab et al.	
	134	6,654,624	11/25/2003	Diab et al.	
	135	6,658,276	12/2/2003	Kiani et al.	
	136	6,661,161	12/9/2003	Lanzo et al.	
	137	6,671,526	12/30/2003	Aoyagi et al.	
	138	6,671,531	12/30/2003	Al-Ali et al.	
	139	6,678,543	1/13/2004	Diab et al.	
	140	6,684,090	1/27/2004	Ali et al.	
	141	6,684,091	1/27/2004	Parker	
	142	6,697,656	2/24/2004	Al-Ali	
	143	6,697,657	2/24/2004	Shehada, et al.	
	144	6,697,658	2/24/2004	Al-Ali	
	145	6,699,194	3/2/2004	Diab et al.	

Examiner Signature /MARJAN FARDANESH/	Date Considered 03/19/2020

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	First Named Inventor	Ammar Al-Ali
	Art Unit	2875
(Multiple sheets used when necessary)	Examiner	Unassigned
SHEET 6 OF 50	Attorney Docket No.	MAS.1007C4

U.S. PATENT DOCUMENTS					
Examiner Initials	Cite No.	Document Number *Number - Kind Code (if known)* Example: 1,234,567 B1	Publication Date MM-DD-YYYY	Name	Pages, Columns, Lines Where Relevant Passages or Relevant Figures Appear
	146	6,714,804	3/30/2004	Al-Ali et al.	
	147	6,721,582	4/13/2004	Trepagnier, et al.	
	148	6,721,585	4/13/2004	Parker	
	149	6,725,075	4/20/2004	Al-Ali	
	150	6,728,560	4/27/2004	Kollias, et al.	
	151	6,735,459	5/11/2004	Parker	
	152	6,745,060	6/1/2004	Diab et al.	
	153	6,760,607	7/6/2004	Al-Ali	
	154	6,770,028	8/3/2004	Ali et al.	
	155	6,771,994	8/3/2004	Kiani et al.	
	156	6,785,568	8/31/2004	Chance	
	157	6,792,300	9/14/2004	Diab et al.	
	158	6,801,799	10/5/2004	Mendelson	
	159	6,813,511	11/2/2004	Diab et al.	
	160	6,816,741	11/9/2004	Diab	
	161	6,822,564	11/23/2004	Al-Ali	
	162	6,826,419	11/30/2004	Diab et al.	
	163	6,830,711	12/14/2004	Mills et al.	
	164	6,831,266	12/14/2004	Paritsky et al.	
	165	6,850,787	2/1/2005	Weber et al.	
	166	6,850,788	2/1/2005	Al-Ali	
	167	6,852,083	2/8/2005	Caro et al.	
	168	6,861,639	3/1/2005	Al-Ali	
	169	6,898,452	5/24/2005	Al-Ali et al.	
	170	6,920,345	7/19/2005	Al-Ali et al.	
	171	6,931,268	8/16/2005	Kiani-Azarbayjany et al.	
	172	6,934,570	8/23/2005	Kiani et al.	
	173	6,939,305	9/6/2005	Flaherty et al.	
	174	6,943,348	9/13/2005	Coffin IV	

Examiner Signature	/MARJAN FARDANESH/	Date Considered	03/19/2020

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PTO/SB/08 Equivalent

INFORMATION DISCLOSURE STATEMENT BY APPLICANT	Application No.	16/791955
	Filing Date	February 14, 2020
	First Named Inventor	Ammar Al-Ali
	Art Unit	2875
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SHEET 7 OF 50	Attorney Docket No.	MAS.1007C4

U.S. PATENT DOCUMENTS					
Examiner Initials	Cite No.	Document Number *Number - Kind Code (if known)* Example: 1,234,567 B1	Publication Date MM-DD-YYYY	Name	Pages, Columns, Lines Where Relevant Passages or Relevant Figures Appear
	175	6,950,687	9/27/2005	Al-Ali	
	176	6,961,598	11/1/2005	Diab	
	177	6,970,792	11/29/2005	Diab	
	178	6,979,812	12/27/2005	Al-Ali	
	179	6,985,764	1/10/2006	Mason et al.	
	180	6,993,371	1/31/2006	Kiani et al.	
	181	6,996,427	2/7/2006	Ali et al.	
	182	6,999,904	2/14/2006	Weber et al.	
	183	7,003,338	2/21/2006	Weber et al.	
	184	7,003,339	2/21/2006	Diab et al.	
	185	7,015,451	3/21/2006	Dalke et al.	
	186	7,024,233	4/4/2006	Ali et al.	
	187	7,027,849	4/11/2006	Al-Ali	
	188	7,030,749	4/18/2006	Al-Ali	
	189	7,039,449	5/2/2006	Al-Ali	
	190	7,041,060	5/9/2006	Flaherty et al	
	191	7,044,918	5/16/2006	Diab	
	192	7,048,687	5/23/2006	Reuss et al.	
	193	7,060,963	6/13/2006	Maegawa et al.	
	194	7,067,893	6/27/2006	Mills et al.	
	195	7,096,052	8/22/2006	Mason et al.	
	196	7,096,054	8/22/2006	Abdul-Hafiz et al.	
	197	7,132,641	11/7/2006	Schulz et al.	
	198	7,142,901	11/28/2006	Kiani et al.	
	199	7,149,561	12/12/2006	Diab	
	200	7,186,966	3/6/2007	Al-Ali	
	201	7,190,261	3/13/2007	Al-Ali	
	202	7,215,984	5/8/2007	Diab	
	203	7,215,986	5/8/2007	Diab	

Examiner Signature /MARJAN FARDANESH/	Date Considered 03/19/2020

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT	Application No.	16/791955
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	First Named Inventor	Ammar Al-Ali
	Art Unit	2875
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U.S. PATENT DOCUMENTS					
Examiner Initials	Cite No.	Document Number *Number - Kind Code (if known)* Example: 1,234,567 B1	Publication Date MM-DD-YYYY	Name	Pages, Columns, Lines Where Relevant Passages or Relevant Figures Appear
	204	7,221,971	5/22/2007	Diab	
	205	7,225,006	5/29/2007	Al-Ali et al.	
	206	7,225,007	5/29/2007	Al-Ali	
	207	7,227,156	6/5/2007	Colvin, Jr. et al.	
	208	7,239,905	7/3/2007	Kiani-Azarbayjany et al.	
	209	7,245,953	7/17/2007	Parker	
	210	7,254,429	8/7/2007	Schurman et al.	
	211	7,254,431	8/7/2007	Al-Ali	
	212	7,254,433	8/7/2007	Diab et al.	
	213	7,254,434	8/7/2007	Schulz et al.	
	214	7,272,425	9/18/2007	Al-Ali	
	215	7,274,955	9/25/2007	Kiani et al.	
	216	7,280,858	10/9/2007	Al-Ali et al.	
	217	7,289,835	10/30/2007	Mansfield et al.	
	218	7,292,883	11/6/2007	De Felice et al.	
	219	7,295,866	11/13/2007	Al-Ali	
	220	7,328,053	2/5/2008	Diab et al.	
	221	7,332,784	2/19/2008	Mills, et al.	
	222	7,340,287	3/4/2008	Mason et al.	
	223	7,341,559	3/11/2008	Schulz et al.	
	224	7,343,186	3/11/2008	Lamego et al.	
	225	7,355,512	4/8/2008	Al-Ali	
	226	7,356,365	4/8/2008	Schurman	
	227	7,371,981	5/13/2008	Abdul-Hafiz	
	228	7,373,193	5/13/2008	Al-Ali et al.	
	229	7,373,194	5/13/2008	Weber et al.	
	230	7,376,453	5/20/2008	Diab et al.	
	231	7,377,794	5/27/2008	Al Ali et al.	
	232	7,377,899	5/27/2008	Weber et al.	

Examiner Signature	/MARJAN FARDANESH/	Date Considered	03/19/2020

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PTO/SB/08 Equivalent

INFORMATION DISCLOSURE STATEMENT BY APPLICANT	Application No.	16/791955
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	First Named Inventor	Ammar Al-Ali
	Art Unit	2875
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U.S. PATENT DOCUMENTS					
Examiner Initials	Cite No.	Document Number *Number - Kind Code (if known)* Example: 1,234,567 B1	Publication Date MM-DD-YYYY	Name	Pages, Columns, Lines Where Relevant Passages or Relevant Figures Appear
	233	7,383,070	6/3/2008	Diab et al.	
	234	7,415,297	8/19/2008	Al-Ali et al.	
	235	7,428,432	9/23/2008	Ali et al.	
	236	7,438,683	10/21/2008	Al-Ali et al.	
	237	7,440,787	10/21/2008	Diab	
	238	7,454,240	11/18/2008	Diab et al.	
	239	7,467,002	12/16/2008	Weber et al.	
	240	7,469,157	12/23/2008	Diab et al.	
	241	7,471,969	12/30/2008	Diab et al.	
	242	7,471,971	12/30/2008	Diab et al.	
	243	7,483,729	1/27/2009	Al-Ali et al.	
	244	7,483,730	1/27/2009	Diab et al.	
	245	7,489,958	2/10/2009	Diab et al.	
	246	7,496,391	2/24/2009	Diab et al.	
	247	7,496,393	2/24/2009	Diab et al.	
	248	7,499,741	3/3/2009	Diab et al.	
	249	7,499,835	3/3/2009	Weber et al.	
	250	7,500,950	3/10/2009	Al-Ali et al.	
	251	7,509,154	3/24/2009	Diab et al.	
	252	7,509,494	3/24/2009	Al-Ali	
	253	7,510,849	3/31/2009	Schurman et al.	
	254	7,519,327	4/14/2009	White	
	255	7,526,328	4/28/2009	Diab et al.	
	256	7,530,942	5/12/2009	Diab	
	257	7,530,949	5/12/2009	Al Ali et al.	
	258	7,530,955	5/12/2009	Diab et al.	
	259	7,563,110	7/21/2009	Al-Ali et al.	
	260	7,596,398	9/29/2009	Al-Ali et al.	
	261	7,601,123	10/13/2009	Tweed, et al.	

Examiner Signature	/MARJAN FARDANESH/	Date Considered	03/19/2020

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	Filing Date	February 14, 2020
	First Named Inventor	Ammar Al-Ali
	Art Unit	2875
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U.S. PATENT DOCUMENTS					
Examiner Initials	Cite No.	Document Number *Number - Kind Code (if known)* Example: 1,234,567 B1	Publication Date MM-DD-YYYY	Name	Pages, Columns, Lines Where Relevant Passages or Relevant Figures Appear
	262	7,613,490	11/3/2009	Sarussi et al.	
	263	7,618,375	11/17/2009	Flaherty	
	264	7,647,083	1/12/2010	Al-Ali et al.	
	265	7,726,209	6/1/2010	Ruotoistenmäki	
	266	7,729,733	6/1/2010	Al-Ali et al.	
	267	7,734,320	6/8/2010	Al-Ali	
	268	7,740,588	6/22/2010	Sciarra	
	269	7,740,589	6/22/2010	Maschke et al.	
	270	7,761,127	7/20/2010	Al-Ali et al.	
	271	7,761,128	7/20/2010	Al-Ali et al.	
	272	7,764,982	7/27/2010	Dalke et al.	
	273	7,791,155	9/7/2010	Diab	
	274	7,801,581	9/21/2010	Diab	
	275	7,822,452	10/26/2010	Schurman et al.	
	276	7,844,313	11/30/2010	Kiani et al.	
	277	7,844,314	11/30/2010	Al-Ali	
	278	7,844,315	11/30/2010	Al-Ali	
	279	7,862,523	1/4/2011	Ruotoistenmaki	
	280	7,865,222	1/4/2011	Weber et al.	
	281	7,869,849	1/11/2011	Ollerdessen et al.	
	282	7,873,497	1/18/2011	Weber et al.	
	283	7,880,606	2/1/2011	Al-Ali	
	284	7,880,626	2/1/2011	Al-Ali et al.	
	285	7,891,355	2/22/2011	Al-Ali et al.	
	286	7,894,868	2/22/2011	Al-Ali et al.	
	287	7,899,507	3/1/2011	Al-Ali et al.	
	288	7,899,510	3/1/2011	Hoarau	
	289	7,899,518	3/1/2011	Trepagnier et al.	
	290	7,904,132	3/8/2011	Weber et al.	

Examiner Signature	/MARJAN FARDANESH/	Date Considered	03/19/2020

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT	Application No.	16/791955
	Filing Date	February 14, 2020
	First Named Inventor	Ammar Al-Ali
	Art Unit	2875
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SHEET 11 OF 50	Attorney Docket No.	MAS.1007C4

U.S. PATENT DOCUMENTS					
Examiner Initials	Cite No.	Document Number *Number - Kind Code (if known)* Example: 1,234,567 B1	Publication Date MM-DD-YYYY	Name	Pages, Columns, Lines Where Relevant Passages or Relevant Figures Appear
	291	7,909,772	3/22/2011	Popov et al.	
	292	7,910,875	3/22/2011	Al-Ali	
	293	7,919,713	4/5/2011	Al-Ali et al.	
	294	7,937,128	5/3/2011	Al-Ali	
	295	7,937,129	5/3/2011	Mason et al.	
	296	7,937,130	5/3/2011	Diab et al.	
	297	7,941,199	5/10/2011	Kiani	
	298	7,951,086	5/31/2011	Flaherty et al.	
	299	7,957,780	6/7/2011	Lamego et al.	
	300	7,962,188	6/14/2011	Kiani et al.	
	301	7,962,190	6/14/2011	Diab et al.	
	302	7,976,472	7/12/2011	Kiani	
	303	7,988,637	8/2/2011	Diab	
	304	7,990,382	8/2/2011	Kiani	
	305	7,991,446	8/2/2011	Al-Ali et al.	
	306	8,000,761	8/16/2011	Al-Ali	
	307	8,008,088	8/30/2011	Bellott et al.	
	308	8,019,400	9/13/2011	Diab et al.	
	309	8,028,701	10/4/2011	Al-Ali et al.	
	310	8,029,765	10/4/2011	Bellott et al.	
	311	8,036,727	10/11/2011	Schurman et al.	
	312	8,036,728	10/11/2011	Diab et al.	
	313	8,046,040	10/25/2011	Ali et al.	
	314	8,046,041	10/25/2011	Diab et al.	
	315	8,046,042	10/25/2011	Diab et al.	
	316	8,048,040	11/1/2011	Kiani	
	317	8,050,728	11/1/2011	Al-Ali et al.	
	318	8,071,935	12/6/2011	Besko et al.	
	319	8,118,620	2/21/2012	Al-Ali et al.	

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT	Application No.	16/791955
	Filing Date	February 14, 2020
	First Named Inventor	Ammar Al-Ali
	Art Unit	2875
(Multiple sheets used when necessary)	Examiner	Unassigned
SHEET 12 OF 50	Attorney Docket No.	MAS.1007C4

U.S. PATENT DOCUMENTS					
Examiner Initials	Cite No.	Document Number *Number - Kind Code (if known)* Example: 1,234,567 B1	Publication Date MM-DD-YYYY	Name	Pages, Columns, Lines Where Relevant Passages or Relevant Figures Appear
	320	8,126,528	2/28/2012	Diab et al.	
	321	8,128,572	3/6/2012	Diab et al.	
	322	8,130,105	3/6/2012	Al-Ali et al.	
	323	8,145,287	3/27/2012	Diab et al.	
	324	8,150,487	4/3/2012	Diab et al.	
	325	8,175,672	5/8/2012	Parker	
	326	8,180,420	5/15/2012	Diab et al.	
	327	8,182,443	5/22/2012	Kiani	
	328	8,185,180	5/22/2012	Diab et al.	
	329	8,190,223	5/29/2012	Al-Ali et al.	
	330	8,190,227	5/29/2012	Diab et al.	
	331	8,203,438	6/19/2012	Kiani et al.	
	332	8,203,704	6/19/2012	Merritt et al.	
	333	8,204,566	6/19/2012	Schurman et al.	
	334	8,219,172	7/10/2012	Schurman et al.	
	335	8,224,411	7/17/2012	Al-Ali et al.	
	336	8,228,181	7/24/2012	Al-Ali	
	337	8,229,533	7/24/2012	Diab et al.	
	338	8,233,955	7/31/2012	Al-Ali et al.	
	339	8,244,325	8/14/2012	Al-Ali et al.	
	340	8,255,026	8/28/2012	Al-Ali	
	341	8,255,027	8/28/2012	Al-Ali et al.	
	342	8,255,028	8/28/2012	Al-Ali et al.	
	343	8,260,577	9/4/2012	Weber et al.	
	344	8,265,723	9/11/2012	McHale et al.	
	345	8,274,360	9/25/2012	Sampath et al.	
	346	8,280,469	10/2/2012	Baker, Jr. et al.	
	347	8,280,473	10/2/2012	Al-Ali	
	348	8,289,130	10/16/2012	Nakajima et al.	

Examiner Signature /MARJAN FARDANESH/	Date Considered 03/19/2020

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	Filing Date	February 14, 2020
	First Named Inventor	Ammar Al-Ali
	Art Unit	2875
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U.S. PATENT DOCUMENTS					
Examiner Initials	Cite No.	Document Number *Number - Kind Code (if known)* Example: 1,234,567 B1	Publication Date MM-DD-YYYY	Name	Pages, Columns, Lines Where Relevant Passages or Relevant Figures Appear
	349	8,301,217	10/30/2012	Al-Ali et al.	
	350	8,306,596	11/6/2012	Schurman et al.	
	351	8,310,336	11/13/2012	Muhsin et al.	
	352	8,315,683	11/20/2012	Al-Ali et al.	
	353	8,337,403	12/25/2012	Al-Ali et al.	
	354	8,346,330	1/1/2013	Lamego	
	355	8,353,842	1/15/2013	Al-Ali et al.	
	356	8,355,766	1/15/2013	MacNeish, III et al.	
	357	8,359,080	1/22/2013	Diab et al.	
	358	8,364,223	1/29/2013	Al-Ali et al.	
	359	8,364,226	1/29/2013	Diab et al.	
	360	8,364,389	1/29/2013	Dorogusker et al.	
	361	8,374,665	2/12/2013	Lamego	
	362	8,385,995	2/26/2013	Al-ali et al.	
	363	8,385,996	2/26/2013	Smith et al.	
	364	8,388,353	3/5/2013	Kiani et la.	
	365	8,399,822	3/19/2013	Al-Ali	
	366	8,401,602	3/19/2013	Kiani	
	367	8,405,608	3/26/2013	Al-Ali et al.	
	368	8,414,499	4/9/2013	Al-Ali et al.	
	369	8,418,524	4/16/2013	Al-Ali	
	370	8,423,106	4/16/2013	Lamego et al.	
	371	8,428,967	4/23/2013	Olsen et al.	
	372	8,430,817	4/30/2013	Al-Ali et al.	
	373	8,437,825	5/7/2013	Dalvi et al.	
	374	8,452,364	5/28/2013	Hannula et al.	
	375	8,455,290	6/4/2013	Siskavich	
	376	8,457,703	6/4/2013	Al-Ali	
	377	8,457,707	6/4/2013	Kiani	

Examiner Signature	/MARJAN FARDANESH/	Date Considered	03/19/2020

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	Art Unit	2875
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U.S. PATENT DOCUMENTS					
Examiner Initials	Cite No.	Document Number *Number - Kind Code (if known)* Example: 1,234,567 B1	Publication Date MM-DD-YYYY	Name	Pages, Columns, Lines Where Relevant Passages or Relevant Figures Appear
	378	8,463,349	6/11/2013	Diab et al.	
	379	8,466,286	6/18/2013	Bellot et al.	
	380	8,471,713	6/25/2013	Poeze et al.	
	381	8,473,020	6/25/2013	Kiani et al.	
	382	8,483,787	7/9/2013	Al-Ali et al.	
	383	8,489,364	7/16/2013	Weber et al.	
	384	8,496,595	7/30/2013	Jornod	
	385	8,498,684	0730//2013	Weber et al.	
	386	8,504,128	8/6/2013	Blank et al.	
	387	8,509,867	8/13/2013	Workman et al.	
	388	8,515,509	8/20/2013	Bruinsma et al.	
	389	8,515,515	8/20/2013	McKenna et al.	
	390	8,523,781	9/3/2013	Al-Ali	
	391	8,529,301	9/10/2013	Al-Ali et al.	
	392	8,532,727	9/10/2013	Ali et al.	
	393	8,532,728	9/10/2013	Diab et al.	
	394	8,547,209	10/1/2013	Kiani et al.	
	395	8,548,548	10/1/2013	Al-Ali	
	396	8,548,549	10/1/2013	Schurman et al.	
	397	8,548,550	10/1/2013	Al-Ali et al.	
	398	8,560,032	10/15/2013	Al-Ali et al.	
	399	8,560,034	10/15/2013	Diab et al.	
	400	8,570,167	10/29/2013	Al-Ali	
	401	8,570,503	10/29/2013	Vo et al.	
	402	8,571,617	10/29/2013	Reichgott et al.	
	403	8,571,618	10/29/2013	Lamego et al.	
	404	8,571,619	10/29/2013	Al-Ali et al.	
	405	8,577,431	11/5/2013	Lamego et al.	
	406	8,581,732	11/12/2013	Al-Ali et al.	

Examiner Signature	/MARJAN FARDANESH/	Date Considered	03/19/2020

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U.S. PATENT DOCUMENTS					
Examiner Initials	Cite No.	Document Number *Number - Kind Code (if known)* Example: 1,234,567 B1	Publication Date MM-DD-YYYY	Name	Pages, Columns, Lines Where Relevant Passages or Relevant Figures Appear
	407	8,584,345	11/19/2013	Al-Ali et al.	
	408	8,588,880	11/19/2013	Abdul-Hafiz et al.	
	409	8,591,426	11/26/2013	Onoe et al.	
	410	8,600,467	12/3/2013	Al-Ali et al.	
	411	8,606,342	12/10/2013	Diab	
	412	8,615,290	12/24/2013	Lin et al.	
	413	8,626,255	1/7/2014	Al-Ali et al.	
	414	8,630,691	1/14/2014	Lamego et al.	
	415	8,634,889	1/21/2014	Al-Ali et al.	
	416	8,641,631	2/4/2014	Sierra et al.	
	417	8,652,060	2/18/2014	Al-Ali	
	418	8,655,004	2/18/2014	Prest et al.	
	419	8,663,107	3/4/2014	Kiani	
	420	8,666,468	3/4/2014	Al-Ali	
	421	8,667,967	3/11/2014	Al- Ali et al.	
	422	8,670,811	3/11/2014	O'Reilly	
	423	8,670,814	3/11/2014	Diab et al.	
	424	8,676,286	3/18/2014	Weber et al.	
	425	8,682,407	3/25/2014	Al-Ali	
	426	8,690,799	4/8/2014	Telfort et al.	
	427	8,700,111	4/15/2014	LeBoeuf et al.	
	428	8,700,112	4/15/2014	Kiani	
	429	8,702,627	4/22/2014	Telfort et al.	
	430	8,706,179	4/22/2014	Parker	
	431	8,712,494	4/29/2014	MacNeish, III et al.	
	432	8,715,206	5/6/2014	Telfort et al.	
	433	8,718,735	5/6/2014	Lamego et al.	
	434	8,718,737	5/6/2014	Diab et al.	
	435	8,718,738	5/6/2014	Blank et al.	

Examiner Signature /MARJAN FARDANESH/	Date Considered 03/19/2020

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T[1] - Place a check mark in this area when an English language Translation is attached.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /M.F/

PTO/SB/08 Equivalent

INFORMATION DISCLOSURE STATEMENT BY APPLICANT	Application No.	16/791955
	Filing Date	February 14, 2020
	First Named Inventor	Ammar Al-Ali
	Art Unit	2875
(Multiple sheets used when necessary)	Examiner	Unassigned
SHEET 16 OF 50	Attorney Docket No.	MAS.1007C4

U.S. PATENT DOCUMENTS					
Examiner Initials	Cite No.	Document Number *Number - Kind Code (if known)* Example: 1,234,567 B1	Publication Date MM-DD-YYYY	Name	Pages, Columns, Lines Where Relevant Passages or Relevant Figures Appear
	436	8,720,249	5/13/2014	Al-Ali	
	437	8,721,541	5/13/2014	Al-Ali et al.	
	438	8,721,542	5/13/2014	Al-Ali et al.	
	439	8,723,677	5/13/2014	Kiani	
	440	8,740,792	6/3/2014	Kiani et al.	
	441	8,754,776	6/17/2014	Poeze et al.	
	442	8,755,535	6/17/2014	Telfort et al.	
	443	8,755,856	6/17/2014	Diab et al.	
	444	8,755,872	6/17/2014	Marinow	
	445	8,760,517	6/24/2014	Sarwar et al.	
	446	8,761,850	6/24/2014	Lamego	
	447	8,764,671	7/1/2014	Kiani	
	448	8,768,423	7/1/2014	Shakespeare et al.	
	449	8,768,426	7/1/2014	Haisley et al.	
	450	8,771,204	7/8/2014	Telfort et al.	
	451	8,777,634	7/15/2014	Kiani et al.	
	452	8,781,543	7/15/2014	Diab et al.	
	453	8,781,544	7/15/2014	Al-Ali et al.	
	454	8,781,549	7/15/2014	Al-Ali et al.	
	455	8,788,003	7/22/2014	Schurman et al.	
	456	8,790,268	7/29/2014	Al-Ali	
	457	8,801,613	8/12/2014	Al-Ali et al.	
	458	8,821,397	9/2/2014	Al-Ali et al.	
	459	8,821,415	9/2/2014	Al-Ali et al.	
	460	8,830,449	9/9/2014	Lamego et al.	
	461	8,831,700	9/9/2014	Schurman et al.	
	462	8,838,210	9/16/2014	Wood et al.	
	463	8,840,549	9/23/2014	Al-Ali et al.	
	464	8,845,543	9/30/2014	Diab et al.	

Examiner Signature	/MARJAN FARDANESH/	Date Considered	03/19/2020

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PTO/SB/08 Equivalent

INFORMATION DISCLOSURE STATEMENT BY APPLICANT	Application No.	16/791955
	Filing Date	February 14, 2020
	First Named Inventor	Ammar Al-Ali
	Art Unit	2875
(Multiple sheets used when necessary)	Examiner	Unassigned
SHEET 17 OF 50	Attorney Docket No.	MAS.1007C4

U.S. PATENT DOCUMENTS					
Examiner Initials	Cite No.	Document Number *Number - Kind Code (if known)* Example: 1,234,567 B1	Publication Date MM-DD-YYYY	Name	Pages, Columns, Lines Where Relevant Passages or Relevant Figures Appear
	465	8,847,740	9/30/2014	Kiani et al.	
	466	8,849,365	9/30/2014	Smith et al.	
	467	8,852,094	10/7/2014	Al-Ali et al.	
	468	8,852,994	10/7/2014	Wojtczuk et al.	
	469	8,868,147	10/21/2014	Stippick et al.	
	470	8,868,150	10/21/2014	Al-Ali et al.	
	471	8,870,792	10/28/2014	Al-Ali et al.	
	472	8,886,271	11/11/2014	Kiani et al.	
	473	8,888,539	11/18/2014	Al-Ali et al.	
	474	8,888,708	11/18/2014	Diab et al.	
	475	8,892,180	11/18/2014	Weber et al.	
	476	8,897,847	11/25/2014	Al-Ali	
	477	8,909,310	12/9/2014	Lamego et al.	
	478	8,911,377	12/16/2014	Al-Ali	
	479	8,912,909	12/16/2014	Al-Ali et al.	
	480	8,920,317	12/30/2014	Al-Ali et al.	
	481	8,920,332	12/30/2014	Hong et al.	
	482	8,921,699	12/30/2014	Al-Ali et al	
	483	8,922,382	12/30/2014	Al-Ali et al.	
	484	8,929,964	1/6/2015	Al-Ali et al.	
	485	8,942,777	1/27/2015	Diab et al.	
	486	8,948,834	2/3/2015	Diab et al.	
	487	8,948,835	2/3/2015	Diab	
	488	8,965,471	2/24/2015	Lamego	
	489	8,983,564	3/17/2015	Al-Ali	
	490	8,989,831	3/24/2015	Al-Ali et al.	
	491	8,996,085	3/31/2015	Kiani et al.	
	492	8,998,809	4/7/2015	Kiani	
	493	9,028,429	5/12/2015	Telfort et al.	

Examiner Signature /MARJAN FARDANESH/	Date Considered 03/19/2020

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ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /M.F/

PTO/SB/08 Equivalent

INFORMATION DISCLOSURE STATEMENT BY APPLICANT	Application No.	16/791955
	Filing Date	February 14, 2020
	First Named Inventor	Ammar Al-Ali
	Art Unit	2875
(Multiple sheets used when necessary)	Examiner	Unassigned
SHEET 18 OF 50	Attorney Docket No.	MAS.1007C4

U.S. PATENT DOCUMENTS					
Examiner Initials	Cite No.	Document Number *Number - Kind Code (if known)* Example: 1,234,567 B1	Publication Date MM-DD-YYYY	Name	Pages, Columns, Lines Where Relevant Passages or Relevant Figures Appear
	494	9,037,207	5/19/2015	Al-Ali et al.	
	495	9,060,721	6/23/2015	Reichgott et al.	
	496	9,066,666	6/30/2015	Kiani	
	497	9,066,680	6/30/2015	Al-Ali et al.	
	498	9,072,437	7/7/2015	Paalasmaa	
	499	9,072,474	7/7/2015	Al-Ali et al.	
	500	9,078,560	7/14/2015	Schurman et al.	
	501	9,081,889	7/14/2015	Ingrassia, Jr. et al.	
	502	9,084,569	7/21/2015	Weber et al.	
	503	9,095,316	8/4/2015	Welch et al.	
	504	9,106,038	8/11/2015	Telfort et al.	
	505	9,107,625	8/18/2015	Telfort et al.	
	506	9,107,626	8/18/2015	Al-Ali et al.	
	507	9,113,831	8/25/2015	Al-Ali	
	508	9,113,832	8/25/2015	Al-Ali	
	509	9,119,595	9/1/2015	Lamego	
	510	9,131,881	9/15/2015	Diab et al.	
	511	9,131,882	9/15/2015	Al-Ali et al.	
	512	9,131,883	9/15/2015	Al-Ali	
	513	9,131,917	9/15/2015	Telfort et al.	
	514	9,138,180	9/22/2015	Coverston et al.	
	515	9,138,182	9/22/2015	Al-Ali et al.	
	516	9,138,192	9/22/2015	Weber et al.	
	517	9,142,117	9/22/2015	Muhsin et al.	
	518	9,153,112	10/6/2015	Kiani et al.	
	519	9,153,121	10/6/2015	Kiani et al.	
	520	9,161,696	10/20/2015	Al-Ali et al.	
	521	9,161,713	10/20/2015	Al-Ali et al.	
	522	9,167,995	10/27/2015	Lamego et al.	

Examiner Signature	/MARJAN FARDANESH/	Date Considered	03/19/2020

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PTO/SB/08 Equivalent

INFORMATION DISCLOSURE STATEMENT BY APPLICANT	Application No.	16/791955
	Filing Date	February 14, 2020
	First Named Inventor	Ammar Al-Ali
	Art Unit	2875
(Multiple sheets used when necessary)	Examiner	Unassigned
SHEET 19 OF 50	Attorney Docket No.	MAS.1007C4

U.S. PATENT DOCUMENTS					
Examiner Initials	Cite No.	Document Number *Number - Kind Code (if known)* Example: 1,234,567 B1	Publication Date MM-DD-YYYY	Name	Pages, Columns, Lines Where Relevant Passages or Relevant Figures Appear
	523	9,176,141	11/3/2015	Al-Ali et al.	
	524	9,186,102	11/17/2015	Bruinsma et al.	
	525	9,192,312	11/24/2015	Al-Ali	
	526	9,192,329	11/24/2015	Al-Ali	
	527	9,192,351	11/24/2015	Telfort et al.	
	528	9,195,385	11/24/2015	Al-Ali et al.	
	529	9,210,566	12/8/2015	Ziemianska et al.	
	530	9,211,072	12/15/2015	Kiani	
	531	9,211,095	12/15/2015	Al-Ali	
	532	9,218,454	12/22/2015	Kiani et al.	
	533	9,226,696	1/5/2016	Kiani	
	534	9,241,662	1/26/2016	Al-Ali et al.	
	535	9,245,668	1/26/2016	Vo et al.	
	536	9,259,185	2/16/2016	Abdul-Hafiz et al.	
	537	9,267,572	2/23/2016	Barker et al.	
	538	9,277,880	3/8/2016	Poeze et al.	
	539	9,289,167	3/22/2016	Diab et al.	
	540	9,295,421	3/29/2016	Kiani et al.	
	541	9,307,928	4/12/2016	Al-Ali et al.	
	542	9,311,382	4/12/2016	Varoglu et al.	
	543	9,323,894	4/26/2016	Kiani	
	544	9,326,712	5/3/2016	Kiani	
	545	9,333,316	5/10/2016	Kiani	
	546	9,339,220	5/17/2016	Lamego et al.	
	547	9,339,236	5/17/2016	Frix et al.	
	548	9,341,565	5/17/2016	Lamego et al.	
	549	9,351,673	5/31/2016	Diab et al.	
	550	9,351,675	5/31/2016	Al-Ali et al.	
	551	9,357,665	5/31/2016	Myers et al.	

Examiner Signature	/MARJAN FARDANESH/	Date Considered	03/19/2020

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT	Application No.	16/791955
	Filing Date	February 14, 2020
	First Named Inventor	Ammar Al-Ali
	Art Unit	2875
(Multiple sheets used when necessary)	Examiner	Unassigned
SHEET 20 OF 50	Attorney Docket No.	MAS.1007C4

U.S. PATENT DOCUMENTS					
Examiner Initials	Cite No.	Document Number *Number - Kind Code (if known)* Example: 1,234,567 B1	Publication Date MM-DD-YYYY	Name	Pages, Columns, Lines Where Relevant Passages or Relevant Figures Appear
	552	9,364,181	6/14/2016	Kiani et al.	
	553	9,368,671	6/14/2016	Wojtczuk et al.	
	554	9,370,325	6/21/2016	Al-Ali et al.	
	555	9,370,326	6/21/2016	McHale et al.	
	556	9,370,335	6/21/2016	Al-ali et al.	
	557	9,375,185	6/28/2016	Ali et al.	
	558	9,386,953	7/12/2016	Al-Ali	
	559	9,386,961	7/12/2016	Al-Ali et al.	
	560	9,392,945	7/19/2016	Al-Ali et al.	
	561	9,397,448	7/19/2016	Al-Ali et al.	
	562	9,408,542	8/9/2016	Kinast et al.	
	563	9,436,645	9/6/2016	Al-Ali et al.	
	564	9,445,759	9/20/2016	Lamego et al.	
	565	9,466,919	10/11/2016	Kiani et al.	
	566	9,474,474	10/25/2016	Lamego et al.	
	567	9,480,422	11/1/2016	Al-Ali	
	568	9,480,435	11/1/2016	Olsen	
	569	9,489,081	11/8/2016	Anzures et al.	
	570	9,492,110	11/15/2016	Al-Ali et al.	
	571	9,497,534	11/15/2016	Prest et al.	
	572	9,510,779	12/6/2016	Poeze et al.	
	573	9,517,024	12/13/2016	Kiani et al.	
	574	9,526,430	12/27/2016	Srinivas et al.	
	575	9,532,722	1/3/2017	Lamego et al.	
	576	9,538,949	1/10/2017	Al-Ali et al.	
	577	9,538,980	1/10/2017	Telfort et al.	
	578	9,549,696	1/24/2017	Lamego et al.	
	579	9,553,625	1/24/2017	Hatanaka et al.	
	580	9,554,737	1/31/2017	Schurman et al.	

Examiner Signature /MARJAN FARDANESH/	Date Considered 03/19/2020

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT	Application No.	16/791955
	Filing Date	February 14, 2020
	First Named Inventor	Ammar Al-Ali
	Art Unit	2875
(Multiple sheets used when necessary)	Examiner	Unassigned
SHEET 21 OF 50	Attorney Docket No.	MAS.1007C4

U.S. PATENT DOCUMENTS					
Examiner Initials	Cite No.	Document Number *Number - Kind Code (if known)* Example: 1,234,567 B1	Publication Date MM-DD-YYYY	Name	Pages, Columns, Lines Where Relevant Passages or Relevant Figures Appear
	581	9,560,996	2/7/2017	Kiani	
	582	9,560,998	2/7/2017	Al-Ali et al.	
	583	9,566,019	2/14/2017	Al-Ali et al.	
	584	9,579,039	2/28/2017	Jansen et al.	
	585	9,591,975	3/14/2017	Dalvi et al.	
	586	9,593,969	3/14/2017	King	
	587	9,622,692	4/18/2017	Lamego et al.	
	588	9,622,693	4/18/2017	Diab	
	589	9,636,055	5/2/2017	Al-Ali et al.	
	590	9,636,056	5/2/2017	Al-Ali	
	591	9,649,054	5/16/2017	Lamego et al.	
	592	9,651,405	5/16/2017	Gowreesunker et al.	
	593	9,662,052	5/30/2017	Al-Ali et al.	
	594	9,668,676	6/6/2017	Culbert	
	595	9,668,679	6/6/2017	Schurman et al	
	596	9,668,680	6/6/2017	Bruinsma et al.	
	597	9,668,703	6/6/2017	Al-Ali	
	598	9,675,286	6/13/2017	Diab	
	599	9,681,812	6/20/2017	Presura	
	600	9,684,900	6/20/2017	Motoki et al.	
	601	9,687,160	6/27/2017	Kiani	
	602	9,693,719	7/4/2017	Al-Ali et al.	
	603	9,693,737	7/4/2017	Al-Ali	
	604	9,697,928	7/4/2017	Al-Ali et al.	
	605	9,699,546	7/4/2017	Qian et al.	
	606	9,716,937	7/25/2017	Qian et al.	
	607	9,717,425	8/1/2017	Kiani et al.	
	608	9,717,448	8/1/2017	Frix et al.	
	609	9,717,458	8/1/2017	Lamego et al.	

Examiner Signature /MARJAN FARDANESH/	Date Considered 03/19/2020

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	Filing Date	February 14, 2020
	First Named Inventor	Ammar Al-Ali
	Art Unit	2875
(Multiple sheets used when necessary)	Examiner	Unassigned
SHEET 22 OF 50	Attorney Docket No.	MAS.1007C4

U.S. PATENT DOCUMENTS					
Examiner Initials	Cite No.	Document Number *Number - Kind Code (if known)* Example: 1,234,567 B1	Publication Date MM-DD-YYYY	Name	Pages, Columns, Lines Where Relevant Passages or Relevant Figures Appear
	610	9,723,997	8/8/2017	Lamego	
	611	9,724,016	8/8/2017	Al-Ali et al.	
	612	9,724,024	8/8/2017	Al-Ali	
	613	9,724,025	8/8/2017	Kiani et al.	
	614	9,730,640	8/15/2017	Diab et al.	
	615	9,743,887	8/29/2017	Al-Ali et al.	
	616	9,749,232	8/29/2017	Sampath et al.	
	617	9,750,442	9/5/2017	Olsen	
	618	9,750,443	9/5/2017	Smith et al.	
	619	9,750,461	9/5/2017	Telfort	
	620	9,752,925	9/5/2017	Chu et al.	
	621	9,775,545	10/3/2017	Al-Ali et al.	
	622	9,775,546	10/3/2017	Diab et al.	
	623	9,775,570	10/3/2017	Al-Ali	
	624	9,778,079	10/3/2017	Al-Ali et al.	
	625	9,781,984	10/10/2017	Baranski et al.	
	626	9,782,077	10/10/2017	Lamego et al.	
	627	9,782,110	10/10/2017	Kiani	
	628	9,787,568	10/10/2017	Lamego et al.	
	629	9,788,735	10/17/2017	Al-Ali	
	630	9,788,768	10/17/2017	Al-Ali et al.	
	631	9,795,300	10/24/2017	Al-Ali	
	632	9,795,310	10/24/2017	Al-Ali	
	633	9,795,358	10/24/2017	Telfort et al.	
	634	9,795,739	10/24/2017	Al-Ali et al.	
	635	9,801,556	10/31/2017	Kiani	
	636	9,801,588	10/31/2017	Weber et al.	
	637	9,808,188	11/7/2017	Perea et al.	
	638	9,814,418	11/14/2017	Weber et al.	

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	First Named Inventor	Ammar Al-Ali
	Art Unit	2875
(Multiple sheets used when necessary)	Examiner	Unassigned
SHEET 23 OF 50	Attorney Docket No.	MAS.1007C4

U.S. PATENT DOCUMENTS					
Examiner Initials	Cite No.	Document Number *Number - Kind Code (if known)* Example: 1,234,567 B1	Publication Date MM-DD-YYYY	Name	Pages, Columns, Lines Where Relevant Passages or Relevant Figures Appear
	639	9,820,691	11/21/2017	Kiani	
	640	9,833,152	12/5/2017	Kiani et al.	
	641	9,833,180	12/5/2017	Shakespeare et al.	
	642	9,838,775	12/5/2017	Qian et al.	
	643	9,839,379	12/12/2017	Al-Ali et al.	
	644	9,839,381	12/12/2017	Weber et al.	
	645	9,847,002	12/19/2017	Kiani et al.	
	646	9,847,749	12/19/2017	Kiani et al.	
	647	9,848,800	12/26/2017	Lee et al.	
	648	9,848,806	12/26/2017	Al-Ali et al.	
	649	9,848,807	12/26/2017	Lamego	
	650	9,848,823	12/26/2017	Raghuram et al.	
	651	9,861,298	1/9/2018	Eckerbom et al.	
	652	9,861,304	1/9/2018	Al-Ali et al.	
	653	9,861,305	1/9/2018	Weber et al.	
	654	9,866,671	1/9/2018	Thompson et al.	
	655	9,867,575	1/16/2018	Maani et al.	
	656	9,867,578	1/16/2018	Al-Ali et al.	
	657	9,872,623	1/23/2018	Al-Ali	
	658	9,876,320	1/23/2018	Coverston et al.	
	659	9,877,650	1/30/2018	Muhsin et al.	
	660	9,877,686	1/30/2018	Al-Ali et al.	
	661	9,891,079	2/13/2018	Dalvi	
	662	9,891,590	2/13/2018	Shim et al.	
	663	9,895,107	2/20/2018	Al-Ali et al.	
	664	9,898,049	2/20/2018	Myers et al.	
	665	9,913,617	3/13/2018	Al-Ali et al.	
	666	9,918,646	3/20/2018	Singh Alvarado et al.	
	667	9,924,893	3/27/2018	Schurman et al.	

Examiner Signature	/MARJAN FARDANESH/	Date Considered	03/19/2020

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ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /M.F/

PTO/SB/08 Equivalent

INFORMATION DISCLOSURE STATEMENT BY APPLICANT	Application No.	16/791955
	Filing Date	February 14, 2020
	First Named Inventor	Ammar Al-Ali
	Art Unit	2875
(Multiple sheets used when necessary)	Examiner	Unassigned
SHEET 24 OF 50	Attorney Docket No.	MAS.1007C4

U.S. PATENT DOCUMENTS					
Examiner Initials	Cite No.	Document Number *Number - Kind Code (if known)* Example: 1,234,567 B1	Publication Date MM-DD-YYYY	Name	Pages, Columns, Lines Where Relevant Passages or Relevant Figures Appear
	668	9,924,897	3/27/2018	Abdul-Hafiz	
	669	9,936,917	4/10/2018	Poeze et al.	
	670	9,943,269	4/17/2018	Muhsin et al.	
	671	9,949,676	4/24/2018	Al-Ali	
	672	9,952,095	4/24/2018	Hotelling et al.	
	673	9,955,937	5/1/2018	Telfort	
	674	9,965,946	5/8/2018	Al-Ali	
	675	9,980,667	5/29/2018	Kiani et al.	
	676	9,986,919	6/5/2018	Lamego et al.	
	677	9,986,952	6/5/2018	Dalvi et al.	
	678	9,989,560	6/5/2018	Poeze et al.	
	679	9,993,207	6/12/2018	Al-Ali et al.	
	680	10,007,758	6/26/2018	Al-Ali et al.	
	681	10,010,276	7/3/2018	Al-Ali et al.	
	682	10,032,002	7/24/2018	Kiani et al.	
	683	10,039,080	7/31/2018	Miller et al.	
	684	10,039,482	8/7/2018	Al-Ali et al.	
	685	10,039,491	8/7/2018	Thompson et al.	
	686	10,052,037	8/21/2018	Kinast et al.	
	687	10,055,121	8/21/2018	Chaudhri et al.	
	688	10,058,275	8/28/2018	Al-Ali et al.	
	689	10,064,562	9/4/2018	Al-Ali	
	690	10,066,970	9/4/2018	Gowreesunker et al.	
	691	10,076,257	9/18/2018	Lin et al.	
	692	10,078,052	9/18/2018	Ness et al.	
	693	10,086,138	10/2/2018	Novak, Jr.	
	694	10,092,200	10/9/2018	Al-Ali et al.	
	695	10,092,244	10/9/2018	Chuang et al.	
	696	10,092,249	10/9/2018	Kiani et al.	

Examiner Signature	/MARJAN FARDANESH/	Date Considered	03/19/2020

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ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /M.F/

PTO/SB/08 Equivalent

INFORMATION DISCLOSURE STATEMENT BY APPLICANT	Application No.	16/791955
	Filing Date	February 14, 2020
	First Named Inventor	Ammar Al-Ali
	Art Unit	2875
(Multiple sheets used when necessary)	Examiner	Unassigned
SHEET 25 OF 50	Attorney Docket No.	MAS.1007C4

U.S. PATENT DOCUMENTS					
Examiner Initials	Cite No.	Document Number *Number - Kind Code (if known)* Example: 1,234,567 B1	Publication Date MM-DD-YYYY	Name	Pages, Columns, Lines Where Relevant Passages or Relevant Figures Appear
	697	10,098,550	10/16/2018	Al-Ali et al.	
	698	10,098,591	10/16/2018	Al-Ali et al.	
	699	10,098,610	10/16/2018	Al-Ali et al.	
	700	10,117,587	11/6/2018	Han	
	701	10,123,726	11/13/2018	Al-Ali et al.	
	702	10,130,289	11/20/2018	Al-Ali et al.	
	703	10,130,291	11/20/2018	Schurman et al.	
	704	10,149,616	12/11/2018	Al-Ali et al.	
	705	10,154,815	12/18/2018	Al-Ali et al.	
	706	10,159,412	12/25/2018	Lamego et al.	
	707	10,165,954	1/1/2019	Lee	
	708	10,188,296	1/29/2019	Al-Ali et al.	
	709	10,188,331	1/29/2019	Al-Ali et al.	
	710	10,188,348	1/29/2019	Kiani et al.	
	711	10,194,847	2/5/2019	Al-Ali	
	712	10,194,848	2/5/2019	Kiani et al.	
	713	10,201,286	2/12/2019	Waydo	
	714	10,201,298	2/12/2019	Al-Ali et al.	
	715	10,205,272	2/12/2019	Kiani et al.	
	716	10,205,291	2/12/2019	Scruggs et al.	
	717	10,213,108	2/26/2019	Al-Ali	
	718	10,215,698	2/26/2019	Han et al.	
	719	10,219,706	3/5/2019	Al-Ali	
	720	10,219,746	3/5/2019	McHale et al.	
	721	10,219,754	3/5/2019	Lamego	
	722	10,226,187	3/12/2019	Al-Ali et al	
	723	10,226,576	3/12/2019	Kiani	
	724	10,231,657	3/19/2019	Al-Ali et al	
	725	10,231,670	3/19/2019	Blank et al.	

Examiner Signature	/MARJAN FARDANESH/	Date Considered	03/19/2020

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PTO/SB/08 Equivalent

INFORMATION DISCLOSURE STATEMENT BY APPLICANT	Application No.	16/791955
	Filing Date	February 14, 2020
	First Named Inventor	Ammar Al-Ali
	Art Unit	2875
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SHEET 26 OF 50	Attorney Docket No.	MAS.1007C4

U.S. PATENT DOCUMENTS					
Examiner Initials	Cite No.	Document Number *Number - Kind Code (if known)* Example: 1,234,567 B1	Publication Date MM-DD-YYYY	Name	Pages, Columns, Lines Where Relevant Passages or Relevant Figures Appear
	726	10,231,676	3/19/2019	Al-Ali et al	
	727	10,247,670	4/2/2019	Ness et al.	
	728	10,251,585	4/9/2019	Al-Ali et al.	
	729	10,251,586	4/9/2019	Lamego	
	730	10,255,994	4/9/2019	Sampath et al.	
	731	10,258,265	4/16/2019	Poeze et al.	
	732	10,258,266	4/16/2019	Poeze et al.	
	733	10,265,024	4/23/2019	Lee et al.	
	734	10,271,748	4/30/2019	Al-Ali	
	735	10,278,626	5/7/2019	Schurman et al.	
	736	10,278,648	5/7/2019	Al-Ali et al.	
	737	10,279,247	5/7/2019	Kiani	
	738	10,285,626	5/14/2019	Kestelli et al.	
	739	10,292,628	5/21/2019	Poeze et al.	
	740	10,292,657	5/21/2019	Abdul-Hafiz et al.	
	741	10,292,664	5/21/2019	Al-Ali	
	742	10,299,708	5/28/2019	Poeze et al.	
	743	10,299,709	5/28/2019	Perea et al.	
	744	10,305,775	5/28/2019	Lamego et al.	
	745	10,307,111	6/4/2019	Muhsin et al.	
	746	10,325,681	6/18/2019	Sampath et al.	
	747	10,327,337	6/18/2019	Triman et al.	
	748	10,390,716	8/27/2019	Shimuta	
	749	10,398,383	9/3/2019	van Dinther et al.	
	750	10,406,445	9/10/2019	Vock et al.	
	751	10,416,079	9/17/2019	Magnussen et al.	
	752	2002/0042558	4/11/2002	Mendelson	
	753	2003/0036690	2/20/2003	Geddes et al.	
	754	2004/0054290	3/18/2004	Chance	

Examiner Signature	/MARJAN FARDANESH/	Date Considered	03/19/2020

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT	Application No.	16/791955
	Filing Date	February 14, 2020
	First Named Inventor	Ammar Al-Ali
	Art Unit	2875
(Multiple sheets used when necessary)	Examiner	Unassigned
SHEET 27 OF 50	Attorney Docket No.	MAS.1007C4

U.S. PATENT DOCUMENTS					
Examiner Initials	Cite No.	Document Number *Number - Kind Code (if known)* Example: 1,234,567 B1	Publication Date MM-DD-YYYY	Name	Pages, Columns, Lines Where Relevant Passages or Relevant Figures Appear
	755	2005/0277819	12/15/2005	Kiani et al.	
	756	2006/0009607	1/12/2006	Lutz et al.	
	757	2006/0161054	7/20/2006	Reuss et al.	
	758	2006/0182659	8/17/2006	Unlu et al.	
	759	2007/0282478	12/6/2007	Al-Ali et al.	
	760	2008/0030468	2/7/2008	Al-Ali et al.	
	761	2009/0177097	7/9/2009	Ma et al.	
	762	2009/0247984	10/1/2009	Lamego et al.	
	763	2009/0275813	11/5/2009	Davis	
	764	2009/0275844	11/5/2009	Al-Ali	
	765	2010/0004518	1/7/2010	Vo et al.	
	766	2010/0030040	2/4/2010	Poeze et al.	
	767	2010/0030043	2/4/2010	Kuhn	
	768	2010/0113948	5/6/2010	Yang et al.	
	769	2011/0004106	1/6/2011	Iwamiya et al.	
	770	2011/0082711	4/7/2011	Poeze et al.	
	771	2011/0085721	4/14/2011	Guyon et al.	
	772	2011/0105854	5/5/2011	Kiani et al.	
	773	2011/0125060	5/26/2011	Telfort et al.	
	774	2011/0208015	8/25/2011	Welch et al.	
	775	2011/0213212	9/1/2011	Al-Ali	
	776	2011/0230733	9/22/2011	Al-Ali	
	777	2011/0237969	9/29/2011	Eckerbom et al.	
	778	2011/0245697	10/6/2011	Miettinen	
	779	2011/0288383	11/24/2011	Diab	
	780	2011/0301444	12/8/2011	Al-Ali	
	781	2012/0041316	2/16/2012	Al-Ali et al.	
	782	2012/0046557	2/23/2012	Kiani	
	783	2012/0059267	3/8/2012	Lamego et al.	

Examiner Signature	/MARJAN FARDANESH/	Date Considered	03/19/2020

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT	Application No.	16/791955
	Filing Date	February 14, 2020
	First Named Inventor	Ammar Al-Ali
	Art Unit	2875
(Multiple sheets used when necessary)	Examiner	Unassigned
SHEET 28 OF 50	Attorney Docket No.	MAS.1007C4

U.S. PATENT DOCUMENTS					
Examiner Initials	Cite No.	Document Number *Number - Kind Code (if known)* Example: 1,234,567 B1	Publication Date MM-DD-YYYY	Name	Pages, Columns, Lines Where Relevant Passages or Relevant Figures Appear
	784	2012/0088984	4/12/2012	Al-Ali et al.	
	785	2012/0150052	6/14/2012	Buchheim et al.	
	786	2012/0165629	6/28/2012	Merritt et al.	
	787	2012/0179006	7/12/2012	Jansen et al.	
	788	2012/0197093	8/2/2012	LeBoeuf et al.	
	789	2012/0197137	8/2/2012	Jeanne et al.	
	790	2012/0209082	8/16/2012	Al-Ali	
	791	2012/0209084	8/16/2012	Olsen et al.	
	792	2012/0283524	11/8/2012	Kiani et al.	
	793	2012/0296178	11/22/2012	Lamego et al.	
	794	2012/0319816	12/20/2012	Al-Ali	
	795	2012/0330112	12/27/2012	Lamego et al.	
	796	2013/0006076	1/3/2013	McHale	
	797	2013/0018233	1/17/2013	Cinbis et al.	
	798	2013/0023775	1/24/2013	Lamego et al.	
	799	2013/0041591	2/14/2013	Lamego	
	800	2013/0046204	2/21/2013	Lamego et al.	
	801	2013/0060147	3/7/2013	Welch et al.	
	802	2013/0085346	4/4/2013	Lin et al.	
	803	2013/0096405	4/18/2013	Garfio	
	804	2013/0096936	4/18/2013	Sampath et al.	
	805	2013/0131474	5/23/2013	Gu et al.	
	806	2013/0190581	7/25/2013	Al-Ali et al.	
	807	2013/0204112	8/8/2013	White et al.	
	808	2013/0211214	8/15/2013	Olsen	
	809	2013/0243021	9/19/2013	Siskavich	
	810	2013/0253334	9/26/2013	Al-Ali et al.	
	811	2013/0262730	10/3/2013	Al-Ali et al.	
	812	2013/0267804	10/10/2013	Al-Ali	

Examiner Signature /MARJAN FARDANESH/	Date Considered 03/19/2020

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT	Application No.	16/791955
	Filing Date	February 14, 2020
	First Named Inventor	Ammar Al-Ali
	Art Unit	2875
(Multiple sheets used when necessary)	Examiner	Unassigned
SHEET 29 OF 50	Attorney Docket No.	MAS.1007C4

U.S. PATENT DOCUMENTS					
Examiner Initials	Cite No.	Document Number *Number - Kind Code (if known)* Example: 1,234,567 B1	Publication Date MM-DD-YYYY	Name	Pages, Columns, Lines Where Relevant Passages or Relevant Figures Appear
	813	2013/0274572	10/17/2013	Al-Ali et al.	
	814	2013/0296672	11/7/2013	O'Neil et al.	
	815	2013/0296713	11/7/2013	Al-Ali et al.	
	816	2013/0317370	11/28/2013	Dalvi et al.	
	817	2013/0324808	12/5/2013	Al-Ali et al.	
	818	2013/0331660	12/12/2013	Al-Ali et al.	
	819	2013/0331670	12/12/2013	Kiani	
	820	2014/0012100	1/9/2014	Al-Ali et al.	
	821	2014/0034353	2/6/2014	Al-Ali et al.	
	822	2014/0051953	2/20/2014	Lamego et al.	
	823	2014/0051955	2/20/2014	Tiao et al.	
	824	2014/0066783	3/6/2014	Kiani et al.	
	825	2014/0073887	3/13/2014	Petersen et al.	
	826	2014/0073960	3/13/2014	Rodriguez-Llorente et al.	
	827	2014/0077956	3/20/2014	Sampath et al.	
	828	2014/0081100	3/20/2014	Muhsin et al.	
	829	2014/0081175	3/20/2014	Telfort	
	830	2014/0094667	4/3/2014	Schurman et al.	
	831	2014/0100434	4/10/2014	Diab et al.	
	832	2014/0107493	4/17/2014	Yuen et al.	
	833	2014/0114199	4/24/2014	Lamego et al.	
	834	2014/0120564	5/1/2014	Workman et al.	
	835	2014/0121482	5/1/2014	Merritt et al.	
	836	2014/0121483	5/1/2014	Kiani	
	837	2014/0127137	5/8/2014	Bellott et al.	
	838	2014/0129702	5/8/2014	Lamego et al.	
	839	2014/0135588	5/15/2014	Al-Ali et al.	
	840	2014/0142401	5/22/2014	Al-Ali et al.	
	841	2014/0163344	6/12/2014	Al-Ali	

Examiner Signature /MARJAN FARDANESH/	Date Considered 03/19/2020

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT	Application No.	16/791955
	Filing Date	February 14, 2020
	First Named Inventor	Ammar Al-Ali
	Art Unit	2875
(Multiple sheets used when necessary)	Examiner	Unassigned
SHEET 30 OF 50	Attorney Docket No.	MAS.1007C4

U.S. PATENT DOCUMENTS					
Examiner Initials	Cite No.	Document Number *Number - Kind Code (if known)* Example: 1,234,567 B1	Publication Date MM-DD-YYYY	Name	Pages, Columns, Lines Where Relevant Passages or Relevant Figures Appear
	842	2014/0163402	6/12/2014	Lamego et al.	
	843	2014/0166076	6/19/2014	Kiani et al.	
	844	2014/0171146	6/19/2014	Ma et al.	
	845	2014/0171763	6/19/2014	Diab	
	846	2014/0180038	6/26/2014	Kiani	
	847	2014/0180154	6/26/2014	Sierra et al.	
	848	2014/0180160	6/26/2014	Brown et al.	
	849	2014/0187973	7/3/2014	Brown et al.	
	850	2014/0192177	7/10/2014	Bartula et al.	
	851	2014/0194766	7/10/2014	Al-Ali et al.	
	852	2014/0206954	7/24/2014	Yuen et al.	
	853	2014/0206963	7/24/2014	Al-Ali	
	854	2014/0213864	7/31/2014	Abdul-Hafiz et al.	
	855	2014/0221854	8/7/2014	Wai	
	856	2014/0266790	9/18/2014	Al-Ali et al.	
	857	2014/0275808	9/18/2014	Poeze et al.	
	858	2014/0275835	9/18/2014	Lamego et al.	
	859	2014/0275871	9/18/2014	Lamego et al.	
	860	2014/0275872	9/18/2014	Merritt et al.	
	861	2014/0275881	9/18/2014	Lamego et al.	
	862	2014/0276013	9/18/2014	Muehlemann et al.	
	863	2014/0276115	9/18/2014	Dalvi et al.	
	864	2014/0276116	9/18/2014	Takahashi et al.	
	865	2014/0288400	9/25/2014	Diab et al.	
	866	2014/0303520	10/9/2014	Telfort et al.	
	867	2014/0316217	10/23/2014	Purdon et al.	
	868	2014/0316218	10/23/2014	Purdon et al.	
	869	2014/0316228	10/23/2014	Blank et al.	
	870	2014/0323825	10/30/2014	Al-Ali et al.	

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	Filing Date	February 14, 2020
	First Named Inventor	Ammar Al-Ali
	Art Unit	2875
(Multiple sheets used when necessary)	Examiner	Unassigned
SHEET 31 OF 50	Attorney Docket No.	MAS.1007C4

U.S. PATENT DOCUMENTS					
Examiner Initials	Cite No.	Document Number *Number - Kind Code (if known)* Example: 1,234,567 B1	Publication Date MM-DD-YYYY	Name	Pages, Columns, Lines Where Relevant Passages or Relevant Figures Appear
	871	2014/0323897	10/30/2014	Brown et al.	
	872	2014/0323898	10/30/2014	Purdon et al.	
	873	2014/0330092	11/6/2014	Al-Ali et al.	
	874	2014/0330098	11/6/2014	Merritt et al.	
	875	2014/0330099	11/6/2014	Al-Ali et al.	
	876	2014/0336481	11/13/2014	Shakespeare et al.	
	877	2014/0357966	12/4/2014	Al-Ali et al.	
	878	2014/0361147	12/11/2014	Fei	
	879	2014/0371548	12/28/2014	Al-Ali et al.	
	880	2014/0371632	12/18/2014	Al-Ali et al.	
	881	2014/0378784	12/25/2014	Kiani et al.	
	882	2014/0378844	12/25/2014	Fei	
	883	2015/0005600	1/1/2015	Blank et al.	
	884	2015/0011907	1/8/2015	Purdon et al.	
	885	2015/0012231	1/8/2015	Poeze et al.	
	886	2015/0018650	1/15/2015	Al-Ali et al.	
	887	2015/0025406	1/22/2015	Al-Ali	
	888	2015/0032029	1/29/2015	Al-Ali et al.	
	889	2015/0038859	2/5/2015	Dalvi et al.	
	890	2015/0045637	2/12/2015	Dalvi	
	891	2015/0045685	2/12/2015	Al-Ali et al.	
	892	2015/0051462	2/19/2015	Olsen	
	893	2015/0065889	3/5/2015	Gandelman et al.	
	894	2015/0080754	3/19/2015	Purdon et al.	
	895	2015/0087936	3/26/2015	Al-Ali et al.	
	896	2015/0094546	4/2/2015	Al-Ali	
	897	2015/0097701	4/9/2015	Al-Ali et al.	
	898	2015/0099324	4/9/2015	Wojtczuk et al.	
	899	2015/0099950	4/9/2015	Al-Ali et al.	

Examiner Signature /MARJAN FARDANESH/	Date Considered 03/19/2020

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT	Application No.	16/791955
	Filing Date	February 14, 2020
	First Named Inventor	Ammar Al-Ali
	Art Unit	2875
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U.S. PATENT DOCUMENTS					
Examiner Initials	Cite No.	Document Number *Number - Kind Code (if known)* Example: 1,234,567 B1	Publication Date MM-DD-YYYY	Name	Pages, Columns, Lines Where Relevant Passages or Relevant Figures Appear
	900	2015/0099951	4/9/2015	Al-Ali et al.	
	901	2015/0099955	4/9/2015	Al-Ali et al.	
	902	2015/0101844	4/16/2015	Al-Ali et al.	
	903	2015/0106121	4/16/2015	Muhsin et al.	
	904	2015/0112151	4/23/2015	Muhsin et al.	
	905	2015/0116076	4/30/2015	Al-Ali et al.	
	906	2015/0119725	4/30/2015	Martin et al.	
	907	2015/0126830	5/7/2015	Schurman et al.	
	908	2015/0133755	5/14/2015	Smith et al.	
	909	2015/0140863	5/21/2015	Al-Ali et al.	
	910	2015/0141781	5/21/2015	Weber et al.	
	911	2015/0165312	6/18/2015	Kiani	
	912	2015/0173671	6/25/2015	Paalasmaa et al.	
	913	2015/0196237	7/16/2015	Lamego	
	914	2015/0201874	7/23/2015	Diab	
	915	2015/0208966	7/30/2015	Al-Ali	
	916	2015/0216459	8/6/2015	Al-Ali et al.	
	917	2015/0230755	8/20/2015	Al-Ali et al.	
	918	2015/0238722	8/27/2015	Al-Ali	
	919	2015/0245773	9/3/2015	Lamego et al.	
	920	2015/0245793	9/2/2015	Al-Ali et al.	
	921	2015/0245794	9/3/2015	Al-Ali	
	922	2015/0255001	9/10/2015	Haughav et al.	
	923	2015/0257689	9/17/2015	Al-Ali et al.	
	924	2015/0272514	10/1/2015	Kiani et al.	
	925	2015/0281424	10/1/2015	Vock et al.	
	926	2015/0318100	11/5/2015	Rothkopf et al.	
	927	2015/0351697	12/10/2015	Weber et al.	
	928	2015/0351704	12/20/2015	Kiani et al.	

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT	Application No.	16/791955
	Filing Date	February 14, 2020
	First Named Inventor	Ammar Al-Ali
	Art Unit	2875
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U.S. PATENT DOCUMENTS					
Examiner Initials	Cite No.	Document Number *Number - Kind Code (if known)* Example: 1,234,567 B1	Publication Date MM-DD-YYYY	Name	Pages, Columns, Lines Where Relevant Passages or Relevant Figures Appear
	929	2015/0359429	12/17/2015	Al-Ali et al.	
	930	2015/0366472	12/24/2015	Kiani	
	931	2015/0366507	12/24/2015	Blank	
	932	2015/0374298	12/31/2015	Al-Ali et al.	
	933	2015/0380875	12/31/2015	Coverston et al.	
	934	2016/0000362	1/7/2016	Diab et al.	
	935	2016/0007930	1/14/2016	Weber et al.	
	936	2016/0019360	1/21/2016	PAHWA et al.	
	937	2016/0022160	1/28/2016	Pi et al.	
	938	2016/0023245	1/28/2016	Zadesky et al.	
	939	2016/0029932	2/4/2016	Al-Ali	
	940	2016/0029933	2/4/2016	Al-Ali et al.	
	941	2016/0038045	2/11/2016	Shapiro	
	942	2016/0041531	2/11/2016	Mackie et al.	
	943	2016/0045118	2/18/2016	Kiani	
	944	2016/0051157	2/25/2016	Waydo	
	945	2016/0051158	2/25/2016	Silva	
	946	2016/0051205	2/25/2016	Al-Ali et al.	
	947	2016/0058302	3/3/2016	Raghuram et al.	
	948	2016/0058309	3/3/2016	Han	
	949	2016/0058310	3/3/2016	Lijima	
	950	2016/0058312	3/3/2016	Han et al.	
	951	2016/0058338	3/3/2016	Schurman et al.	
	952	2016/0058347	3/3/2016	Reichgott et al.	
	953	2016/0058356	3/3/2016	RAGHURAM et al.	
	954	2016/0058370	3/3/2016	RAGHURAM et al.	
	955	2016/0066823	3/10/2016	Kind et al.	
	956	2016/0066824	3/10/2016	Al-Ali et al.	
	957	2016/0066879	3/10/2016	Telfort et al.	

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT	Application No.	16/791955
	Filing Date	February 14, 2020
	First Named Inventor	Ammar Al-Ali
	Art Unit	2875
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Examiner Initials	Cite No.	Document Number *Number - Kind Code (if known)* Example: 1,234,567 B1	Publication Date MM-DD-YYYY	Name	Pages, Columns, Lines Where Relevant Passages or Relevant Figures Appear
	958	2016/0071392	3/10/2016	Hankey et al.	
	959	2016/0072429	3/10/2016	Kiani et al.	
	960	2016/0073967	3/17/2016	Lamego et al.	
	961	2016/0081552	3/24/2016	Wojtczuk et al.	
	962	2016/0095543	4/7/2016	Telfort et al.	
	963	2016/0095548	4/7/2016	Al-Ali et al.	
	964	2016/0103598	4/14/2016	Al-Ali et al.	
	965	2016/0106367	4/21/2016	Jorov et al.	
	966	2016/0113527	4/28/2016	Al-Ali et al.	
	967	2016/0143548	5/26/2016	Al-Ali	
	968	2016/0154950	6/2/2016	NAKAJIMA et al.	
	969	2016/0157780	6/9/2016	RIMMINEN et al.	
	970	2016/0166182	6/16/2016	Al-Ali et al.	
	971	2016/0166183	6/16/2016	Poeze et al.	
	972	2016/0196388	7/7/2016	Lamego	
	973	2016/0197436	7/7/2016	Barker et al.	
	974	2016/0213281	7/28/2016	Eckerbom, et al.	
	975	2016/0213309	7/28/2016	SANNHOLM et al.	
	976	2016/0228043	8/11/2016	O'Neil et al.	
	977	2016/0233632	8/11/2016	Scruggs et al.	
	978	2016/0234944	8/11/2016	Schmidt et al.	
	979	2016/0256058	9/8/2016	Pham et al.	
	980	2016/0256082	9/8/2016	Ely et al.	
	981	2016/0267238	9/15/2016	Nag	
	982	2016/0270735	9/22/2016	Diab et al.	
	983	2016/0283665	9/29/2016	Sampath et al.	
	984	2016/0287090	10/6/2016	Al-Ali et al.	
	985	2016/0287107	10/6/2016	Szabados et al.	
	986	2016/0287181	10/6/2016	Han et al.	

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT	Application No.	16/791955
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	First Named Inventor	Ammar Al-Ali
	Art Unit	2875
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Examiner Initials	Cite No.	Document Number *Number - Kind Code (if known)* Example: 1,234,567 B1	Publication Date MM-DD-YYYY	Name	Pages, Columns, Lines Where Relevant Passages or Relevant Figures Appear
	987	2016/0287786	10/6/2016	Kiani	
	988	2016/0296169	10/13/2016	McHale et al.	
	989	2016/0296173	10/13/2016	Culbert	
	990	2016/0296174	10/13/2016	Isikman et al.	
	991	2016/0310027	10/27/2016	Han	
	992	2016/0310052	10/27/2016	Al-Ali et al.	
	993	2016/0314260	10/27/2016	Kiani	
	994	2016/0324488	11/10/2016	Olsen	
	995	2016/0327984	11/10/2016	Al-Ali et al.	
	996	2016/0331332	11/17/2016	Al-Ali	
	997	2016/0367173	12/22/2016	Dalvi et al.	
	998	2016/0378069	12/29/2016	Rothkopf	
	999	2016/0378071	12/29/2016	Rothkopf	
	1000	2017/0000394	1/5/2017	Al-Ali et al.	
	1001	2017/0007134	1/12/2017	Al-Ali et al.	
	1002	2017/0007183	1/12/2017	Dusan et al.	
	1003	2017/0007198	1/12/2017	Al-Ali et al.	
	1004	2017/0010858	1/12/2017	Prest et al.	
	1005	2017/0014083	1/19/2017	Diab et al.	
	1006	2017/0014084	1/19/2017	Al-Ali et al.	
	1007	2017/0024748	1/26/2017	Haider	
	1008	2017/0042488	2/16/2017	Muhsin	
	1009	2017/0055851	3/2/2017	Al-Ali	
	1010	2017/0055882	3/2/2017	Al-Ali et al.	
	1011	2017/0055887	3/2/2017	Al-Ali	
	1012	2017/0055896	3/2/2017	Al-Ali et al.	
	1013	2017/0074897	3/16/2017	Mermel et al.	
	1014	2017/0079594	3/23/2017	Telfort et al.	
	1015	2017/0084133	3/23/2017	Cardinali et al.	

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	Filing Date	February 14, 2020
	First Named Inventor	Ammar Al-Ali
	Art Unit	2875
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U.S. PATENT DOCUMENTS					
Examiner Initials	Cite No.	Document Number *Number - Kind Code (if known)* Example: 1,234,567 B1	Publication Date MM-DD-YYYY	Name	Pages, Columns, Lines Where Relevant Passages or Relevant Figures Appear
	1016	2017/0086689	3/30/2017	Shui et al.	
	1017	2017/0086723	3/30/2017	Al-Ali et al.	
	1018	2017/0086742	3/30/2017	Harrison-Noonan et al.	
	1019	2017/0086743	3/30/2017	Bushnell et al.	
	1020	2017/0094450	3/30/2017	Tu et al.	
	1021	2017/0143281	5/25/2017	Olsen	
	1022	2017/0147774	5/25/2017	Kiani	
	1023	2017/0156620	6/8/2017	Al-Ali et al.	
	1024	2017/0164884	6/15/2017	Culbert et al.	
	1025	2017/0172435	6/22/2017	Presura	
	1026	2017/0172476	6/22/2017	Schilthuizen	
	1027	2017/0173632	6/22/2017	Al-Ali	
	1028	2017/0187146	6/29/2017	Kiani et al.	
	1029	2017/0188919	7/6/2017	Al-Ali et al.	
	1030	2017/0196464	7/13/2017	Jansen et al.	
	1031	2017/0196470	7/13/2017	Lamego et al.	
	1032	2017/0202505	7/20/2017	Kirenko et al.	
	1033	2017/0209095	7/27/2017	Wagner et al.	
	1034	2017/0224262	8/10/2017	Al-Ali	
	1035	2017/0228516	8/10/2017	Sampath et al.	
	1036	2017/0245790	8/31/2017	Al-Ali et al.	
	1037	2017/0248446	8/31/2017	Gowreesunker et al.	
	1038	2017/0251974	9/7/2017	Shreim et al.	
	1039	2017/0251975	9/7/2017	Shreim et al.	
	1040	2017/0258403	9/14/2017	Abdul-Hafiz et al.	
	1041	2017/0273619	9/28/2017	Alvarado et al.	
	1042	2017/0281024	10/5/2017	Narasimhan et al.	
	1043	2017/0293727	10/12/2017	Klaassen et al.	
	1044	2017/0311851	11/2/2017	Schurman et al.	

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT	Application No.	16/791955
	Filing Date	February 14, 2020
	First Named Inventor	Ammar Al-Ali
	Art Unit	2875
(Multiple sheets used when necessary)	Examiner	Unassigned
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U.S. PATENT DOCUMENTS					
Examiner Initials	Cite No.	Document Number *Number - Kind Code (if known)* Example: 1,234,567 B1	Publication Date MM-DD-YYYY	Name	Pages, Columns, Lines Where Relevant Passages or Relevant Figures Appear
	1045	2017/0311891	11/2/2017	Kiani et al.	
	1046	2017/0325698	11/16/2017	Allec et al.	
	1047	2017/0325728	11/16/2017	Al-Ali et al.	
	1048	2017/0325744	11/16/2017	Allec et al.	
	1049	2017/0332976	11/23/2017	Al-Ali et al.	
	1050	2017/0340209	11/30/2017	Klaassen et al.	
	1051	2017/0340219	11/30/2017	Sullivan et al.	
	1052	2017/0340293	11/30/2017	Al-Ali et al.	
	1053	2017/0347885	12/7/2017	Tan et al.	
	1054	2017/0354332	12/14/2017	Lamego	
	1055	2017/0354795	12/14/2017	BLAHNIK et al.	
	1056	2017/0358239	12/14/2017	Arney et al.	
	1057	2017/0358240	12/14/2017	Blahnik et al.	
	1058	2017/0358242	12/14/2017	Thompson et al.	
	1059	2017/0360306	12/14/2017	Narasimhan et al.	
	1060	2017/0360310	12/21/2017	Kiani et al.	
	1061	2017/0366657	12/21/2017	Thompson et al.	
	1062	2017/0367632	12/28/2017	Al-Ali et al.	
	1063	2018/0008146	1/11/2018	Al-Ali et al.	
	1064	2018/0013562	1/11/2018	Haider et al.	
	1065	2018/0014752	1/18/2018	Al-Ali et al.	
	1066	2018/0014781	1/18/2018	Clavelle et al.	
	1067	2018/0025287	1/25/2018	Mathew et al.	
	1068	2018/0028124	2/1/2018	Al-Ali et al.	
	1069	2018/0042556	2/15/2018	SHAHPARNIA et al.	
	1070	2018/0049694	2/22/2018	Singh Alvarado et al.	
	1071	2018/0050235	2/22/2018	Tan et al.	
	1072	2018/0055375	3/1/2018	MARTINEZ et al.	
	1073	2018/0055385	3/1/2018	Al-Ali	

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	Filing Date	February 14, 2020
	First Named Inventor	Ammar Al-Ali
	Art Unit	2875
(Multiple sheets used when necessary)	Examiner	Unassigned
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U.S. PATENT DOCUMENTS					
Examiner Initials	Cite No.	Document Number *Number - Kind Code (if known)* Example: 1,234,567 B1	Publication Date MM-DD-YYYY	Name	Pages, Columns, Lines Where Relevant Passages or Relevant Figures Appear
	1074	2018/0055390	3/1/2018	Kiani et al.	
	1075	2018/0055430	3/1/2018	Diab et al.	
	1076	2018/0055439	3/1/2018	Pham et al.	
	1077	2018/0056129	1/1/2018	NARASIMHA RAO et al.	
	1078	2018/0064381	3/8/2018	Shakespeare et al.	
	1079	2018/0069776	3/8/2018	Lamego et al.	
	1080	2018/0070867	3/15/2018	Smith et al.	
	1081	2018/0078151	3/22/2018	ALLEC et al.	
	1082	2018/0078182	3/22/2018	CHEN et al.	
	1083	2018/0082767	3/22/2018	Al-Ali et al.	
	1084	2018/0085068	3/29/2018	Telfort	
	1085	2018/0087937	3/29/2018	Al-Ali et al.	
	1086	2018/0103874	4/19/2018	Lee et al.	
	1087	2018/0103905	4/19/2018	Kiani	
	1088	2018/0110469	4/26/2018	MAANI et al.	
	1089	2018/0110478	4/26/2018	Al-Ali	
	1090	2018/0116575	5/3/2018	Perea et al.	
	1091	2018/0125368	5/10/2018	Lamego et al.	
	1092	2018/0125430	5/10/2018	Al-Ali et al.	
	1093	2018/0125445	5/10/2018	Telfort et al.	
	1094	2018/0130325	5/10/2018	Kiani et al.	
	1095	2018/0132769	5/17/2018	Weber et al.	
	1096	2018/0132770	5/17/2018	Lamego	
	1097	2018/0146901	5/31/2018	Al-Ali et al.	
	1098	2018/0146902	5/31/2018	Kiani et al.	
	1099	2018/0153418	6/7/2018	SULLIVAN et al.	
	1100	2018/0153442	6/7/2018	Eckerbom, et al.	
	1101	2018/0153446	6/7/2018	Kiani	
	1102	2018/0153447	6/7/2018	Al-Ali et al.	

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	First Named Inventor	Ammar Al-Ali
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U.S. PATENT DOCUMENTS					
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	1103	2018/0153448	6/7/2018	Weber et al.	
	1104	2018/0161499	6/14/2018	Al-Ali et al.	
	1105	2018/0164853	6/14/2018	Myers et al.	
	1106	2018/0168491	6/21/2018	Al-Ali et al.	
	1107	2018/0174679	6/21/2018	Sampath et al.	
	1108	2018/0174680	6/21/2018	Sampath et al.	
	1109	2018/0182484	6/28/2018	Sampath et al.	
	1110	2018/0184917	7/5/2018	Kiani	
	1111	2018/0192924	7/12/2018	Al-Ali	
	1112	2018/0192953	7/12/2018	Shreim et al.	
	1113	2018/0192955	7/12/2018	Al-Ali et al.	
	1114	2018/0196514	7/12/2018	ALLEC et al.	
	1115	2018/0199871	7/19/2018	Pauley et al.	
	1116	2018/0206795	7/26/2018	Al-Ali	
	1117	2018/0206815	7/26/2018	Telfort	
	1118	2018/0213583	7/26/2018	Al-Ali	
	1119	2018/0214031	8/2/2018	Kiani et al.	
	1120	2018/0214090	8/2/2018	Al-Ali et al.	
	1121	2018/0218792	8/2/2018	Muhsin et al.	
	1122	2018/0225960	8/9/2018	Al-Ali et al.	
	1123	2018/0228414	8/16/2018	SHAO et al.	
	1124	2018/0238718	8/23/2018	Dalvi	
	1125	2018/0238734	8/23/2018	Hotelling et al.	
	1126	2018/0242853	8/30/2018	Al-Ali	
	1127	2018/0242921	8/30/2018	Muhsin et al.	
	1128	2018/0242923	8/30/2018	Al-Ali et al.	
	1129	2018/0242924	8/30/2018	Barker et al.	
	1130	2018/0242926	8/30/2018	Muhsin et al.	
	1131	2018/0247353	8/30/2018	Al-Ali et al.	

Examiner Signature	/MARJAN FARDANESH/	Date Considered	03/19/2020

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ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /M.F/

PTO/SB/08 Equivalent

INFORMATION DISCLOSURE STATEMENT BY APPLICANT	Application No.	16/791955
	Filing Date	February 14, 2020
	First Named Inventor	Ammar Al-Ali
	Art Unit	2875
(Multiple sheets used when necessary)	Examiner	Unassigned
SHEET 40 OF 50	Attorney Docket No.	MAS.1007C4

U.S. PATENT DOCUMENTS					
Examiner Initials	Cite No.	Document Number *Number - Kind Code (if known)* Example: 1,234,567 B1	Publication Date MM-DD-YYYY	Name	Pages, Columns, Lines Where Relevant Passages or Relevant Figures Appear
	1132	2018/0247712	8/30/2018	Muhsin et al.	
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	1135	2018/0256087	9/13/2018	Al-Ali et al.	
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	1137	2018/0279956	10/4/2018	WAYDO et al.	
	1138	2018/0285094	10/4/2018	Housel et al.	
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	1147	2018/0333055	11/22/2018	Lamego et al.	
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	1150	2019/0000362	1/3/2019	Kiani et al.	
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Examiner Signature	/MARJAN FARDANESH/	Date Considered	03/19/2020

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PTO/SB/08 Equivalent

INFORMATION DISCLOSURE STATEMENT BY APPLICANT	Application No.	16/791955
	Filing Date	February 14, 2020
	First Named Inventor	Ammar Al-Ali
	Art Unit	2875
(Multiple sheets used when necessary)	Examiner	Unassigned
SHEET 41 OF 50	Attorney Docket No.	MAS.1007C4

U.S. PATENT DOCUMENTS					
Examiner Initials	Cite No.	Document Number *Number - Kind Code (if known)* Example: 1,234,567 B1	Publication Date MM-DD-YYYY	Name	Pages, Columns, Lines Where Relevant Passages or Relevant Figures Appear
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	1173	2019/0133525	5/9/2019	Al-Ali et al.	
	1174	2019/0142283	5/16/2019	Lamego et al.	
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Examiner Signature	/MARJAN FARDANESH/	Date Considered	03/19/2020

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT	Application No.	16/791955
	Filing Date	February 14, 2020
	First Named Inventor	Ammar Al-Ali
	Art Unit	2875
(Multiple sheets used when necessary)	Examiner	Unassigned
SHEET 42 OF 50	Attorney Docket No.	MAS.1007C4

U.S. PATENT DOCUMENTS					
Examiner Initials	Cite No.	Document Number *Number - Kind Code (if known)* Example: 1,234,567 B1	Publication Date MM-DD-YYYY	Name	Pages, Columns, Lines Where Relevant Passages or Relevant Figures Appear
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Examiner Signature	/MARJAN FARDANESH/	Date Considered	03/19/2020

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT	Application No.	16/791955
	Filing Date	February 14, 2020
	First Named Inventor	Ammar Al-Ali
	Art Unit	2875
(Multiple sheets used when necessary)	Examiner	Unassigned
SHEET 43 OF 50	Attorney Docket No.	MAS.1007C4

U.S. PATENT DOCUMENTS					
Examiner Initials	Cite No.	Document Number *Number - Kind Code (if known)* Example: 1,234,567 B1	Publication Date MM-DD-YYYY	Name	Pages, Columns, Lines Where Relevant Passages or Relevant Figures Appear
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Examiner Signature	/MARJAN FARDANESH/	Date Considered	03/19/2020

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT	Application No.	16/791955
	Filing Date	February 14, 2020
	First Named Inventor	Ammar Al-Ali
	Art Unit	2875
(Multiple sheets used when necessary)	Examiner	Unassigned
SHEET 44 OF 50	Attorney Docket No.	MAS.1007C4

FOREIGN PATENT DOCUMENTS

Examiner Initials	Cite No.	Foreign Patent Document *Country Code-Number-Kind Code* Example: JP 1234567 A1	Publication Date MM-DD-YYYY	Name	Pages, Columns, Lines Where Relevant Passages or Relevant Figures Appear	T[1]
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Examiner Signature	/MARJAN FARDANESH/	Date Considered	03/19/2020

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT	Application No.	16/791955
	Filing Date	February 14, 2020
	First Named Inventor	Ammar Al-Ali
	Art Unit	2875
(Multiple sheets used when necessary)	Examiner	Unassigned
SHEET 45 OF 50	Attorney Docket No.	MAS.1007C4

FOREIGN PATENT DOCUMENTS						
Examiner Initials	Cite No.	Foreign Patent Document *Country Code-Number-Kind Code* Example: JP 1234567 A1	Publication Date MM-DD-YYYY	Name	Pages, Columns, Lines Where Relevant Passages or Relevant Figures Appear	T[1]
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NON PATENT LITERATURE DOCUMENTS			
Examiner Initials	Cite No.	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T[1]
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Examiner Signature	/MARJAN FARDANESH/	Date Considered	03/19/2020

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	Filing Date	February 14, 2020
	First Named Inventor	Ammar Al-Ali
	Art Unit	2875
(Multiple sheets used when necessary)	Examiner	Unassigned
SHEET 46 OF 50	Attorney Docket No.	MAS.1007C4

NON PATENT LITERATURE DOCUMENTS			
Examiner Initials	Cite No.	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T[1]
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	Filing Date	February 14, 2020
	First Named Inventor	Ammar Al-Ali
	Art Unit	2875
(Multiple sheets used when necessary)	Examiner	Unassigned
SHEET 47 OF 50	Attorney Docket No.	MAS.1007C4

NON PATENT LITERATURE DOCUMENTS			
Examiner Initials	Cite No.	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T[1]
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PTO/SB/08 Equivalent

INFORMATION DISCLOSURE STATEMENT BY APPLICANT	Application No.	16/791955
	Filing Date	February 14, 2020
	First Named Inventor	Ammar Al-Ali
	Art Unit	2875
(Multiple sheets used when necessary)	Examiner	Unassigned
SHEET 48 OF 50	Attorney Docket No.	MAS.1007C4

NON PATENT LITERATURE DOCUMENTS			
Examiner Initials	Cite No.	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T[1]
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Examiner Signature /MARJAN FARDANESH/	Date Considered 03/19/2020

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	Filing Date	February 14, 2020
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	Art Unit	2875
(Multiple sheets used when necessary)	Examiner	Unassigned
SHEET 49 OF 50	Attorney Docket No.	MAS.1007C4

NON PATENT LITERATURE DOCUMENTS			
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Examiner Signature	/MARJAN FARDANESH/	Date Considered	03/19/2020

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT	Application No.	16/791955
	Filing Date	February 14, 2020
	First Named Inventor	Ammar Al-Ali
	Art Unit	2875
(Multiple sheets used when necessary)	Examiner	Unassigned
SHEET 50 OF 50	Attorney Docket No.	MAS.1007C4

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Examiner Signature	/MARJAN FARDANESH/	Date Considered	03/19/2020

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PTO/SB/08 Equivalent

INFORMATION DISCLOSURE STATEMENT BY APPLICANT	Application No.	16/791955
	Filing Date	February 14, 2020
	First Named Inventor	Ammar Al-Ali
	Art Unit	3791
(Multiple sheets used when necessary)	Examiner	FARDANESH, MARJAN
SHEET 1 OF 1	Attorney Docket No.	MAS.1007C4

U.S. PATENT DOCUMENTS					
Examiner Initials	Cite No.	Document Number *Number - Kind Code (if known)* Example: 1,234,567 B1	Publication Date MM-DD-YYYY	Name	Pages, Columns, Lines Where Relevant Passages or Relevant Figures Appear

FOREIGN PATENT DOCUMENTS						
Examiner Initials	Cite No.	Foreign Patent Document *Country Code-Number-Kind Code* Example: JP 1234567 A1	Publication Date MM-DD-YYYY	Name	Pages, Columns, Lines Where Relevant Passages or Relevant Figures Appear	T[1]

NON PATENT LITERATURE DOCUMENTS			
Examiner Initials	Cite No.	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T[1]
	1	2020-03-25 First Amended Complaint for (1) Patent Infringement (2) Trade Secret Misappropriation (3) Correction of Inventorship and (4) Ownership of Patents and Demand for Jury Trial, and including Exhibits 13-24 (Exhibits 1-12 and 25-31 comprise copies of publicly available U.S. patents and U.S. patent application publications, and are not included herein for ease of transmission), Masimo Corporation and Cercacor Laboratories, Inc. v. Apple Inc., Case No. 8:20-cv-00048, pgs. 1-94, 983-1043 (total of 156 pages).	

Examiner Signature	Date Considered
***Examiner:** Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.	

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INFORMATION DISCLOSURE STATEMENT
AND NOTICE OF CONCURRENT LITIGATION

First Inventor	:	Ammar Al-Ali
App. No.	:	16/791955
Filed	:	February 14, 2020
For	:	PHYSIOLOGICAL MEASUREMENT DEVICES, SYSTEMS, AND METHODS
Examiner	:	Fardanesh, Marjan
Art Unit	:	3791
Conf. No.	:	3106

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

References and Listing

Pursuant to 37 CFR 1.56, an Information Disclosure Statement listing references is provided herewith. Copies of any listed foreign and non-patent literature references are being submitted.

Pursuant to 37 CFR 1.97(g) and (h), Applicant makes no representation that the information is considered to be material to patentability. Additionally, inclusion on this list is not an admission that any of the cited documents are prior art in this application. Further, Applicant makes no representation regarding the completeness of this list, or that better art does not exist.

Related Proceedings

Pursuant to M.P.E.P § 2001.06(c), Applicant provides this notification of related litigation proceedings. On January 9, 2020, Applicant, Masimo Corporation, and Cercacor Laboratories, Inc., filed a complaint in the United States Court for the Central District of California (Case No. 8:20-cv-00048) against Apple Inc.. On March 25, 2020 an amended complaint was filed. The complaint alleges infringement of U.S. Patent Nos. 10,258,265; 10,258,266; 10,292,628; 10,299,708; 10,376,190; 10,376,191; 10,588,553; 10,588,554; 10,470,695; 6,771,994; 8,457,703; and 10,433,776. At least U.S. Patent No. 10,470,695 shares a

common priority claim with the present application. Copies of related documents in the proceeding are being submitted herewith.

For convenience in reviewing this submission, the following chart is provided showing the pending applications which share at least one common priority claim with each of the asserted patents. It should be noted that other family members that share at least one common priority claim may have issued as well.

Patent No.	**Pending Family Members**
10,258,265	16/449143
10,258,266	16/534956
10,292,628	16/541987
10,299,708	16/725478
10,376,190	16/725292
10,376,191	16/829510
10,588,553	16/829578
10,588,554	16/829536
	16/834467
	16/834538
	16/834533
10,470,695	16/532061
	16/532065
	16/791955
	16/791963
	16/835712
	16/835772
6,771,994	
8,457,703	15/820082
10,433,776	16/174130

No Disclaimers

To the extent that anything in the Information Disclosure Statement or the listed references could be construed as a disclaimer of any subject matter supported by the present application, Applicant hereby rescinds and retracts such disclaimer.

Timing of Disclosure

This Information Disclosure Statement is being filed before the receipt of a First Office Action on the merits, and presumably no fee is required. If a First Office Action on the merits was mailed before the mailing date of this Statement, the Commissioner is authorized to charge the fee set forth in 37 CFR 1.17(p) to Deposit Account No. 11-1410.

Respectfully submitted,

KNOBBE, MARTENS, OLSON & BEAR, LLP

Dated: April 8, 2020

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Attorneys for Plaintiff,
Masimo Corporation

IN THE UNITED STATES DISTRICT COURT

FOR THE CENTRAL DISTRICT OF CALIFORNIA

SOUTHERN DIVISION

MASIMO CORPORATION, a Delaware corporation; and CERCACOR LABORATORIES, INC., a Delaware corporation Plaintiffs, v. APPLE INC., a California corporation Defendant.	Case No. 8:20-cv-00048-JVS-JDE **FIRST AMENDED COMPLAINT FOR (1) PATENT INFRINGEMENT (2) TRADE SECRET MISAPPROPRIATION (3) CORRECTION OF INVENTORSHIP AND (4) OWNERSHIP OF PATENTS** **AND DEMAND FOR JURY TRIAL** Hon. James V. Selna

Plaintiffs MASIMO CORPORATION ("Masimo") and CERCACOR LABORATIES, INC. ("Cercacor") hereby complain of Defendant APPLE INC. ("Apple"), and allege as follows:

I. THE PARTIES

1. Plaintiff Masimo is a Delaware corporation having its principal place of business at 52 Discovery, Irvine, California 92618.

2. Plaintiff Cercacor is a Delaware corporation having its principal place of business at 15750 Alton Pkwy, Irvine, California 92618.

3. Upon information and belief, Defendant Apple is a California corporation having a principal place of business at One Apple Park Way, Cupertino, California, 95014.

II. JURISDICTION AND VENUE

4. This civil action includes claims for patent infringement arising under the patent laws of the United States, 35 U.S.C. §§ 100, *et seq.*, more particularly, 35 U.S.C. §§ 271 and 281. This civil action includes claims for correction of inventorship of certain United States patents arising under the patent law of the United States, more particularly 35 U.S.C. § 256. This Complaint further alleges trade secret misappropriation and seeks a declaration of ownership of certain patents and patent applications.

5. This Court has subject matter jurisdiction over claims 1-12 and 14-18 pursuant to at least 28 U.S.C. §§ 1331 and 1338(a), and has at least supplemental jurisdiction over claims 13 and 19-24 pursuant to at least 28 U.S.C. §§ 1367(a), including because, as alleged in more detail below, they are sufficiently related to the claims over which this Court has original jurisdiction that they form part of the same case or controversy under Article III of the United States Constitution.

6. Apple has its principal place of business in California. Apple is subject to personal jurisdiction in California and has committed the acts complained of in this Judicial District.

7. Venue is proper in the Southern Division of the Central District of California pursuant to 28 U.S.C. § 1400(b) with respect to patent infringement because Defendant has a regular and established place of business in the County of Orange within the Central District of California and committed acts of infringement in this Judicial District. Defendant also committed acts of misappropriation in this Judicial District. Inventive contributions to the patents and patent application as to which Plaintiffs seek correction of inventorship and/or declarations of ownership also took place in this Judicial District. Thus, venue is proper pursuant to 28 U.S.C. §§ 1391(b) because a substantial part of the events or omissions giving rise to the claims occurred in this Judicial District.

III. STATEMENT OF THE CASE

8. This action seeks relief for the theft of Plaintiffs' highly confidential information and trade secrets, and infringement of Masimo's patents by Defendant, correction of inventorship, and ownership of patents assigned to or filed by Apple on subject matter that belongs to Plaintiffs.

IV. STATEMENT OF FACTS

9. Masimo is a medical technology company that revolutionized non-invasive monitoring of physiological parameters, such as pulse rate, arterial oxygen saturation and many others.

10. Most of these parameters are measured using light that is transmitted through the body tissue. The received light, that has been attenuated by the various components of the body tissue, including the blood, is known in the industry as a photoplethysmograph or "PPG." The transmission and receipt

of this light is typically accomplished through a sensor that is applied to a body part such as a finger, arm, toe, forehead or ear.

11. Before Masimo, non-invasive measurements from the PPG were plagued by unreliability, often when the measurement was needed most, due to the person moving or having low peripheral blood flow (known as "low perfusion"). The industry had essentially given up on solving these problems, concluding they were largely unsolvable. In the medical context, clinicians had to live with the results – patient monitors gave excessive false alarms, froze their measurements for prolonged periods of time despite potential changes in the physiological parameter (e.g., oxygen saturation or pulse rate), delayed notification of alarms due to long averaging times of sensor data, produced inaccurate measurements, or were unable to obtain data on the most critical patients and babies who cannot be instructed to stay still. Masimo's pioneering technology, known as Masimo Signal Extraction Technology ("Masimo SET"), solved this problem and dramatically improved the reliability of monitoring and reporting physiological signals derived from the PPG.

12. Following its initial success with Masimo SET, Masimo invested heavily in developing additional breakthrough measurement technologies, such as non-invasively measuring total hemoglobin, carboxyhemoglobin, and methemoglobin. Masimo has continued to innovate, succeeding where others have consistently failed. Masimo was the first, and remains the only, company delivering these game-changing technologies to hospitals in the United States. Use of Masimo's technology in the clinical setting has been proven to reduce blindness in premature infants, detect congenital heart disease in infants, save lives on the general care floor and post-surgery, and improve transfusion management, while saving money.

13. From its inception, Masimo has continuously developed cutting-edge noninvasive patient monitoring technologies. Masimo sought and received

numerous U.S. patents for many of its inventions. Masimo's revolutionary technology was a key to its gaining significant market praise and penetration. After introduction into the market, many competitors, much larger than Masimo, used Masimo's technology without a license, resulting in patent infringement lawsuits that ultimately confirmed the validity of Masimo's innovations. Masimo also maintains some technology as trade secrets. Masimo also closely guards its future product and market plans. Only select employees have knowledge of and access to these guarded secrets.

14. Masimo's innovations also include important advances in sensor technologies that work together as part of Masimo's system and algorithms. Masimo's sensors are integral to the success of the revolutionary technologies Masimo has developed.

15. In 1998, Masimo spun certain technologies off into a new company, Masimo Laboratories, Inc. or "Masimo Labs," to further research and develop the technologies. The name of the company was later changed to Cercacor Laboratories Inc. or "Cercacor." Cercacor and Masimo have a cross-license agreement to facilitate confidential collaboration between the companies. Cercacor is not owned by Masimo.

16. Like Masimo, Cercacor is an innovator of non-invasive monitoring technologies. Cercacor is on the frontline of understanding how measuring, tracking, and analyzing physiological parameters can impact pre-diabetic and diabetic patients, sports training and performance and overall health and wellness principally in the consumer market. Cercacor continued the development that started at Masimo on non-invasive total hemoglobin (SpHb®), methemoglobin (SpMet®), and carboxyhemoglobin (SpCO®) and other non-invasive physiological parameters.

17. Leading hospitals around the world use Cercacor technology licensed to Masimo and sold under the name Masimo rainbow SET. Like

Masimo, Cercacor also maintains some technology as trade secrets, and Cercacor closely guards its future product and market plans. Only select employees have knowledge of and access to these guarded secrets.

18. Plaintiffs carefully guard the secrecy of their confidential information and documents. For example, Plaintiffs have policies regarding labeling confidential information and documents as "CONFIDENTIAL AND PROPRIETARY." They also restrict these documents and information from disclosure to third parties and employees on a need-to-know basis. Plaintiffs also have policies in place regarding the use of computers and related equipment that govern how their computer systems may be used. Those policies also govern the protection of Plaintiffs' confidential information. Plaintiffs have document management systems that restrict access to confidential documents to only those employees with proper security credentials and a need for access. Plaintiffs also require employees to sign agreements precluding the employees from disclosing or making use of any confidential information except as authorized by Plaintiffs and as necessary for the performance of the employees' duties. Plaintiffs also require third parties, including customers, to execute confidential non-disclosure agreements. Plaintiffs implemented such policies and procedures to maintain the confidentiality of sensitive information. These policies remain in place today.

19. In 2013, Apple contacted Masimo and asked to meet regarding a potential collaboration. Apple told Masimo that Apple would like to understand more about Masimo's technology to potentially integrate that technology into Apple's products. Apple and Masimo later entered into a confidentiality agreement, and Masimo's management met with Apple. The meetings included confidential discussions of Masimo's technology. After what seemed to Masimo to have been productive meetings, Apple quickly began trying to hire Masimo employees, including engineers and key management.

20. Masimo employed Michael O'Reilly as its Chief Medical Officer and Executive Vice President for Medical Affairs beginning in January 2008. As part of the Masimo executive team, O'Reilly was privy to extremely sensitive information, including information about mobile medical products and applications, wellness applications, clinical data gathering and analytics, and other technology of Masimo. Upon information and belief, Apple employed O'Reilly in July 2013, shortly after the meetings with Masimo, to assist in wellness and mobile applications that include non-invasive measurement of physiological parameters. Not long after, by December of 2013, O'Reilly was already meeting with the FDA on behalf of Apple to discuss medical applications and discuss medical products that non-invasively measures blood constituents.

21. Apple systematically recruited other key Masimo personnel, such as Marcelo Lamego, who was the former Chief Technical Officer of Cercacor and a former Research Scientist at Masimo. Lamego was a Masimo employee during 2000-2001 and 2003-2006, and the Cercacor Chief Technical Officer during 2006-2014.

22. Lamego had unfettered access to Plaintiffs' highly confidential technical information. He was trained and mentored at Masimo by the most skilled engineers and scientists, and was taught about the keys to effective non-invasive monitoring, something he was not involved in prior to Masimo. Masimo engineers and scientists taught Lamego about non-invasive monitoring, including, among others, Ammar Al-Ali, Mohamed Diab, and Walter Weber. The Masimo engineers, including Al-Ali, Diab, and Weber, were Masimo employees at all relevant times. Lamego also had access to and learned guarded secrets regarding Plaintiffs' mobile medical products, including key technology and advance plans for future products.

23. When Lamego left Cercacor, he assured Plaintiffs that he would not violate his agreements with Plaintiffs and volunteered that he would not work on technology similar to Plaintiffs' technology. On January 24, 2014, Plaintiffs sent a letter to Defendant explaining that Lamego possessed Plaintiffs' confidential proprietary information and warning Apple to respect Plaintiffs' rights in such information. The letter stated "we trust that Apple will employ Mr. Lamego in an area that does not involve healthcare technology, including mobile health applications and the measurement of physiological information." The letter also asked that "Apple refrain from inducing Mr. Lamego to take actions that would violate the Agreement while he performs services for Apple" and asked Apple to "direct Mr. Lamego to honor his obligations to all of his prior employers." Based on Plaintiffs' conversations with Lamego, Plaintiffs' letter to Apple, and Plaintiffs' confidentiality agreement with Apple, Plaintiffs reasonably believed that Lamego would not use or disclose Plaintiffs' confidential information and that Defendant would not induce Lamego to do so or itself use Plaintiffs' confidential information.

24. Unbeknownst to Plaintiffs at the time, it now appears that, shortly after joining Apple in January 2014, Lamego began pursuing on behalf of Apple numerous patent applications directed toward technologies he worked on at Plaintiffs, and with which he had no prior experience or knowledge.

25. Upon information and belief, Apple announced the first version of its watch in September 2014, and began shipping its watch in April 2015. The Apple Watch Series 3 was released on September 22, 2017, and upon information and belief had significant performance issues with the non-invasive physiological measurements. Apple announced the Apple Watch Series 4 on September 12, 2018, and upon information and belief, that watch includes technology that tracks Plaintiffs' technologies to solve some of the performance issues. The Apple Watch Series 5 was announced on September 10, 2019 and

released on September 20, 2019. Upon information and belief, the Apple Watch Series 5 also includes Plaintiffs' technologies to solve some of the prior performance issues, including technology as to which Lamego was an inventor while at Plaintiffs.

26. As set forth in detail below, and on information and belief, each portion of evidence cited by Plaintiffs, such as the selected portions of Apple patent applications and Apple websites, accurately portrays, in relevant part, the structure, design, function and/or operation of the Apple Watch Series 4 and later devices.

V. THE PATENTS-IN-SUIT

27. Masimo is the owner by assignment of U.S. Patent No. 10,258,265 entitled "Multi-stream data collection system for noninvasive measurement of blood constituents" ("the '265 patent"), which the United States Patent and Trademark Office lawfully and duly issued on April 16, 2019. A true and correct copy of the '265 patent is attached hereto as Exhibit 1.

28. Masimo is the owner by assignment of U.S. Patent No. 10,258,266 entitled "Multi-stream data collection system for noninvasive measurement of blood constituents" ("the '266 patent"), which the United States Patent and Trademark Office lawfully and duly issued on April 16, 2019. A true and correct copy of the '266 patent is attached hereto as Exhibit 2.

29. Masimo is the owner by assignment of U.S. Patent No. 10,292,628 entitled "Multi-stream data collection system for noninvasive measurement of blood constituents" ("the '628 patent"), which the United States Patent and Trademark Office lawfully and duly issued on May 21, 2019. A true and correct copy of the '628 patent is attached hereto as Exhibit 3.

30. Masimo is the owner by assignment of U.S. Patent No. 10,299,708 entitled "Multi-stream data collection system for noninvasive measurement of blood constituents" ("the '708 patent"), which the United States Patent and

Trademark Office lawfully and duly issued on May 21, 2019. A true and correct copy of the '708 patent is attached hereto as Exhibit 4.

31. Masimo is the owner by assignment of U.S. Patent No. 10,376,190 entitled "Multi-stream data collection system for noninvasive measurement of blood constituents" ("the '190 patent"), which the United States Patent and Trademark Office lawfully and duly issued on August 13, 2019. A true and correct copy of the '190 patent is attached hereto as Exhibit 5.

32. Masimo is the owner by assignment of U.S. Patent No. 10,376,191 entitled "Multi-stream data collection system for noninvasive measurement of blood constituents" ("the '191 patent"), which the United States Patent and Trademark Office lawfully and duly issued on August 13, 2019. A true and correct copy of the '191 patent is attached hereto as Exhibit 6.

33. Masimo is the owner by assignment of U.S. Patent No. 10,470,695 entitled "Advanced pulse oximetry sensor" ("the '695 patent"), which the United States Patent and Trademark Office lawfully and duly issued on November 12, 2019. A true and correct copy of the '695 patent is attached hereto as Exhibit 7.

34. Masimo is the owner by assignment of U.S. Patent No. 6,771,994 entitled "Pulse oximeter probe-off detection system" ("the '994 patent"), which the United States Patent and Trademark Office lawfully and duly issued on August 3, 2004. A true and correct copy of the '994 patent is attached hereto as Exhibit 8.

35. Masimo is the owner by assignment of U.S. Patent No. 8,457,703 entitled "Low power pulse oximeter" ("the '703 patent"), which the United States Patent and Trademark Office lawfully and duly issued on June 4, 2013. A true and correct copy of the '703 patent is attached hereto as Exhibit 9.

36. Masimo is the owner by assignment of U.S. Patent No. 10,433,776 entitled "Low power pulse oximeter" ("the '776 patent"), which the United

States Patent and Trademark Office lawfully and duly issued on October 8, 2019. A true and correct copy of the '776 patent is attached hereto as Exhibit 10.

37. Masimo is the owner by assignment of U.S. Patent No. 10,588,553 entitled "Multi-Stream Data Collection System For Noninvasive Measurement of Blood Constituents" ("the '553 patent"), which the United States Patent and Trademark Office lawfully and duly issued on March 17, 2020. A true and correct copy of the '553 patent is attached hereto as Exhibit 11.

38. Masimo is the owner by assignment of U.S. Patent No. 10,588,554 entitled "Multi-Stream Data Collection System For Noninvasive Measurement of Blood Constituents" ("the '554 patent"), which the United States Patent and Trademark Office lawfully and duly issued on March 17, 2020. A true and correct copy of the '554 patent is attached hereto as Exhibit 12.

VI. THE DISPUTED LAMEGO PATENTS

39. Lamego is named as an inventor on U.S. Provisional Patent Application No. 62/043,294, filed Aug. 28, 2014 and titled "Reflective Surface Treatments for Optical Sensors." Related applications that also name Lamego as an inventor include U.S Patent Application Nos. 14/740,196 and 16/114,003, which issued as U.S. Patent Nos. 10,078,052 and 10,247,670.

40. Lamego is also named as an inventor on U.S. Provisional Patent Application No. 62/047,818, filed Sep. 9, 2014, entitled "Modulation and Demodulation Techniques for a Health Monitoring System." A related application that names Lamego as the sole inventor includes U.S Patent Application No. 14/621,268, which issued as U.S. Patent No. 10,219,754.

41. Lamego is also named as an inventor on U.S. Provisional Patent Application No. 62/056,299, filed on Sep. 26, 2014, and entitled "Electronic Device that Computes Health Data." Related applications that also name Lamego as the sole inventor include U.S Patent Application Nos. 14/617,422,

15/667,832, and 16/700,710. The '422 Application issued as U.S. Patent No. 9,723,997 and the '832 Application issued as U.S. Patent No. 10,524,671.

42. Lamego is also named as an inventor on U.S. Provisional Patent Application No. 62/057,089, filed on Sep. 29, 2014, and entitled "Methods and Systems for Modulation and Demodulation of Optical Signals." Related applications that also name Lamego as an inventor include U.S Patent Application Nos. 14/618,664 and 15/960,507. The '664 Application issued as U.S. Patent No. 9,952,095.

VII. FIRST CAUSE OF ACTION

(INFRINGEMENT OF U.S. PATENT NO. 10,258,265)

43. Plaintiff Masimo hereby realleges and incorporates by reference the allegations set forth in paragraphs 1 through 42.

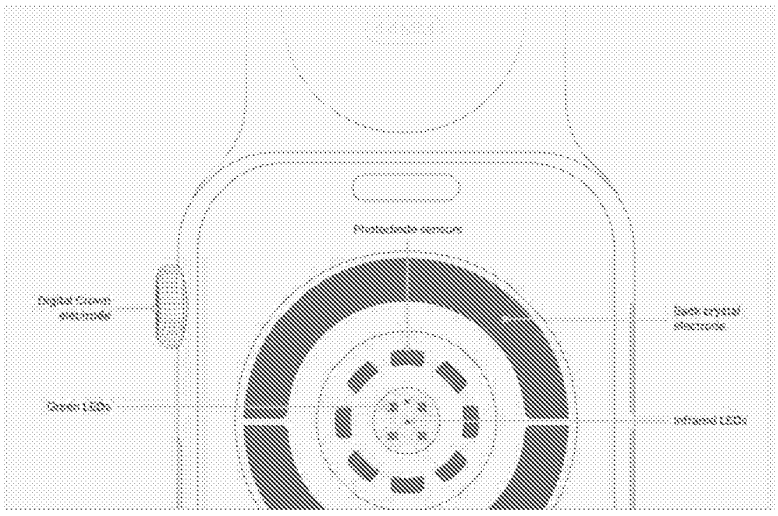
44. Upon information and belief, Defendant's products, including at least the Apple Watch Series 4 and later devices, infringe at least Claims 1-3, 6-11, 13, 17, and 17-25 of the '265 patent under at least 35 U.S.C. § 271(a), (b), and (c).

45. Upon information and belief, Defendant has directly infringed one or more claims of the '265 patent through manufacture, use, sale, offer for sale, and/or importation into the United States of physiological monitors, including the Apple Watch Series 4 and later devices.

46. For example, upon information and belief, in operation, the Apple Watch Series 4 and later devices include all of the limitations of Claim 1 of the '265 patent as set forth herein and further illustrated in the claim chart shown in Exhibit 13. The Apple Watch Series 4 and later devices are adapted to be worn by a wearer and provide an indication of a physiological parameter (for example, heart rate) of the wearer as shown in the image below found on the Apple website at https://www.apple.com/apple-watch-series-4/health/:



47. The Apple Watch Series 4 and later devices include a plurality of emitters of different wavelengths (for example, green and infrared LEDs) and at least four detectors (for example, photodiode sensors) spaced apart from each other as shown in the image below found on the Apple website at https://support.apple.com/en-us/HT204666:



48. The detectors output signals responsive to light from the light emitters attenuated by body tissue. Upon information and belief, the signals are indicative of a physiological parameter (for example, heart rate) of the wearer.

49. Upon information and belief, the relevant technology in the Apple Watch Series 4 and later devices is described in the below citations to U.S. Patent Application Publication 2019/0072912 (the '912 publication). A copy of the publication is attached as Exhibit 25. The Apple Watch Series 4 and later devices include a housing having a surface and a circular wall protruding from the surface, and a light permeable cover arranged above a portion of the housing and covering the detectors. Fig. 4C and the corresponding text of the '912 publication show, for example, such housing:

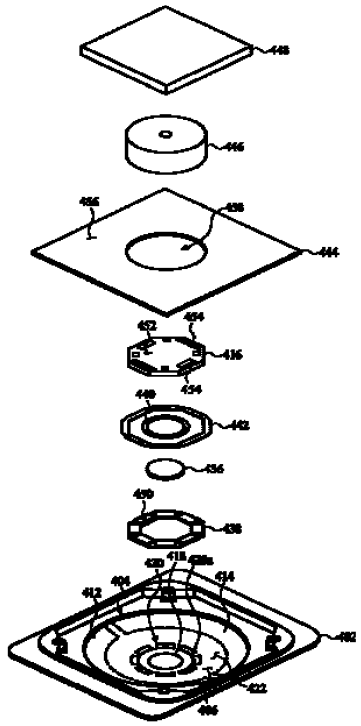


FIG. 4C

50. Upon information and belief, Defendant has knowledge of Masimo's patents, including the '265 patent, at least based on O'Reilly and Lamego's former positions with Plaintiffs. Masimo filed provisional patent applications that led to the '265 patent in August 2008, while O'Reilly and Lamego were with Masimo and/or Cercacor. Lamego is a named inventor of

the '265 patent. Defendant had knowledge of the '265 patent no later than the filing of the original Complaint.

51. Upon information and belief, Defendant has actively induced others to infringe the '265 patent by marketing and selling the above Apple Watch Series 4 and later devices, knowing and intending that such systems would be used by customers and end users in a manner that infringes the '265 patent. To that end, Defendant provides instructions and teachings to its customers and end users that such Apple Watch Series 4 and later devices be used to infringe the '265 patent. Defendant's acts constitute infringement of the '265 patent in violation of 35 U.S.C. § 271(b).

52. Upon information and belief, Defendant actively induces users to directly infringe the asserted claims of the '265 patent. By way of example only, upon information and belief, Defendant actively induces direct infringement of the '265 patent by providing directions, demonstrations, guides, manuals, training for use, and/or other materials necessary for the use of the Apple Watch Series 4 and later devices, including use with Apple iPhones. Upon information and belief, Defendant knew or should have known that these activities would cause direct infringement.

53. Upon information and belief, Defendant's acts constitute contributory infringement of the '265 patent in violation of 35 U.S.C. § 271(c). Upon information and belief, Defendant contributorily infringes because, among other things, Defendant offers to sell and/or sells within the United States, and/or imports into the United States, components of the Apple Watch Series 4 and later devices and Apple iPhones that constitute material parts of the invention of the asserted claims of the '265 patent, are not staple articles or commodities of commerce suitable for substantial non-infringing use and are known by Defendant to be especially made or especially adapted for use in an infringement of the '265 patent.

54. Defendant's infringement of the '265 patent is willful, deliberate, and intentional by continuing its acts of infringement after becoming aware of the '265 patent and its infringement thereof, thus acting in reckless disregard of Masimo's patent rights.

55. Because of Defendant's infringement of the '265 patent, Masimo has suffered and will continue to suffer irreparable harm and injury, including monetary damages in an amount to be determined at trial.

56. Upon information and belief, unless enjoined, Defendant, and/or others acting on behalf of Defendant, will continue their infringing acts, thereby causing additional irreparable injury to Masimo for which there is no adequate remedy at law.

VIII. SECOND CAUSE OF ACTION

(INFRINGEMENT OF U.S. PATENT NO. 10,258,266)

57. Plaintiff Masimo hereby realleges and incorporates by reference the allegations set forth in paragraphs 1 through 42.

58. Upon information and belief, Defendant's products, including at least the Apple Watch Series 4 and later devices, infringe at least Claims 1-19 of the '266 patent under at least 35 U.S.C. § 271(a), (b), and (c).

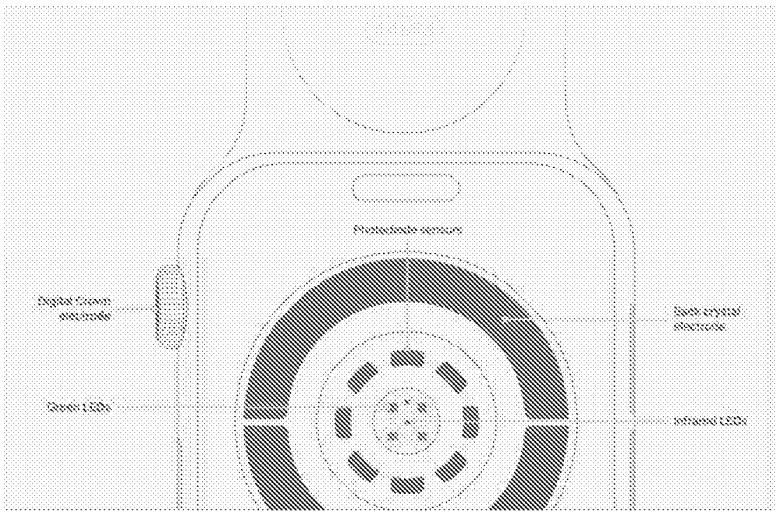
59. Upon information and belief, Defendant has directly infringed one or more claims of the '266 patent through manufacture, use, sale, offer for sale, and/or importation into the United States of physiological monitors, including the Apple Watch Series 4 and later devices.

60. For example, upon information and belief, in operation, the Apple Watch Series 4 and later devices 4 and 5 devices include all of the limitations of Claim 1 of the '266 patent as set forth herein and further illustrated in the claim chart shown in Exhibit 14. The Apple Watch Series 4 and later devices provide an indication of a physiological parameter (for example, heart rate) of the

wearer as shown in the image below found on the Apple website at https://www.apple.com/apple-watch-series-4/health/:



61. The Apple Watch Series 4 and later devices include a plurality of emitters that emit light into tissue of a user and a plurality of detectors (for example, photodiode sensors) that detect light that has been attenuated by tissue of the user as shown in the image below found on the Apple website at https://support.apple.com/en-us/HT204666:



62. The Apple Watch Series 4 and later devices include a housing configured to house the detectors and a lens located between the tissue of the

user and the detectors. Fig. 4C and the corresponding text of the '912 publication show, for example, such housing:

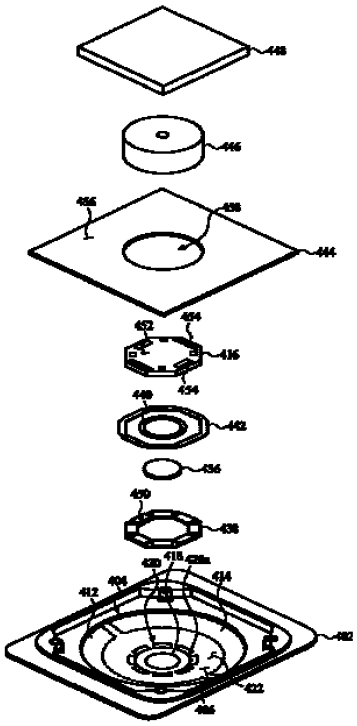


FIG. 4C

63. Upon information and belief, the lens has a single outwardly protruding convex surface configured to cause tissue of the user to conform to the protruding convex surface during operation of the noninvasive optical physiological sensor.

64. Upon information and belief, Defendant has knowledge of Masimo's patents, including the '266 patent, at least based on O'Reilly and Lamego's former positions with Plaintiffs. Masimo filed provisional patent applications that led to the '266 patent in August 2008, while O'Reilly and Lamego were with Masimo and/or Cercacor. Lamego is a named inventor of the '266 patent. Defendant had knowledge of the '266 patent no later than the filing of the original Complaint.

65. Upon information and belief, Defendant has actively induced others to infringe the '266 patent by marketing and selling the above Apple Watch Series 4 and later devices, knowing and intending that such systems would be used by customers and end users in a manner that infringes the '266 patent. To that end, Defendant provides instructions and teachings to its customers and end users that such Apple Watch Series 4 and later devices be used to infringe the '266 patent. Defendant's acts constitute infringement of the '266 patent in violation of 35 U.S.C. § 271(b).

66. Upon information and belief, Defendant actively induces users to directly infringe the asserted claims of the '266 patent. By way of example only, upon information and belief, Defendant actively induces direct infringement of the '266 patent by providing directions, demonstrations, guides, manuals, training for use, and/or other materials necessary for the use of the Apple Watch Series 4 and later devices. Upon information and belief, Defendant knew or should have known that these activities would cause direct infringement.

67. Upon information and belief, Defendant's acts constitute contributory infringement of the '266 patent in violation of 35 U.S.C. § 271(c). Upon information and belief, Defendant contributorily infringes because, among other things, Defendant offers to sell and/or sells within the United States, and/or imports into the United States, components of the Apple Watch Series 4 and later devices that constitute material parts of the invention of the asserted claims of the '266 patent, are not staple articles or commodities of commerce suitable for substantial non-infringing use and are known by Defendant to be especially made or especially adapted for use in an infringement of the '266 patent.

68. Defendant's infringement of the '266 patent is willful, deliberate, and intentional by continuing its acts of infringement after becoming aware of

the '266 patent and its infringement thereof, thus acting in reckless disregard of Masimo's patent rights.

69. Because of Defendant's infringement of the '266 patent, Masimo has suffered and will continue to suffer irreparable harm and injury, including monetary damages in an amount to be determined at trial.

70. Upon information and belief, unless enjoined, Defendant, and/or others acting on behalf of Defendant, will continue their infringing acts, thereby causing additional irreparable injury to Masimo for which there is no adequate remedy at law.

IX. THIRD CAUSE OF ACTION

(INFRINGEMENT OF U.S. PATENT NO. 10,292,628)

71. Plaintiff Masimo hereby realleges and incorporates by reference the allegations set forth in paragraphs 1 through 42.

72. Upon information and belief, Defendant's products, including at least the Apple Watch Series 4 and later devices, infringe at least Claim 1 of the '628 patent under at least 35 U.S.C. § 271(a), (b), and (c).

73. Upon information and belief, Defendant has directly infringed one or more claims of the '628 patent through manufacture, use, sale, offer for sale, and/or importation into the United States of physiological monitors, including the Apple Watch Series 4 and later devices.

74. For example, upon information and belief, in operation, the Apple Watch Series 4 and later devices include all of the limitations of Claim 1 of the '628 patent as set forth herein and further illustrated in the claim chart shown in Exhibit 15.

75. The Apple Watch Series 4 and later devices include a housing configured to house a plurality of detectors. Fig. 4C and the corresponding text of the '912 publication show, for example, such housing:

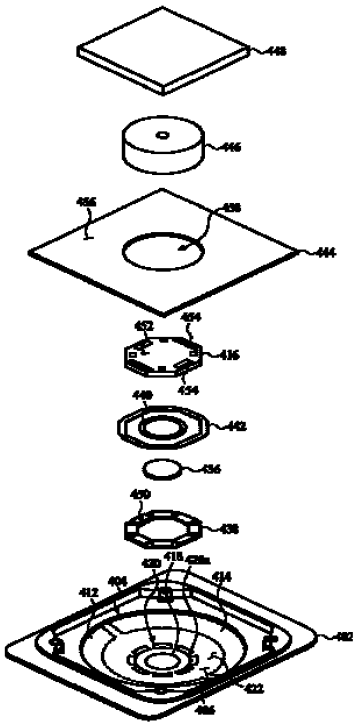
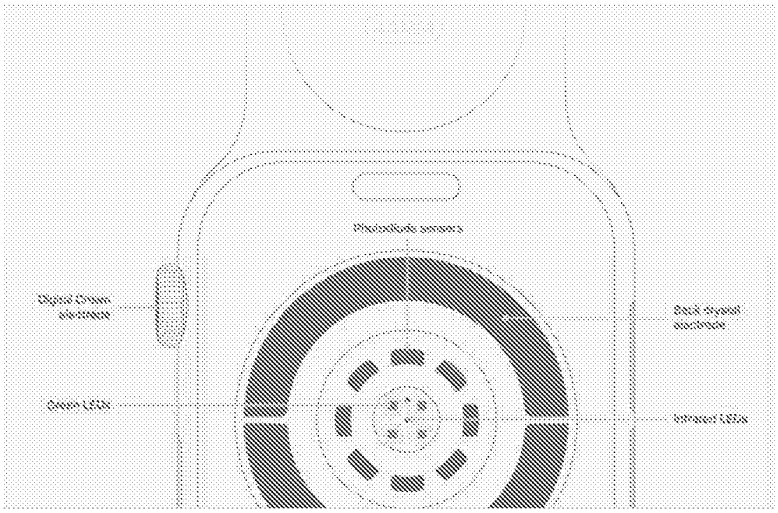


FIG. 4C

76. The Apple Watch Series 4 and later devices include a plurality of emitters that emit light into tissue of a user and a plurality of detectors that detect light that has been attenuated by tissue of the user as shown in the image below found on the Apple website at https://support.apple.com/en-us/HT204666:



77. The Apple Watch Series 4 and later devices include a light permeable cover configured to be located between 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. Fig. 4C and the corresponding text of the '912 publication show, for example, such cover:

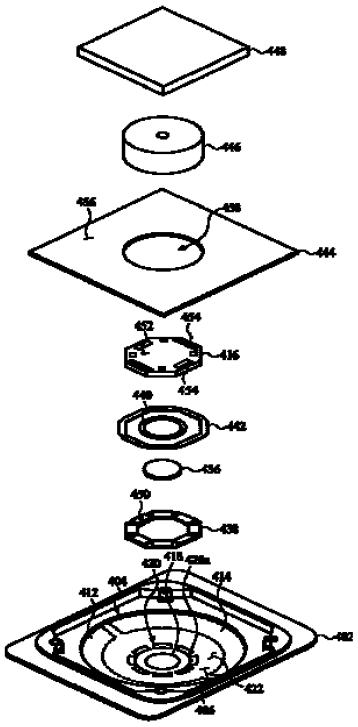


FIG. 4C

78. Upon information and belief, Defendant has knowledge of Masimo's patents, including the '628 patent, at least based on O'Reilly and Lamego's former positions with Plaintiffs. Masimo filed provisional patent applications that led to the '628 patent in August 2008, while O'Reilly and Lamego were with Masimo and/or Cercacor. Lamego is a named inventor of the '628 patent. Defendant had knowledge of the '628 patent no later than the filing of the original Complaint.

79. Upon information and belief, Defendant has actively induced others to infringe the '628 patent by marketing and selling the above Apple Watch Series 4 and later devices, knowing and intending that such systems would be used by customers and end users in a manner that infringes the '628 patent. To that end, Defendant provides instructions and teachings to its customers and end users that such Apple Watch Series 4 and later devices be

used to infringe the '628 patent. Defendant's acts constitute infringement of the '628 patent in violation of 35 U.S.C. § 271(b).

80. Upon information and belief, Defendant actively induces users to directly infringe the asserted claims of the '628 patent. By way of example only, upon information and belief, Defendant actively induces direct infringement of the '628 patent by providing directions, demonstrations, guides, manuals, training for use, and/or other materials necessary for the use of the Apple Watch Series 4 and later devices, including use with Apple iPhones. Upon information and belief, Defendant knew or should have known that these activities would cause direct infringement.

81. Upon information and belief, Defendant's acts constitute contributory infringement of the '628 patent in violation of 35 U.S.C. § 271(c). Upon information and belief, Defendant contributorily infringes because, among other things, Defendant offers to sell and/or sells within the United States, and/or imports into the United States, components of the Apple Watch Series 4 and later devices and Apple iPhones that constitute material parts of the invention of the asserted claims of the '628 patent, are not staple articles or commodities of commerce suitable for substantial non-infringing use, and are known by Defendant to be especially made or especially adapted for use in an infringement of the '628 patent.

82. Defendant's infringement of the '628 patent is willful, deliberate, and intentional by continuing its acts of infringement after becoming aware of the '628 patent and its infringement thereof, thus acting in reckless disregard of Masimo's patent rights.

83. Because of Defendant's infringement of the '628 patent, Masimo has suffered and will continue to suffer irreparable harm and injury, including monetary damages in an amount to be determined at trial.

84. Upon information and belief, unless enjoined, Defendant, and/or others acting on behalf of Defendant, will continue their infringing acts, thereby causing additional irreparable injury to Masimo for which there is no adequate remedy at law.

X. FOURTH CAUSE OF ACTION

(INFRINGEMENT OF U.S. PATENT NO. 10,299,708)

85. Plaintiff Masimo hereby realleges and incorporates by reference the allegations set forth in paragraphs 1 through 42.

86. Upon information and belief, Defendant's products, including at least the Apple Watch Series 4 and later devices, infringe at least Claim 1 of the '708 patent under at least 35 U.S.C. § 271(a), (b), and (c).

87. Upon information and belief, Defendant has directly infringed one or more claims of the '708 patent through manufacture, use, sale, offer for sale, and/or importation into the United States of physiological monitors, including the Apple Watch Series 4 and later devices.

88. For example, upon information and belief, in operation, the Apple Watch Series 4 and later devices include all of the limitations of Claim 1 of the '708 patent as set forth herein and further illustrated in the claim chart shown in Exhibit 16. The Apple Watch Series 4 and later devices are adapted to be worn by a wearer and provide an indication of a physiological parameter (for example, heart rate) of the wearer as shown in the image below found on the Apple website at https://www.apple.com/apple-watch-series-4/health/:



89. The Apple Watch Series 4 and later devices include a platform including a planar surface, a housing including a raised edge portion extending from and enclosing at least a portion of the planar surface, and the housing including a protruding light permeable cover. Fig. 4C and the corresponding text of the '912 publication show, for example, such platform and housing:

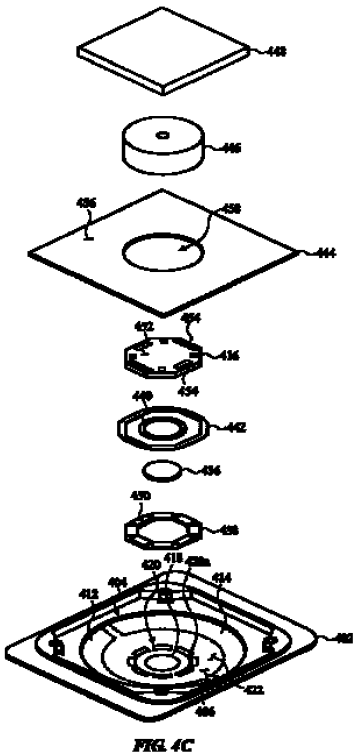
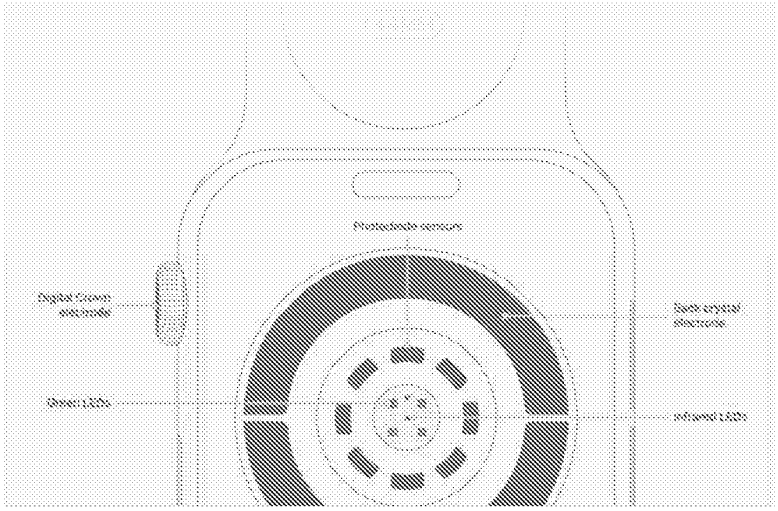


FIG. 4C

90. Upon information and belief, the Apple Watch Series 4 and later devices include at least four detectors (for example, photodiode sensors) arranged on the planar surface of the platform and within the housing, wherein the at least four detectors are arranged in a grid pattern such that a first detector and a second detector are arranged across from each other on opposite sides of a central point along a first axis, and a third detector and a fourth detector are arranged across from each other on opposite sides of the central point along a second axis which is perpendicular to the first axis as shown in the image below found on the Apple website at https://support.apple.com/en-us/HT204666:



91. Upon information and belief, Defendant has knowledge of Masimo's patents, including the '708 patent, at least based on O'Reilly and Lamego's former positions with Plaintiffs. Masimo filed provisional patent applications that led to the '708 patent in August 2008, while O'Reilly and Lamego were with Masimo and/or Cercacor. Lamego is a named inventor of the '708 patent. Defendant had knowledge of the '708 patent no later than the filing of the original Complaint.

92. Upon information and belief, Defendant has actively induced others to infringe the '708 patent by marketing and selling the above Apple

Watch Series 4 and later devices, knowing and intending that such systems would be used by customers and end users in a manner that infringes the '708 patent. To that end, Defendant provides instructions and teachings to its customers and end users that such Apple Watch Series 4 and later devices be used to infringe the '708 patent. Defendant's acts constitute infringement of the '708 patent in violation of 35 U.S.C. § 271(b).

93. Upon information and belief, Defendant actively induces users to directly infringe the asserted claims of the '708 patent. By way of example only, upon information and belief, Defendant actively induces direct infringement of the '708 patent by providing directions, demonstrations, guides, manuals, training for use, and/or other materials necessary for the use of the Apple Watch Series 4 and later devices, including use with Apple iPhones. Upon information and belief, Defendant knew or should have known that these activities would cause direct infringement.

94. Upon information and belief, Defendant's acts constitute contributory infringement of the '708 patent in violation of 35 U.S.C. § 271(c). Upon information and belief, Defendant contributorily infringes because, among other things, Defendant offers to sell and/or sells within the United States, and/or imports into the United States, components of the Apple Watch Series 4 and later devices and Apple iPhones that constitute material parts of the invention of the asserted claims of the '708 patent, are not staple articles or commodities of commerce suitable for substantial non-infringing use, and are known by Defendant to be especially made or especially adapted for use in an infringement of the '708 patent.

95. Defendant's infringement of the '708 patent is willful, deliberate, and intentional by continuing its acts of infringement after becoming aware of the '708 patent and its infringement thereof, thus acting in reckless disregard of Masimo's patent rights.

96. Because of Defendant's infringement of the '708 patent, Masimo has suffered and will continue to suffer irreparable harm and injury, including monetary damages in an amount to be determined at trial.

97. Upon information and belief, unless enjoined, Defendant, and/or others acting on behalf of Defendant, will continue their infringing acts, thereby causing additional irreparable injury to Masimo for which there is no adequate remedy at law.

XI. FIFTH CAUSE OF ACTION

(INFRINGEMENT OF U.S. PATENT NO. 10,376,190)

98. Plaintiff Masimo hereby realleges and incorporates by reference the allegations set forth in paragraphs 1 through 42.

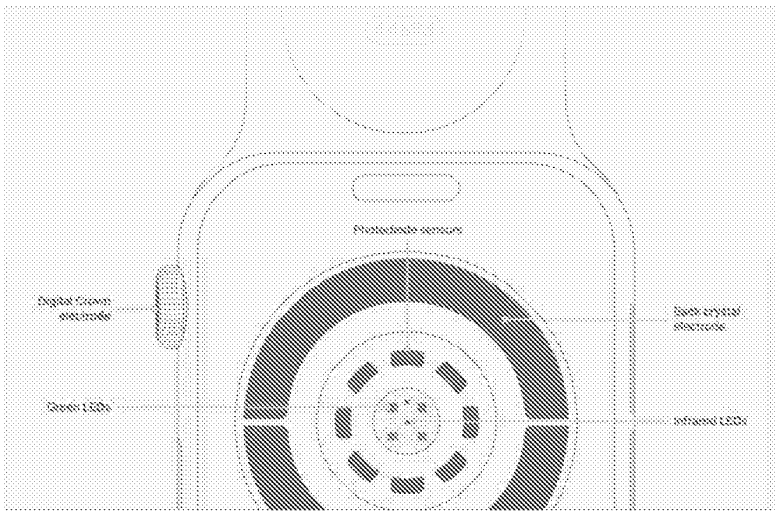
99. Upon information and belief, Defendant's products, including at least the Apple Watch Series 4 and later devices, infringe at least Claim 1 of the '190 patent under at least 35 U.S.C. § 271(a), (b), and (c).

100. Upon information and belief, Defendant has directly infringed one or more claims of the '190 patent through manufacture, use, sale, offer for sale, and/or importation into the United States of physiological monitors, including the Apple Watch Series 4 and later devices.

101. For example, upon information and belief, in operation, the Apple Watch Series 4 and later devices include all of the limitations of Claim 1 of the '190 patent as set forth herein and further illustrated in the claim chart shown in Exhibit 17. The Apple Watch Series 4 and later devices are noninvasive optical physiological measurement devices adapted to be worn by a wearer, the noninvasive optical physiological measurement device providing an indication of a physiological parameter (for example, heart rate) of the wearer as shown in the image below found on the Apple website at https://www.apple.com/apple-watch-series-4/health/:



102. Upon information and belief, the Apple Watch Series 4 and later devices include light emitters and at least four detectors spaced apart from each other and configured to output one or more signals responsive to light from the one or more light emitters attenuated by body tissue, the one or more signals indicative of a physiological parameter of the wearer as shown in the image below found on the Apple website at https://support.apple.com/en-us/HT204666:



103. The Apple Watch Series 4 and later devices include a housing having a surface and a circular raised edge extending from the surface, and a

light permeable cover arranged above at least a portion of the housing, the light permeable cover comprising a protrusion arranged to cover the at least four detectors. Fig. 4C and the corresponding text of the '912 publication show, for example, such housing:

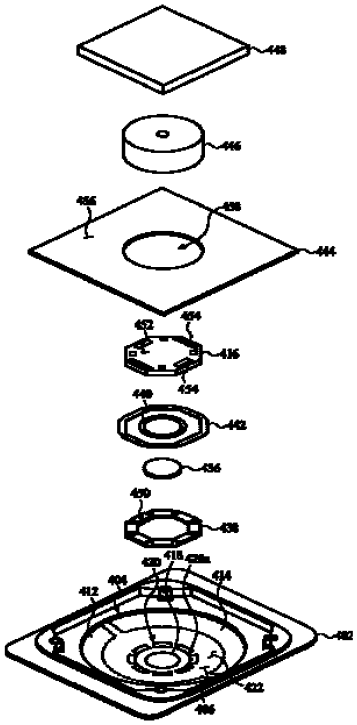


FIG. 4C

104. Upon information and belief, Defendant has knowledge of Masimo's patents, including the '190 patent, at least based on O'Reilly and Lamego's former positions with Plaintiffs. Masimo filed provisional patent applications that led to the '190 patent in August 2008, while O'Reilly and Lamego were with Masimo and/or Cercacor. Lamego is a named inventor of the '190 patent. Defendant had knowledge of the '190 patent no later than the filing of the original Complaint.

105. Upon information and belief, Defendant has actively induced others to infringe the '190 patent by marketing and selling the above Apple

Watch Series 4 and later devices, knowing and intending that such systems would be used by customers and end users in a manner that infringes the '190 patent. To that end, Defendant provides instructions and teachings to its customers and end users that such Apple Watch Series 4 and later devices be used to infringe the '190 patent. Defendant's acts constitute infringement of the '190 patent in violation of 35 U.S.C. § 271(b).

106. Upon information and belief, Defendant actively induces users to directly infringe the asserted claims of the '190 patent. By way of example only, upon information and belief, Defendant actively induces direct infringement of the '190 patent by providing directions, demonstrations, guides, manuals, training for use, and/or other materials necessary for the use of the Apple Watch Series 4 and later devices, including use with Apple iPhones. Upon information and belief, Defendant knew or should have known that these activities would cause direct infringement.

107. Upon information and belief, Defendant's acts constitute contributory infringement of the '190 patent in violation of 35 U.S.C. § 271(c). Upon information and belief, Defendant contributorily infringes because, among other things, Defendant offers to sell and/or sells within the United States, and/or imports into the United States, components of the Apple Watch Series 4 and later devices and Apple iPhones that constitute material parts of the invention of the asserted claims of the '190 patent, are not staple articles or commodities of commerce suitable for substantial non-infringing use, and are known by Defendant to be especially made or especially adapted for use in an infringement of the '190 patent.

108. Defendant's infringement of the '190 patent is willful, deliberate, and intentional by continuing its acts of infringement after becoming aware of the '190 patent and its infringement thereof, thus acting in reckless disregard of Masimo's patent rights.

109. Because of Defendant's infringement of the '190 patent, Masimo has suffered and will continue to suffer irreparable harm and injury, including monetary damages in an amount to be determined at trial.

110. Upon information and belief, unless enjoined, Defendant, and/or others acting on behalf of Defendant, will continue their infringing acts, thereby causing additional irreparable injury to Masimo for which there is no adequate remedy at law.

XII. SIXTH CAUSE OF ACTION

(INFRINGEMENT OF U.S. PATENT NO. 10,376,191)

111. Plaintiff Masimo hereby realleges and incorporates by reference the allegations set forth in paragraphs 1 through 42.

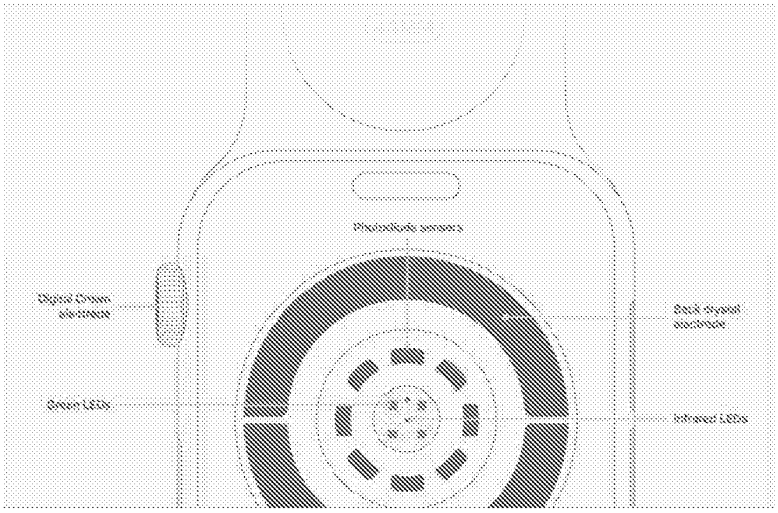
112. Upon information and belief, Defendant's products, including at least the Apple Watch Series 4 and later devices, infringe at least Claim 1 of the '191 patent under at least 35 U.S.C. § 271(a), (b), and (c).

113. Upon information and belief, Defendant has directly infringed one or more claims of the '191 patent through manufacture, use, sale, offer for sale, and/or importation into the United States of physiological monitors, including the Apple Watch Series 4 and later devices.

114. For example, upon information and belief, in operation, the Apple Watch Series 4 and later devices include all of the limitations of Claim 1 of the '191 patent as set forth herein and further illustrated in the claim chart shown in Exhibit 18. The Apple Watch Series 4 and later devices are a noninvasive optical physiological sensor as shown in the image below found on the Apple website at https://www.apple.com/apple-watch-series-4/health/:



115. The Apple Watch Series 4 and later devices include a plurality of emitters configured to emit light into tissue of a user and 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 as shown in the image below found on the Apple website at https://support.apple.com/en-us/HT204666:



116. The Apple Watch Series 4 and later devices include a housing configured to house at least the plurality of detectors in a circular portion of the housing, and a lens configured to be located between tissue of the user and the

plurality of detectors when the noninvasive optical physiological sensor is worn by the user, wherein the lens comprises a single outwardly protruding convex surface configured to cause tissue of the user to conform to at least a portion of the single outwardly protruding convex surface when the noninvasive optical physiological sensor is worn by the user and during operation of the noninvasive optical physiological sensor. Fig. 4C and the corresponding text of the '912 publication show, for example, such housing and lens:

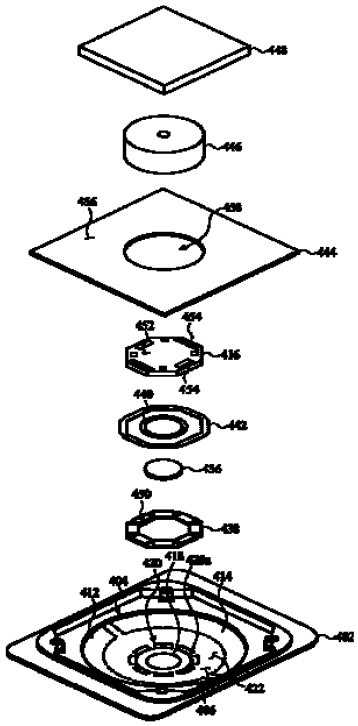


FIG. 4C

117. Upon information and belief, Defendant has knowledge of Masimo's patents, including the '191 patent, at least based on O'Reilly and Lamego's former positions with Plaintiffs. Masimo filed provisional patent applications that led to the '191 patent in August 2008, while O'Reilly and Lamego were with Masimo and/or Cercacor. Lamego is a named inventor of

the '191 patent. Defendant had knowledge of the '191 patent no later than the filing of the original Complaint.

118. Upon information and belief, Defendant has actively induced others to infringe the '191 patent by marketing and selling the above Apple Watch Series 4 and later devices, knowing and intending that such systems would be used by customers and end users in a manner that infringes the '191 patent. To that end, Defendant provides instructions and teachings to its customers and end users that such Apple Watch Series 4 and later devices be used to infringe the '191 patent. Defendant's acts constitute infringement of the '191 patent in violation of 35 U.S.C. § 271(b).

119. Upon information and belief, Defendant actively induces users to directly infringe the asserted claims of the '191 patent. By way of example only, upon information and belief, Defendant actively induces direct infringement of the '191 patent by providing directions, demonstrations, guides, manuals, training for use, and/or other materials necessary for the use of the Apple Watch Series 4 and later devices. Upon information and belief, Defendant knew or should have known that these activities would cause direct infringement.

120. Upon information and belief, Defendant's acts constitute contributory infringement of the '191 patent in violation of 35 U.S.C. § 271(c). Upon information and belief, Defendant contributorily infringes because, among other things, Defendant offers to sell and/or sells within the United States, and/or imports into the United States, components of the Apple Watch Series 4 and later devices that constitute material parts of the invention of the asserted claims of the '191 patent, are not staple articles or commodities of commerce suitable for substantial non-infringing use, and are known by Defendant to be especially made or especially adapted for use in an infringement of the '191 patent.

121. Defendant's infringement of the '191 patent is willful, deliberate, and intentional by continuing its acts of infringement after becoming aware of the '191 patent and its infringement thereof, thus acting in reckless disregard of Masimo's patent rights.

122. Because of Defendant's infringement of the '191 patent, Masimo has suffered and will continue to suffer irreparable harm and injury, including monetary damages in an amount to be determined at trial.

123. Upon information and belief, unless enjoined, Defendant, and/or others acting on behalf of Defendant, will continue their infringing acts, thereby causing additional irreparable injury to Masimo for which there is no adequate remedy at law.

XIII. SEVENTH CAUSE OF ACTION

(INFRINGEMENT OF U.S. PATENT NO. 10,470,695)

124. Plaintiff Masimo hereby realleges and incorporates by reference the allegations set forth in paragraphs 1 through 42.

125. Upon information and belief, Defendant's products, including at least the Apple Watch Series 4 and later devices, infringe at least Claim 1 of the '695 patent under at least 35 U.S.C. § 271(a), (b), and (c).

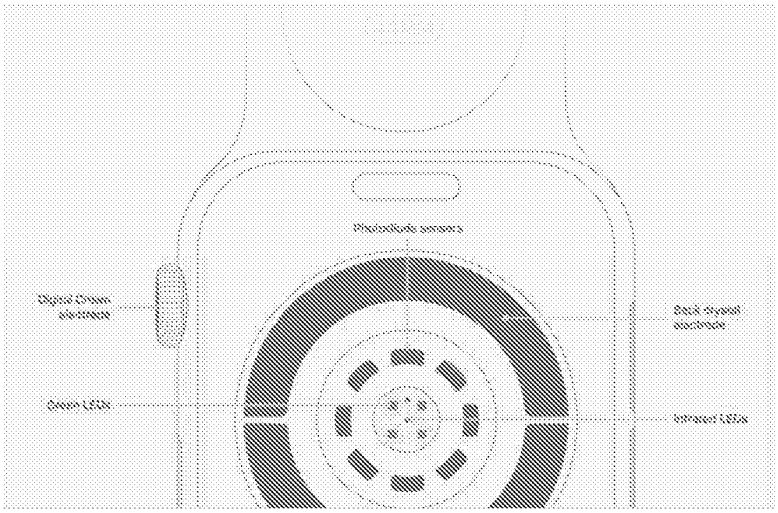
126. Upon information and belief, Defendant has directly infringed one or more claims of the '695 patent through manufacture, use, sale, offer for sale, and/or importation into the United States of physiological monitors, including the Apple Watch Series 4 and later devices.

127. For example, upon information and belief, in operation, the Apple Watch Series 4 and later devices include all of the limitations of Claim 1 of the '695 patent as set forth herein and further illustrated in the claim chart shown in Exhibit 19. The Apple Watch Series 4 and later devices are a wrist-worn physiological monitoring device configured for placement on a user at a tissue

measurement site as shown in the image below found on the Apple website at https://www.apple.com/apple-watch-series-4/health/:



128. The Apple Watch Series 4 and later devices include a light emission source comprising a plurality of emitters configured to irradiate the tissue measurement site by emitting light towards the tissue measurement site, the tissue measurement site being located on a wrist of the user, the plurality of emitters configured to emit one or more wavelengths and a plurality of detectors configured to detect the light emitted by the plurality of emitters after attenuation by a circular portion of the tissue measurement site, the plurality of detectors further configured to output at least one signal responsive to the detected light as shown in the image below found on the Apple website at https://support.apple.com/en-us/HT204666:



129. The Apple Watch Series 4 and later devices include a processor configured to receive the at least one signal responsive to the output and determine a physiological parameter of the user and a light block forming an enclosing wall between the light emission source and the plurality of detectors, the light block defining the circular portion of the tissue measurement site, the light emission source arranged proximate a first side of the enclosing wall and the plurality of detectors arranged proximate a second side of the enclosing wall, the first side being different than the second side, wherein the enclosing wall prevents at least a portion of light emitted from the light emission source from being detected by the plurality of detectors without attenuation by the tissue, and wherein the plurality of detectors are arranged in an array having a spatial configuration corresponding to the portion of the tissue measurement site. Fig. 4C and the corresponding text of the '912 publication show, for example, such light block:

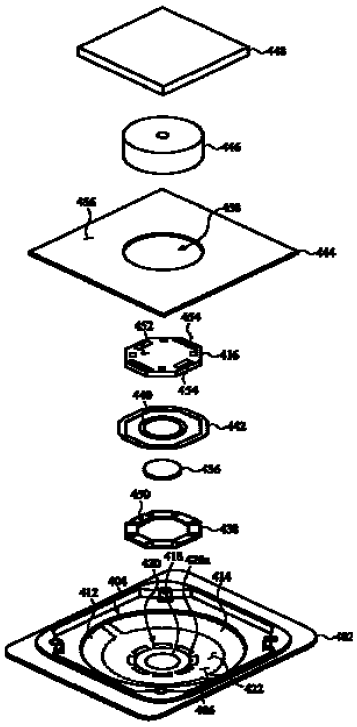


FIG. 4C

130. Upon information and belief, Defendant has knowledge of Masimo's patents, including the '695 patent, at least based on O'Reilly and Lamego's former positions with Plaintiffs. Masimo filed provisional patent applications that led to the '695 patent in August 2008, while O'Reilly and Lamego were with Masimo and/or Cercacor. Lamego is a named inventor of the '695 patent. Defendant had knowledge of the '695 patent no later than the filing of the original Complaint.

131. Upon information and belief, Defendant has actively induced others to infringe the '695 patent by marketing and selling the above Apple Watch Series 4 and later devices, knowing and intending that such systems would be used by customers and end users in a manner that infringes the '695 patent. To that end, Defendant provides instructions and teachings to its customers and end users that such Apple Watch Series 4 and later devices be used to infringe the '695 patent. Defendant's acts constitute infringement of the '695 patent in violation of 35 U.S.C. § 271(b).

132. Upon information and belief, Defendant actively induces users to directly infringe the asserted claims of the '695 patent. By way of example only, upon information and belief, Defendant actively induces direct infringement of the '695 patent by providing directions, demonstrations, guides, manuals, training for use, and/or other materials necessary for the use of the Apple Watch Series 4 and later devices. Upon information and belief, Defendant knew or should have known that these activities would cause direct infringement.

133. Upon information and belief, Defendant's acts constitute contributory infringement of the '695 patent in violation of 35 U.S.C. § 271(c). Upon information and belief, Defendant contributorily infringes because, among other things, Defendant offers to sell and/or sells within the United States, and/or imports into the United States, components of the Apple Watch Series 4 and later devices that constitute material parts of the invention of the asserted claims of the '695 patent, are not staple articles or commodities of commerce suitable for substantial non-infringing use, and are known by Defendant to be especially made or especially adapted for use in an infringement of the '695 patent.

134. Defendant's infringement of the '695 patent is willful, deliberate, and intentional by continuing its acts of infringement after becoming aware of the '695 patent and its infringement thereof, thus acting in reckless disregard of Masimo's patent rights.

135. Because of Defendant's infringement of the '695 patent, Masimo has suffered and will continue to suffer irreparable harm and injury, including monetary damages in an amount to be determined at trial.

136. Upon information and belief, unless enjoined, Defendant, and/or others acting on behalf of Defendant, will continue their infringing acts, thereby

causing additional irreparable injury to Masimo for which there is no adequate remedy at law.

XIV. EIGHTH CAUSE OF ACTION

(INFRINGEMENT OF U.S. PATENT NO. 6,771,994)

137. Plaintiff Masimo hereby realleges and incorporates by reference the allegations set forth in paragraphs 1 through 42.

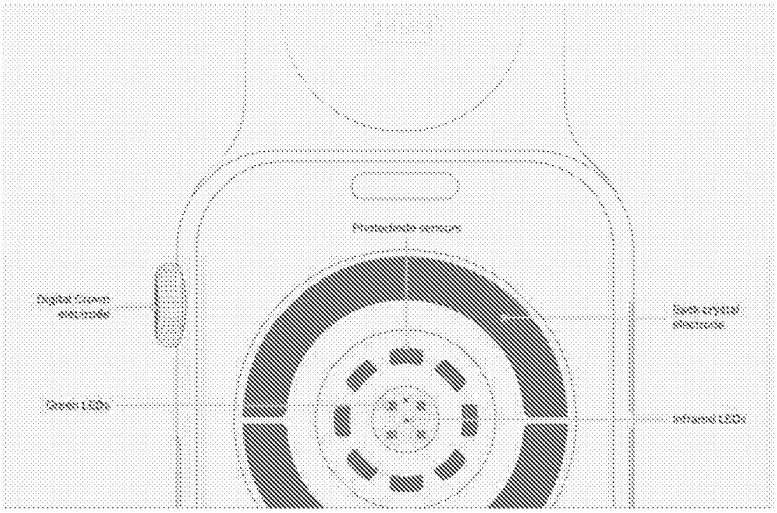
138. Upon information and belief, Defendant's products, including at least the Apple Watch Series 4 and later devices, infringe at least Claim 15 of the '994 patent under at least 35 U.S.C. § 271(a), (b), and (c).

139. Upon information and belief, Defendant has directly infringed one or more claims of the '994 patent through manufacture, use, sale, offer for sale, and/or importation into the United States of physiological monitors, including the Apple Watch Series 4 and later devices.

140. For example, upon information and belief, in operation, the Apple Watch Series 4 and later devices include all of the limitations of Claim 15 of the '994 patent as set forth herein and further illustrated in the claim chart shown in Exhibit 20. Upon information and belief, the Apple Watch Series 4 and later devices detects light transmitted through body tissue carrying pulsing blood to determine heart rate as shown in the image below found on the Apple website at https://www.apple.com/apple-watch-series-4/health/:



141. The Apple Watch Series 4 and later devices include at least one light emission device and a light sensitive detector as shown in the image below found on the Apple website at https://support.apple.com/en-us/HT204666:



142. The detectors output signals responsive to light from the light emitters attenuated by body tissue. Upon information and belief, the signals are indicative of a physiological parameter (for example, heart rate) of the wearer.

143. Upon information and belief, the relevant technology in the Apple Watch Series 4 and later devices is described in the below citations to U.S. Patent Application Publication 2019/0090806 (the '806 publication). A copy of

the publication is attached as Exhibit 26. The Apple Watch Series 4 and later devices include a plurality of louvers positioned over the light sensitive detector to accept light from the at least one light emission device originating from a general direction of the at least one light emission device and then transmitting through body tissue carrying pulsing blood, wherein the louvers accept the light when the sensor is properly applied to tissue of a patient. Upon information and belief, this technology is described, for example, in Fig. 7 and the corresponding text of the '806 publication:

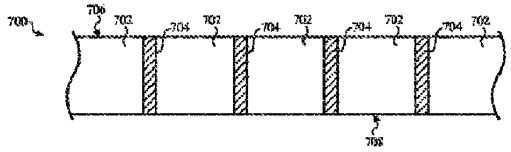


FIG. 7

144. Upon information and belief, Defendant has knowledge of Masimo's patents, including the '994 patent, at least based on O'Reilly and Lamego's former positions with Plaintiffs. Masimo filed a patent application that led to the '994 patent on June 16, 2000. The '994 patent issued on August 3, 2004, and Masimo has maintained the patent while O'Reilly and Lamego were with Masimo and/or Cercacor. Defendant had knowledge of the '994 patent no later than the filing of the original Complaint.

145. Upon information and belief, Defendant has actively induced others to infringe the '994 patent by marketing and selling the above Apple Watch Series 4 and later devices, knowing and intending that such systems would be used by customers and end users in a manner that infringes the '994 patent. To that end, Defendant provides instructions and teachings to its customers and end users that such Apple Watch Series 4 and later devices be used to infringe the '994 patent. Defendant's acts constitute infringement of the '994 patent in violation of 35 U.S.C. § 271(b).

146. Upon information and belief, Defendant actively induces users to directly infringe the asserted claims of the '994 patent. By way of example

only, upon information and belief, Defendant actively induces direct infringement of the '994 patent by providing directions, demonstrations, guides, manuals, training for use, and/or other materials necessary for the use of the Apple Watch Series 4 and later devices. Upon information and belief, Defendant knew or should have known that these activities would cause direct infringement.

147. Upon information and belief, Defendant's acts constitute contributory infringement of the '994 patent in violation of 35 U.S.C. § 271(c). Upon information and belief, Defendant contributorily infringes because, among other things, Defendant offers to sell and/or sells within the United States, and/or imports into the United States, components of the Apple Watch Series 4 and later devices that constitute material parts of the invention of the asserted claims of the '994 patent, are not staple articles or commodities of commerce suitable for substantial non-infringing use, and are known by Defendant to be especially made or especially adapted for use in an infringement of the '994 patent.

148. Defendant's infringement of the '994 patent is willful, deliberate, and intentional by continuing its acts of infringement after becoming aware of the '994 patent and its infringement thereof, thus acting in reckless disregard of Masimo's patent rights.

149. Because of Defendant's infringement of the '994 patent, Masimo has suffered and will continue to suffer irreparable harm and injury, including monetary damages in an amount to be determined at trial.

150. Upon information and belief, unless enjoined, Defendant, and/or others acting on behalf of Defendant, will continue their infringing acts, thereby causing additional irreparable injury to Masimo for which there is no adequate remedy at law.

XV. NINTH CAUSE OF ACTION

(INFRINGEMENT OF U.S. PATENT NO. 8,457,703)

151. Plaintiff Masimo hereby realleges and incorporates by reference the allegations set forth in paragraphs 1 through 42.

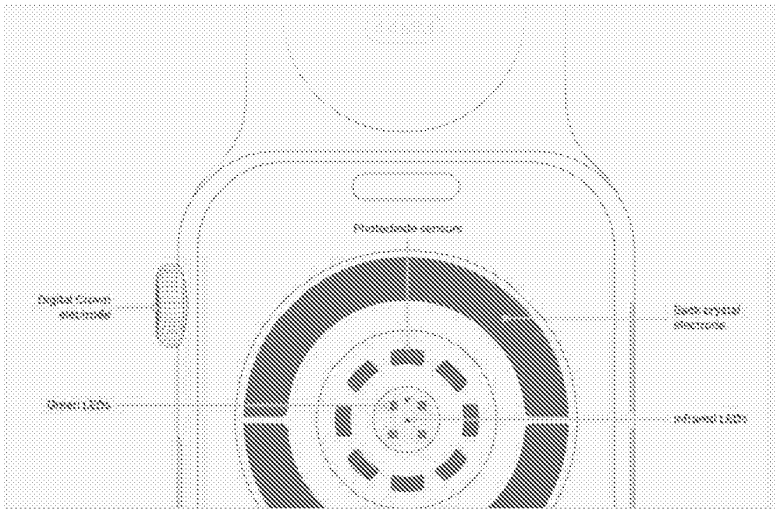
152. Upon information and belief, Defendant's products, including at least the Apple Watch Series 4 and later devices, infringe at least Claim 1 of the '703 patent under at least 35 U.S.C. § 271(a), (b), and (c).

153. Upon information and belief, Defendant has directly infringed one or more claims of the '703 patent through manufacture, use, sale, offer for sale, and/or importation into the United States of physiological monitors, including the Apple Watch Series 4 and later devices.

154. For example, upon information and belief, in operation, the Apple Watch Series 4 and later devices include all of the limitations of Claim 1 of the '703 patent as set forth herein and further illustrated in the claim chart shown in Exhibit 21. The Apple Watch Series 4 and later devices provide an indication of a physiological parameter (for example, heart rate) of the wearer as shown in the image below found on the Apple website at https://www.apple.com/apple-watch-series-4/health/:



155. The Apple Watch Series 4 and later devices drive one or more light sources configured to emit light into tissue and receives one or more signals from one or more detectors configured to detect light after attenuation by tissue as shown in the image below found on the Apple website at https://support.apple.com/en-us/HT204666:



156. The detectors output signals responsive to light from the light emitters attenuated by body tissue. Upon information and belief, the signals are indicative of a physiological parameter (for example, heart rate) of the wearer.

157. Upon information and belief, the Apple Watch Series 4 and later devices continuously operate at a lower power consumption level to determine measurement values for heart rate, as described at https://support.apple.com/en-us/HT204666:

> The optical heart sensor in Apple Watch uses what is known as photoplethysmography. This technology, while difficult to pronounce, is based on a very simple fact: Blood is red because it reflects red light and absorbs green light. Apple Watch uses green LED lights paired with light-sensitive photodiodes to detect the amount of blood flowing through your wrist at any given moment.

> When your heart beats, the blood flow in your wrist — and the green light absorption — is greater. Between beats, it's less. By flashing its LED lights hundreds of times per second, Apple Watch can calculate the number of times the heart beats each minute — your heart rate. The optical heart sensor supports a range of 30–210 beats per minute. In addition, the optical heart sensor is designed to compensate for low signal levels by increasing both LED brightness and sampling rate.

158. Upon information and belief, the Apple Watch Series 4 and later devices as described above compare processing characteristics to a predetermined threshold, and when the processing characteristics pass the threshold, the Apple Watch Series 4 and later devices transition to continuously operating at a higher power consumption level, wherein the continuously operating at the lower power consumption level comprises reducing activation of an attached sensor, the sensor positioning the light sources and the detectors proximate to the tissue.

159. Upon information and belief, Defendant has knowledge of Masimo's patents, including the '703 patent, at least based on O'Reilly and Lamego's former positions with Plaintiffs. Masimo filed a provisional patent application that led to the '703 patent on July 2, 2001. The '703 patent issued on June 4, 2013, while O'Reilly and Lamego were with Masimo and/or Cercacor. Defendant had knowledge of the '703 patent no later than the filing of the original Complaint.

160. Upon information and belief, Defendant has actively induced others to infringe the '703 patent by marketing and selling the above Apple Watch Series 4 and later devices, knowing and intending that such systems would be used by customers and end users in a manner that infringes the '703 patent. To that end, Defendant provides instructions and teachings to its

customers and end users that such Apple Watch Series 4 and later devices be used to infringe the '703 patent. Defendant's acts constitute infringement of the '703 patent in violation of 35 U.S.C. § 271(b).

161. Upon information and belief, Defendant actively induces users to directly infringe the asserted claims of the '703 patent. By way of example only, upon information and belief, Defendant actively induces direct infringement of the '703 patent by providing directions, demonstrations, guides, manuals, training for use, and/or other materials necessary for the use of the Apple Watch Series 4 and later devices. Upon information and belief, Defendant knew or should have known that these activities would cause direct infringement.

162. Upon information and belief, Defendant's acts constitute contributory infringement of the '703 patent in violation of 35 U.S.C. § 271(c). Upon information and belief, Defendant contributorily infringes because, among other things, Defendant offers to sell and/or sells within the United States, and/or imports into the United States, components of the Apple Watch Series 4 and later devices that constitute material parts of the invention of the asserted claims of the '703 patent, are not staple articles or commodities of commerce suitable for substantial non-infringing use, and are known by Defendant to be especially made or especially adapted for use in an infringement of the '703 patent.

163. Defendant's infringement of the '703 patent is willful, deliberate, and intentional by continuing its acts of infringement after becoming aware of the '703 patent and its infringement thereof, thus acting in reckless disregard of Masimo's patent rights.

164. Because of Defendant's infringement of the '703 patent, Masimo has suffered and will continue to suffer irreparable harm and injury, including monetary damages in an amount to be determined at trial.

165. Upon information and belief, unless enjoined, Defendant, and/or others acting on behalf of Defendant, will continue their infringing acts, thereby causing additional irreparable injury to Masimo for which there is no adequate remedy at law.

XVI. TENTH CAUSE OF ACTION

(INFRINGEMENT OF U.S. PATENT NO. 10,433,776)

166. Plaintiff Masimo hereby realleges and incorporates by reference the allegations set forth in paragraphs 1 through 42.

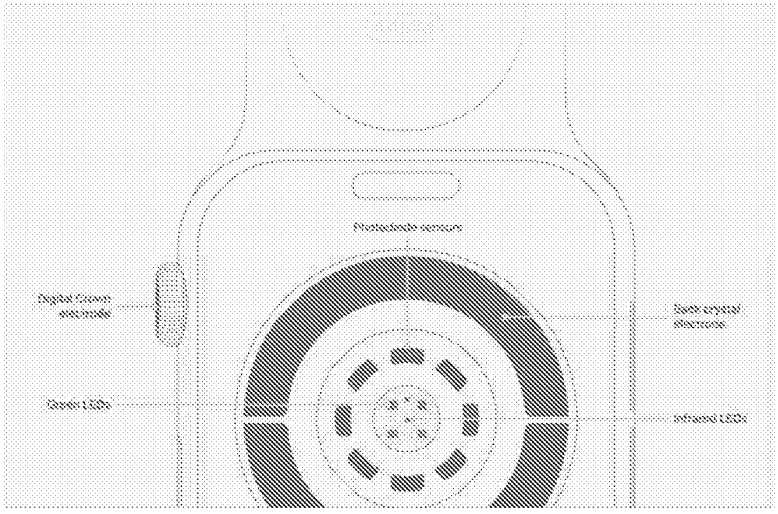
167. Upon information and belief, Defendant's products, including at least the Apple Watch Series 4 and later devices, infringe at least Claim 1 of the '776 patent under at least 35 U.S.C. § 271(a), (b), and (c).

168. Upon information and belief, Defendant has directly infringed one or more claims of the '776 patent through manufacture, use, sale, offer for sale, and/or importation into the United States of physiological monitors, including the Apple Watch Series 4 and later devices.

169. For example, upon information and belief, in operation, the Apple Watch Series 4 and later devices include all of the limitations of Claim 1 of the '776 patent as set forth herein and further illustrated in the claim chart shown in Exhibit 22. The Apple Watch Series 4 and later devices are configured to monitor at least a pulse rate of a patient by processing signals responsive to light attenuated by body tissue of the wearer as shown in the image below found on the Apple website at https://www.apple.com/apple-watch-series-4/health/:



170. The Apple Watch Series 4 and later devices drive one or more light sources configured to emit light into tissue and receives one or more signals from one or more detectors configured to detect light after attenuation by tissue as shown in the image below found on the Apple website at https://support.apple.com/en-us/HT204666:



171. Upon information and belief, the Apple Watch Series 4 and later devices operate according to a first control protocol, wherein said operating includes activating a first control protocol light source in accordance with the

first control protocol, the first control protocol light source including one or more of a plurality of light sources, and when operating according to the first control protocol, calculating, by the patient monitor, measurement values of the pulse rate, the measurement values responsive to light from the first control protocol light source, detected by a detector of an optical sensor after attenuation by body tissue of the patient using the patient monitor as explained, for example, on the Apple website at https://support.apple.com/en-us/HT204666. That webpage explains the optical heart sensor uses photoplethysmography. "Apple Watch uses green LED lights paired with light-sensitive photodiodes to detect the amount of blood flowing through your wrist at any given moment. When your heart beats, the blood flow in your wrist — and the green light absorption — is greater. Between beats, it's less. By flashing its LED lights hundreds of times per second, Apple Watch can calculate the number of times the heart beats each minute — your heart rate. The optical heart sensor supports a range of 30–210 beats per minute. In addition, the optical heart sensor is designed to compensate for low signal levels by increasing both LED brightness and sampling rate." That webpage further explains that the "optical heart sensor can also use infrared light. This mode is what Apple Watch uses when it measures your heart rate in the background, and for heart rate notifications. Apple Watch uses green LED lights to measure your heart rate during workouts and Breathe sessions, and to calculate walking average and Heart Rate Variability (HRV)."

172. Upon information and belief, the Apple Watch Series 4 and later devices generate a trigger signal, wherein generating said trigger signal is responsive to at least one of: a comparison of processing characteristics to a predetermined threshold, a physiological event, or signal quality characteristics of signals received from the detector, and in response to receiving the trigger signal, operating the patient monitor according to a second control protocol

different from the first control protocol, wherein said operating includes activating a second control protocol light source in accordance with the second control protocol, the second control protocol light source including one or more of the plurality of light sources, and when operating the patient monitor according to the second control protocol, calculating the measurement values of the pulse rate, the measurement values responsive to light from the second control protocol light source, detected by the detector after attenuation by the body tissue of the patient using the patient monitor, wherein said operating of the patient monitor according to the first control protocol operates the first control protocol light source according to a first duty cycle and said operating of the patient monitor according to the second control protocol operates the second control protocol light source according to a second duty cycle, wherein power consumption of the first control protocol light source according to the first duty cycle is different than power consumption of the second control protocol light source according to the second duty cycle.

173. Upon information and belief, Defendant has knowledge of Masimo's patents, including the '776 patent, at least based on O'Reilly and Lamego's former positions with Plaintiffs. Masimo filed a provisional patent application that led to the '776 patent on July 2, 2001. The '776 patent issued on June 4, 2013, while O'Reilly and Lamego were with Masimo and/or Cercacor. Defendant had knowledge of the '776 patent no later than the filing of the original Complaint.

174. Upon information and belief, Defendant has actively induced others to infringe the '776 patent by marketing and selling the above Apple Watch Series 4 and later devices, knowing and intending that such systems would be used by customers and end users in a manner that infringes the '776 patent. To that end, Defendant provides instructions and teachings to its customers and end users that such Apple Watch Series 4 and later devices be

used to infringe the '776 patent. Defendant's acts constitute infringement of the '776 patent in violation of 35 U.S.C. § 271(b).

175. Upon information and belief, Defendant actively induces users to directly infringe the asserted claims of the '776 patent. By way of example only, upon information and belief, Defendant actively induces direct infringement of the '776 patent by providing directions, demonstrations, guides, manuals, training for use, and/or other materials necessary for the use of the Apple Watch Series 4 and later devices. Upon information and belief, Defendant knew or should have known that these activities would cause direct infringement.

176. Upon information and belief, Defendant's acts constitute contributory infringement of the '776 patent in violation of 35 U.S.C. § 271(c). Upon information and belief, Defendant contributorily infringes because, among other things, Defendant offers to sell and/or sells within the United States, and/or imports into the United States, components of the Apple Watch Series 4 and later devices that constitute material parts of the invention of the asserted claims of the '776 patent, are not staple articles or commodities of commerce suitable for substantial non-infringing use, and are known by Defendant to be especially made or especially adapted for use in an infringement of the '776 patent.

177. Defendant's infringement of the '776 patent is willful, deliberate, and intentional by continuing its acts of infringement after becoming aware of the '776 patent and its infringement thereof, thus acting in reckless disregard of Masimo's patent rights.

178. Because of Defendant's infringement of the '776 patent, Masimo has suffered and will continue to suffer irreparable harm and injury, including monetary damages in an amount to be determined at trial.

179. Upon information and belief, unless enjoined, Defendant, and/or others acting on behalf of Defendant, will continue their infringing acts, thereby causing additional irreparable injury to Masimo for which there is no adequate remedy at law.

XVII. ELEVENTH CAUSE OF ACTION

(INFRINGEMENT OF U.S. PATENT NO. 10,588,553)

180. Plaintiff Masimo hereby realleges and incorporates by reference the allegations set forth in paragraphs 1 through 42.

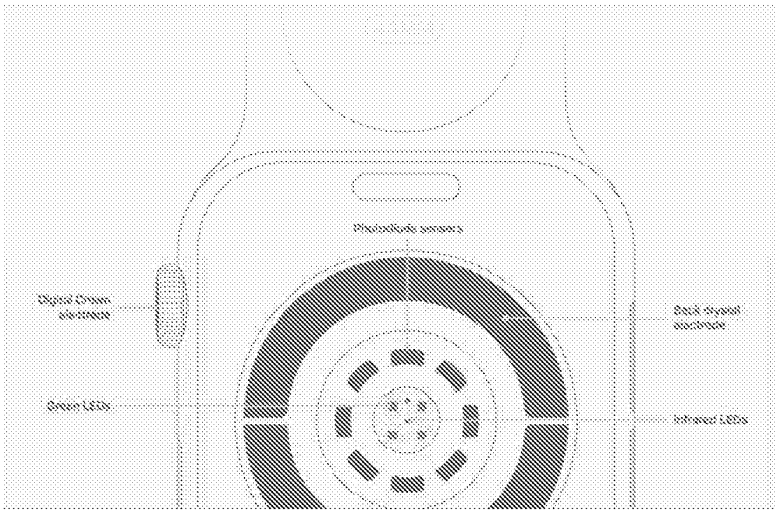
181. Upon information and belief, Defendant's products, including at least the Apple Watch Series 4 and later devices, infringe at least Claim 1 of the '553 patent under at least 35 U.S.C. § 271(a), (b), and (c).

182. Upon information and belief, Defendant has directly infringed one or more claims of the '553 patent through manufacture, use, sale, offer for sale, and/or importation into the United States of physiological monitors, including the Apple Watch Series 4 and later devices.

183. For example, upon information and belief, in operation, the Apple Watch Series 4 and later devices include all of the limitations of Claim 1 of the '553 patent as set forth herein and further illustrated in the claim chart shown in Exhibit 23. The Apple Watch Series 4 and later devices are noninvasive optical physiological sensor devices as shown in the image below found on the Apple website at https://www.apple.com/apple-watch-series-4/health/:



184. The Apple Watch Series 4 and later devices include a plurality of emitters configured to emit light into tissue of a user, and at least four detectors, wherein at least one of the at least four detectors is configured to detect light that has been attenuated by tissue of the user, and wherein the at least four detectors are arranged on a substrate as shown in the image below found on the Apple website at https://support.apple.com/en-us/HT204666:



185. The detectors output signals responsive to light from the light emitters attenuated by body tissue. Upon information and belief, the signals are indicative of a physiological parameter (for example, heart rate) of the wearer.

186. Upon information and belief, the relevant technology in the Apple Watch Series 4 and later devices is described in the below citations to U.S. Patent Application Publication 2019/0072912 (the '912 publication). A copy of the publication is attached as Exhibit 25. The Apple Watch Series 4 and later devices include a wall configured to circumscribe at least the at least four detectors and a cover configured to be located between tissue of the user and the at least four detectors when the noninvasive optical physiological sensor is worn by the user, wherein the cover comprises a single protruding convex surface operable to conform tissue of the user to at least a portion of the single protruding convex surface when the noninvasive optical physiological sensor is worn by the user, and wherein the wall operably connects to the substrate and the cover. Fig. 4C and the corresponding text of the '912 publication show, for example, such wall and cover:

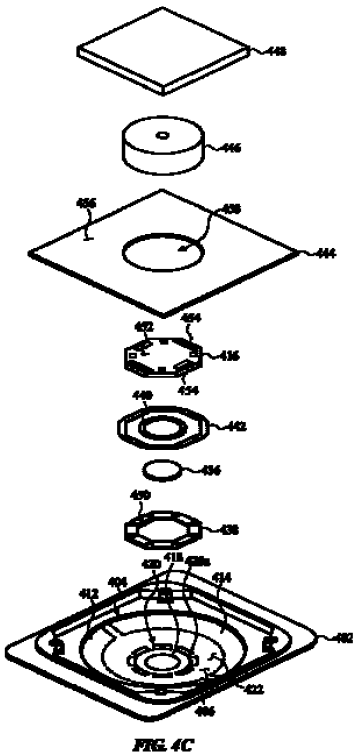


FIG. 4C

187. Upon information and belief, Defendant has knowledge of Masimo's patents, including the '553 patent, at least based on O'Reilly and Lamego's former positions with Plaintiffs. Masimo filed provisional patent applications that led to the '553 patent in August 2008, while O'Reilly and Lamego were with Masimo and/or Cercacor. Lamego is a named inventor of the '553 patent. Defendant had knowledge of the '553 patent no later than the filing of this First Amended Complaint.

188. Upon information and belief, Defendant has actively induced others to infringe the '553 patent by marketing and selling the above Apple Watch Series 4 and later devices, knowing and intending that such systems would be used by customers and end users in a manner that infringes the '553 patent. To that end, Defendant provides instructions and teachings to its customers and end users that such Apple Watch Series 4 and later devices be used to infringe the '553 patent. Defendant's acts constitute infringement of the '553 patent in violation of 35 U.S.C. § 271(b).

189. Upon information and belief, Defendant actively induces users to directly infringe the asserted claims of the '553 patent. By way of example only, upon information and belief, Defendant actively induces direct infringement of the '553 patent by providing directions, demonstrations, guides, manuals, training for use, and/or other materials necessary for the use of the Apple Watch Series 4 and later devices, including use with Apple iPhones. Upon information and belief, Defendant knew or should have known that these activities would cause direct infringement.

190. Upon information and belief, Defendant's acts constitute contributory infringement of the '553 patent in violation of 35 U.S.C. § 271(c). Upon information and belief, Defendant contributorily infringes because, among other things, Defendant offers to sell and/or sells within the United States, and/or imports into the United States, components of the Apple Watch Series 4

and later devices and Apple iPhones that constitute material parts of the invention of the asserted claims of the '553 patent, are not staple articles or commodities of commerce suitable for substantial non-infringing use and are known by Defendant to be especially made or especially adapted for use in an infringement of the '553 patent.

191. Defendant's infringement of the '553 patent is willful, deliberate, and intentional by continuing its acts of infringement after becoming aware of the '553 patent and its infringement thereof, thus acting in reckless disregard of Masimo's patent rights.

192. Because of Defendant's infringement of the '553 patent, Masimo has suffered and will continue to suffer irreparable harm and injury, including monetary damages in an amount to be determined at trial.

193. Upon information and belief, unless enjoined, Defendant, and/or others acting on behalf of Defendant, will continue their infringing acts, thereby causing additional irreparable injury to Masimo for which there is no adequate remedy at law.

XVIII. TWELFTH CAUSE OF ACTION

(INFRINGEMENT OF U.S. PATENT NO. 10,588,554)

194. Plaintiff Masimo hereby realleges and incorporates by reference the allegations set forth in paragraphs 1 through 42.

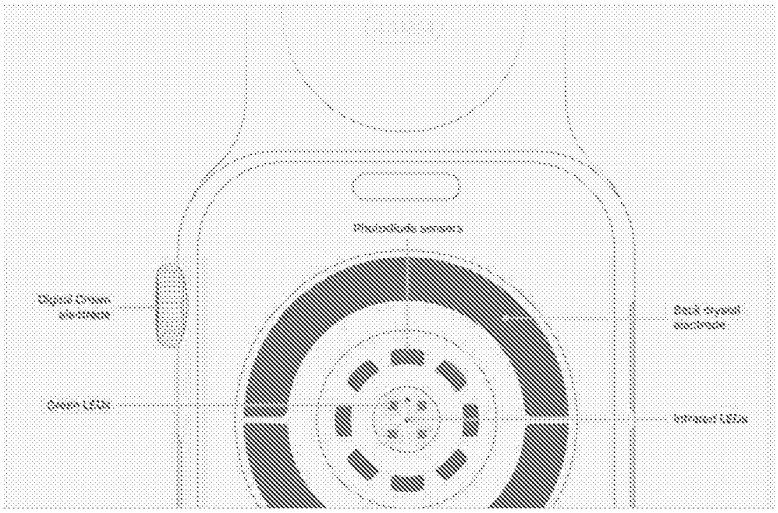
195. Upon information and belief, Defendant's products, including at least the Apple Watch Series 4 and later devices, infringe at least Claim 21 of the '554 patent under at least 35 U.S.C. § 271(a), (b), and (c).

196. Upon information and belief, Defendant has directly infringed one or more claims of the '554 patent through manufacture, use, sale, offer for sale, and/or importation into the United States of physiological monitors, including the Apple Watch Series 4 and later devices.

197. For example, upon information and belief, in operation, the Apple Watch Series 4 and later devices in combination with iPhone devices include all of the limitations of Claim 21 of the '554 patent as set forth herein and further illustrated in the claim chart shown in Exhibit 24. The Apple Watch Series 4 and later devices are physiological measurement systems with physiological sensors as shown in the image below found on the Apple website at https://www.apple.com/apple-watch-series-4/health/:



198. The Apple Watch Series 4 and later devices include a plurality of emitters configured to emit light into tissue of a user, and 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 as shown in the image below found on the Apple website at https://support.apple.com/en-us/HT204666:



199. The detectors output signals responsive to light from the light emitters attenuated by body tissue. Upon information and belief, the signals are indicative of a physiological parameter (for example, heart rate) of the wearer.

200. Upon information and belief, the relevant technology in the Apple Watch Series 4 and later devices is described in the below citations to U.S. Patent Application Publication 2019/0072912 (the '912 publication). A copy of the publication is attached as Exhibit 25. The Apple Watch Series 4 and later devices include a wall that surrounds at least the at least four detectors, a cover comprising a single protruding convex surface, wherein the single protruding convex surface is configured to be located between tissue of the user and the at least four detectors when the physiological sensor device is worn by the user, wherein at least a portion of the single protruding convex surface is sufficiently rigid to cause tissue of the user to conform to at least a portion of a shape of the single protruding convex surface when the physiological sensor device is worn by the user, and wherein the cover operably connects to the wall. Fig. 4C and the corresponding text of the '912 publication show, for example, such wall and cover:

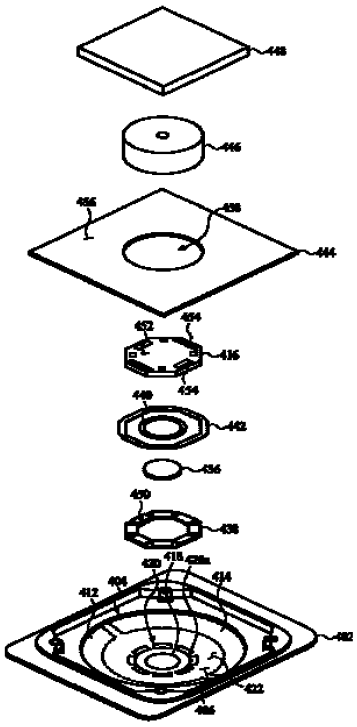
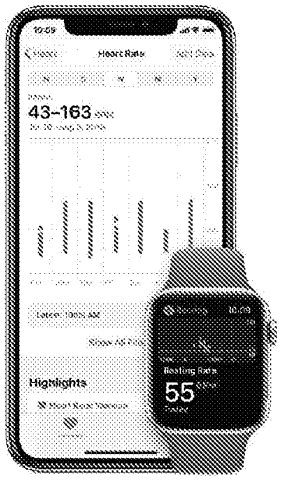


FIG. 4C

201. The Apple Watch Series 4 and later devices communicate wirelessly with handheld computing devices as shown in the image below found on the Apple website at https://support.apple.com/en-us/HT204666 and as further described at https://support.apple.com/en-us/HT204505:



202. Upon information and belief, Defendant has knowledge of Masimo's patents, including the '554 patent, at least based on O'Reilly and Lamego's former positions with Plaintiffs. Masimo filed provisional patent applications that led to the '554 patent in August 2008, while O'Reilly and Lamego were with Masimo and/or Cercacor. Lamego is a named inventor of the '554 patent. Defendant had knowledge of the '554 patent no later than the filing of this First Amended Complaint.

203. Upon information and belief, Defendant has actively induced others to infringe the '554 patent by marketing and selling the above Apple Watch Series 4 and later devices, knowing and intending that such systems would be used by customers and end users in a manner that infringes the '554 patent. To that end, Defendant provides instructions and teachings to its customers and end users that such Apple Watch Series 4 and later devices be used to infringe the '554 patent. Defendant's acts constitute infringement of the '554 patent in violation of 35 U.S.C. § 271(b).

204. Upon information and belief, Defendant actively induces users to directly infringe the asserted claims of the '554 patent. By way of example only, upon information and belief, Defendant actively induces direct infringement of the '554 patent by providing directions, demonstrations, guides, manuals, training for use, and/or other materials necessary for the use of the Apple Watch Series 4 and later devices, including use with Apple iPhones. Upon information and belief, Defendant knew or should have known that these activities would cause direct infringement.

205. Upon information and belief, Defendant's acts constitute contributory infringement of the '554 patent in violation of 35 U.S.C. § 271(c). Upon information and belief, Defendant contributorily infringes because, among other things, Defendant offers to sell and/or sells within the United States, and/or imports into the United States, components of the Apple Watch Series 4

and later devices and Apple iPhones that constitute material parts of the invention of the asserted claims of the '554 patent, are not staple articles or commodities of commerce suitable for substantial non-infringing use and are known by Defendant to be especially made or especially adapted for use in an infringement of the '554 patent.

206. Defendant's infringement of the '554 patent is willful, deliberate, and intentional by continuing its acts of infringement after becoming aware of the '554 patent and its infringement thereof, thus acting in reckless disregard of Masimo's patent rights.

207. Because of Defendant's infringement of the '554 patent, Masimo has suffered and will continue to suffer irreparable harm and injury, including monetary damages in an amount to be determined at trial.

208. Upon information and belief, unless enjoined, Defendant, and/or others acting on behalf of Defendant, will continue their infringing acts, thereby causing additional irreparable injury to Masimo for which there is no adequate remedy at law.

XIX. THIRTEENTH CAUSE OF ACTION
(TRADE SECRET MISAPPROPRIATION UNDER CALIFORNIA'S UNIFORM TRADE SECRET ACT)

209. Plaintiffs hereby reallege and incorporate by reference the allegations set forth in paragraphs 1 through 42.

210. This is a cause of action for Misappropriation of Trade Secrets under California's Uniform Trade Secrets Act, Cal. Civ. Code §§ 3426 *et seq.*, based upon Defendant's wrongful and improper acquisition, use, and disclosure of confidential and proprietary trade secret information of Plaintiffs.

211. Plaintiffs own trade secrets that include, but are not limited to, Plaintiffs' technical information, sales and marketing information, and other business information relating to non-invasive monitoring of physiological

parameters and products to perform such monitoring. Plaintiffs' technical information includes product plans, engineering plans, product briefs, technical drawings, technical specifications, technical data, product designs, system designs, design captures, assembly design requirements, risk analysis, test procedures and results, test data, design review documents, software requirement specifications, technical know-how, manufacturing techniques and procedures, installation techniques and procedures, and invention disclosures. Plaintiffs' sales and marketing information includes product plans, business plans, customer information, sales pipelines, proposal and quote generation tools, pricing models, pricing schedules, sales training materials, product training materials, marketing and launch plans, marketing analysis, and competitive analysis. Plaintiffs' other business information includes information for successfully operating a non-invasive patient monitoring company, including personnel information, supplier information, and other business spreadsheets and analysis. Plaintiffs trade secrets also include combinations and selections of the above information, and knowledge of the varying importance of the information. Plaintiffs trade secrets also include knowledge for selecting which information and technology are important for improving reliability, improving measurements, and how to successfully combine and implement them to achieve the desired functionality. Plaintiffs' trade secrets also include negative information, what works well under certain conditions, and trade-offs of selecting certain techniques. The aforementioned information is referred to herein as Plaintiffs' "Confidential Information."

212. Plaintiffs' Confidential Information is currently or was, at least at the time of Defendant's misappropriation, not generally known to the public or to other persons who can obtain economic value from its disclosure or use. All individuals with access to Plaintiffs' Confidential Information were instructed to keep it confidential, and they were subject to obligations to keep Plaintiffs' Confidential Information secret. For example, Plaintiffs marked documents

confidential, and instructed those individuals with access to the information to treat it as confidential, restricted access to the information, and required individuals and companies to enter into confidentiality agreements with Plaintiffs in order to receive Plaintiffs' Confidential Information.

213. Plaintiffs' Confidential Information derives independent economic value, actual and potential, because it is, or was at the time of Defendant's misappropriation, not generally known to the public or to other persons who can obtain economic value from its disclosure or use. The actual and potential independent economic value of Plaintiffs' Confidential Information is derived from not being generally known because it gives or gave Plaintiffs an actual and potential business advantage over others who do not know the information and who could obtain economic value from its disclosure or use. If others obtained access to Plaintiffs' Confidential Information, they could use the information to deprive Plaintiffs of the business advantage it has over others, as well as to themselves obtain a business advantage over others.

214. Plaintiffs made reasonable efforts under the circumstances to keep Plaintiffs' Confidential Information from becoming generally known. For example, Plaintiffs' efforts included marking documents confidential, instructing individuals with access to the information to treat it as confidential, restricting access to the information, and requiring individuals and companies to enter into confidentiality agreements with Plaintiffs in order to receive Plaintiffs' Confidential Information. Accordingly, Plaintiffs' Confidential Information constitutes a "trade secret" pursuant to Cal. Civ. Code § 3426.1.

215. Plaintiffs are informed and believe, and thereon allege, that Defendant misappropriated Plaintiffs' Confidential Information by acquisition at least from Plaintiffs' former employees who left Plaintiffs to work for Defendant. For example, upon information and belief, Lamego disclosed Plaintiffs' Confidential Information, without Plaintiffs' consent, to Defendant. At the time of

disclosure, Lamego knew, or had reason to know, that his knowledge of Plaintiffs' Confidential Information was acquired by an employer-employee relationship, fiduciary relationship, and Lamego's employment agreements, which created a duty for Lamego to keep Plaintiffs' Confidential Information secret. Lamego also knew, or had reason to know, that disclosing Plaintiffs' Confidential Information to Defendant constituted a breach of those obligations.

216. At the time of acquisition, Defendant also knew, or had reason to know, that Lamego obtained Plaintiffs' Confidential information pursuant to a duty or obligation to keep Plaintiffs' Confidential information secret. This duty or obligation arose from an employer-employee relationship, fiduciary relationship, and Lamego's employment agreements. Among other things, Defendant knew Lamego was the Chief Technical Officer of Cercacor and a Research Scientist at Masimo. Defendant knew Lamego was under a duty to maintain the secrecy of the information he obtained from Plaintiffs. Defendant knew Plaintiffs considered the information confidential by virtue of its prior relationship with Plaintiffs. Defendant had also received a letter dated January 24, 2014, from Plaintiffs explaining that Lamego possessed Plaintiffs' Confidential Information, asking Defendant not to use such information, and attaching a copy of Lamego's Employee Confidentiality Agreement with Cercacor. Nevertheless, Defendant induced Lamego to disclose Plaintiffs' Confidential Information and Lamego disclosed Plaintiffs' Confidential Information for the benefit of Defendant while employed by Defendant. Thus, Defendant acquired Plaintiffs' trade secrets through the improper means of its employees breaching a duty to maintain secrecy owed to Plaintiffs, as well as inducing its employees to breach a duty to maintain secrecy owed to Plaintiffs.

217. Upon information and belief, Defendant used and disclosed Plaintiffs' Confidential Information it obtained from Plaintiffs and their former employees without Plaintiffs' express or implied consent. For example, Lamego

used and disclosed Plaintiffs' Confidential Information for the benefit of Defendant while employed by Defendant. As discussed above, Lamego knew or had reason to know that his knowledge of Plaintiffs' Confidential Information was acquired under circumstances giving rise to a duty to maintain its secrecy and limit its use.

218. Defendant further used and disclosed Plaintiffs' Confidential Information at least by incorporating it into Defendant's products and by filing patent applications containing Plaintiffs' Confidential Information, without Plaintiffs' express or implied consent. As discussed above, Defendant knew or had reason to know that its knowledge of Plaintiffs' Confidential Information came from Plaintiffs, Lamego's knowledge of Plaintiffs' Confidential Information came from Plaintiffs, and that Lamego had previously acquired Plaintiffs' Confidential Information by virtue of employer-employee and fiduciary relationships and the Lamego employment agreements, all of which created a duty for Lamego to keep Plaintiffs' Confidential Information secret.

219. Plaintiffs had no way of knowing, or learning, of Defendant's improper acquisition, use, or disclosure prior to January 10, 2017. Defendant did not publish Plaintiffs' Confidential Information in patent applications until after January 10, 2017, and the first product at issue was not announced until 2018. Additionally, based at least on Plaintiffs' conversations with Lamego, Plaintiffs' letter to Apple, and Plaintiffs' confidentiality agreement with Apple, Plaintiffs had no reason to suspect or believe that Defendant had ignored Plaintiffs' letter and improperly acquired, used, and disclosed Plaintiffs' Confidential Information until after Plaintiffs discovered patent applications published after January 10, 2017, and accused products announced in 2018.

220. Defendant and Lamego also led Plaintiffs to believe they intended to respect Plaintiffs' intellectual property rights and concealed Defendant's acquisition, use, and disclosure of Plaintiffs' Confidential Information. Plaintiffs

notified Defendant that Lamego possessed the Confidential Information on January 24, 2014. Defendant never informed Plaintiffs that Lamego had used or disclosed the Confidential Information. Defendant also requested non-publication of patent applications, which prevented Plaintiffs from learning of the contents of those applications until much later. For example, Defendant requested non-publication of the '268 Application (which issued as the '754 Patent), the '422 Application (which issued as the '997 Patent), and the '664 Application (which issued as the '095 Patent). On information and belief, Defendant requested non-publication of those applications to prevent Plaintiffs from learning those applications contained Plaintiffs' Confidential Information, and from learning the Defendant had acquired, used and disclosed Plaintiffs' Confidential Information.

221. Plaintiffs were harmed by Defendant's acquisition, use, and disclosure of Plaintiffs' Confidential Information, and Defendant's actions were substantial factors in causing Plaintiffs' harm. As a direct and proximate result of Defendant's willful, improper, and unlawful acquisition, use, and disclosure of Plaintiffs' trade secrets, Plaintiffs have suffered, and will continue to suffer, great harm and damage. Plaintiffs will continue to be irreparably damaged unless Defendant is enjoined from further use and disclosure of Plaintiffs' Confidential Information.

222. Defendant was unjustly enriched by Defendant's acquisition, use, and disclosure of Plaintiffs' Confidential Information, and Defendant's actions were substantial factors in causing Defendant to be unjustly enriched. Defendant was unjustly enriched because its misappropriation of Plaintiffs' Confidential Information caused Defendant to receive a benefit that it otherwise would not have achieved.

223. If neither damages nor unjust enrichment caused by Defendant's misappropriation of Plaintiffs' Confidential Information is provable at trial,

Plaintiffs are entitled to a reasonable royalty for the period of time that Defendant's use of Plaintiffs' Confidential Information could have been prohibited.

224. The aforementioned acts of Defendant wrongfully misappropriating Plaintiffs' trade secrets were, and continue to be, willful and malicious, warranting an award of reasonable attorneys' fees, as provided by Cal. Civ. Code § 3426.4, and exemplary damages, as provided by Cal. Civ. Code §§ 3294 and 3426.3(c).

XX. FOURTEENTH CAUSE OF ACTION

(CORRECTION OF INVENTORSHIP OF U.S. PATENT NO. 10,078,052)

225. Plaintiffs hereby reallege and incorporate by reference the allegations set forth in paragraphs 1 through 42.

226. Lamego is a named inventor of U.S. Patent 10,078,052 presently recorded as owned by Apple. A true and correct copy of the '052 Patent is attached hereto as Exhibit 27.

227. The '052 Patent claims subject matter that Lamego obtained from discussions with, or jointly conceived with, Masimo employees. For example, Claim 1 of the '052 Patent recites an electronic device comprising a housing defining an aperture; an optical sensing system comprising a light emitter for emitting light through the aperture, the light emitter positioned adjacent the aperture; and a light detector for obtaining a first portion of the light after the first portion of the light reflects from an object; and a reflector disposed about the aperture and adapted to reflect a second portion of the light back into the object after the second portion of the light reflects from the object. Lamego obtained this subject matter from discussions with, or jointly conceived it with, Diab. Accordingly, Diab is a joint inventor of any patentable subject matter claimed in the '052 Patent, and should have been named as an inventor on the '052 Patent.

228. In written assignments, Lamego, as well as Diab, agreed to assign and assigned to Masimo all patentable subject matter (as well as all works of authorship, developments, improvements, or trade secrets) conceived during their employment at Masimo, including ownership of all patents and patent applications claiming such subject matter.

229. Those assignments vested in Masimo all legal and equitable title to all patents and patent applications reciting inventions made during their employment, such that Masimo is at least a joint owner of the '052 Patent and Masimo has standing to seek correction of inventorship to perfect Masimo's ownership interest in the '052 Patent.

230. In at least one written assignment, Lamego agreed to assign and assigned to Cercacor all patentable subject matter (as well as all works of authorship, developments, improvements, or trade secrets) conceived during his employment at Cercacor, including ownership of all patents and patent applications claiming such subject matter. An exemplary agreement conveying such rights was attached as Exhibit A to Apple's Motion to Dismiss (Doc. No. 16-3). Accordingly, to the extent the evidence establishes that Lamego obtained patentable subject matter claimed in the '052 Patent from, or jointly conceived such subject matter with, Masimo employees while Lamego was an employee of Cercacor, Cercacor would be a joint owner of the '052 Patent and has standing to seek correction of inventorship to perfect Cercacor's ownership interest in the '052 Patent.

231. Pursuant to 28 U.S.C. § 2201 and 35 U.S.C. § 256, Plaintiffs seek an order directing the U.S. Patent and Trademark Office to correct the inventorship of the '052 Patent by adding inventor Diab as a named inventor.

XXI. FIFTEENTH CAUSE OF ACTION

(CORRECTION OF INVENTORSHIP OF U.S. PATENT NO. 10,247,670)

232. Plaintiffs hereby reallege and incorporate by reference the allegations set forth in paragraphs 1 through 42.

233. Lamego is a named inventor of U.S. Patent 10,247,670 presently recorded as owned by Apple. A true and correct copy of the '670 Patent is attached hereto as Exhibit 28.

234. The '670 Patent claims subject matter that Lamego obtained from discussions with, or jointly conceived with, Masimo employees. For example, Claim 1 of the '670 Patent recites an electronic device comprising a housing with a surface; a reflective layer that is formed on the surface, wherein the reflective layer has first and second openings; a light emitter that emits light through the first opening; and a light detector that receives the light emitted by the light emitter through the second opening. Lamego obtained this subject matter from discussions with, or jointly conceived it with, Diab. Accordingly, Diab is a joint inventor of any patentable subject matter claimed in the '670 Patent, and should have been named as an inventor on the '670 Patent.

235. In written assignments, Lamego, as well as Diab, agreed to assign and assigned to Masimo all patentable subject matter (as well as all works of authorship, developments, improvements, or trade secrets) conceived during their employment at Masimo, including ownership of all patents and patent applications claiming such subject matter.

236. Those assignments vested in Masimo all legal and equitable title to all patents and patent applications reciting inventions made during their employment, such that Masimo is at least a joint owner of the '670 Patent and Masimo has standing to seek correction of inventorship to perfect Masimo's ownership interest in the '670 Patent.

237. In at least one written assignment, Lamego agreed to assign and assigned to Cercacor all patentable subject matter (as well as all works of authorship, developments, improvements, or trade secrets) conceived during his employment at Cercacor, including ownership of all patents and patent applications claiming such subject matter. An exemplary agreement conveying such rights was attached as Exhibit A to Apple's Motion to Dismiss (Doc. No. 16-3). Accordingly, to the extent the evidence establishes that Lamego obtained patentable subject matter claimed in the '670 Patent from, or jointly conceived such subject matter with, Masimo employees while Lamego was an employee of Cercacor, Cercacor would be a joint owner of the '670 Patent and has standing to seek correction of inventorship to perfect Cercacor's ownership interest in the '670 Patent.

238. Pursuant to 28 U.S.C. § 2201 and 35 U.S.C. § 256, Plaintiffs seek an order directing the U.S. Patent and Trademark Office to correct the inventorship of the '670 Patent by adding inventor Diab as a named inventors.

XXII. SIXTEENTH CAUSE OF ACTION

(CORRECTION OF INVENTORSHIP OF U.S. PATENT NO. 9,952,095)

239. Plaintiffs hereby reallege and incorporate by reference the allegations set forth in paragraphs 1 through 42.

240. Lamego is a named inventor of U.S. Patent 9,952,095 presently recorded as owned by Apple. A true and correct copy of the '095 Patent is attached hereto as Exhibit 29.

241. The '095 Patent claims subject matter that Lamego obtained from discussions with, or jointly conceived with, Masimo employees. For example, Claim 1 of the '095 Patent recites an electronic device comprising a housing comprising a surface adapted to be positioned proximate a measurement site of a subject; a biometric sensor positioned at least partially within the surface and comprising: a plurality of light sources for emitting light toward the

measurement site at a selected modulation frequency; and an optical sensor for obtaining light exiting the measurement site; and an input amplifier coupled to the output of the biometric sensor and disposed within the housing; a high pass filter coupled to an output of the input amplifier and disposed within the housing, the high pass filter having a cutoff frequency above that of a periodic biometric property of the measurement site; an output amplifier coupled to an output of the high pass filter and disposed within the housing; and an analog to digital converter coupled to an output of the output amplifier and disposed within the housing. Lamego obtained this subject matter from discussions with, or jointly conceived it with, Diab. Accordingly, Diab is a joint inventor of any patentable subject matter claimed in the '095 Patent, and should have been named as an inventor on the '095 Patent.

242. In written assignments, Lamego, as well as Diab, agreed to assign and assigned to Masimo all patentable subject matter (as well as all works of authorship, developments, improvements, or trade secrets) conceived during their employment at Masimo, including ownership of all patents and patent applications claiming such subject matter.

243. Those assignments vested in Masimo all legal and equitable title to all patents and patent applications reciting inventions made during their employment, such that Masimo is at least a joint owner of the '095 Patent and Masimo has standing to seek correction of inventorship to perfect Masimo's ownership interest in the '095 Patent.

244. In at least one written assignment, Lamego agreed to assign and assigned to Cercacor all patentable subject matter (as well as all works of authorship, developments, improvements, or trade secrets) conceived during his employment at Cercacor, including ownership of all patents and patent applications claiming such subject matter. An exemplary agreement conveying such rights was attached as Exhibit A to Apple's Motion to Dismiss (Doc. No.

16-3). Accordingly, to the extent the evidence establishes that Lamego obtained patentable subject matter claimed in the '095 Patent from, or jointly conceived such subject matter with, Masimo employees while Lamego was an employee of Cercacor, Cercacor would be a joint owner of the '095 Patent and has standing to seek correction of inventorship to perfect Cercacor's ownership interest in the '095 Patent.

245. Pursuant to 28 U.S.C. § 2201 and 35 U.S.C. § 256, Plaintiffs seek an order directing the U.S. Patent and Trademark Office to correct the inventorship of the '095 Patent by adding inventor Diab as a named inventor.

XXIII. SEVENTEENTH CAUSE OF ACTION
(CORRECTION OF INVENTORSHIP OF U.S. PATENT NO. 10,219,754)

246. Plaintiffs hereby reallege and incorporate by reference the allegations set forth in paragraphs 1 through 42.

247. Lamego is a named inventor of U.S. Patent 10,219,754 presently recorded as owned by Apple. A true and correct copy of the '754 Patent is attached hereto as Exhibit 30.

248. The '754 Patent claims subject matter that Lamego obtained from discussions with, or jointly conceived with, Masimo employees. For example, Claim 1 of the '754 Patent recites a method for estimating physiological parameters when modulated light from a first light source and a second light source is emitted toward a body part of a user, the method comprising determining a first multiplier value by: turning on the first light source; generating a first initial signal in response to capturing a first light sample corresponding to the first light source; demodulating the first initial signal to produce first initial demodulated signals; filtering and decimating the first initial demodulated signals; and determining the first multiplier value based on the filtered and decimated first initial demodulated signals; determining a second multiplier value by: turning on the second light source; generating a second

initial signal in response to capturing a second light sample corresponding to the second light source; demodulating the second initial signal to produce second initial demodulated signals; filtering and decimating the second initial demodulated signals; and determining the second multiplier value based on the filtered and decimated second initial demodulated signals; capturing multiple light samples while the first light source and the second light source are turned on to emit modulated light toward the body part of the user and converting the multiple light samples into a captured signal; demodulating the captured signal to produce multiple demodulated signals; performing a first decimation stage by: low pass filtering each demodulated signal; and decimating each demodulated signal; performing a second decimation stage after the first decimation stage by: low pass filtering each demodulated signal; and decimating each demodulated signal; demultiplexing each demodulated signal after the second decimation stage to produce a first signal associated with the first light source and a second signal associated with the second light source; multiplying the first signal by the first multiplier value using a first multiplier circuit to obtain a first conditioned signal; multiplying the second signal by the second multiplier value using a second multiplier circuit to obtain a second conditioned signal; and analyzing the first conditioned signal and the second conditioned signal to estimate the physiological parameter of the user. Lamego obtained this subject matter from discussions with, or jointly conceived it with, Al-Ali, Diab, and Weber. Accordingly, Al-Ali, Diab, and Weber are joint inventors of any patentable subject matter claimed in the '754 Patent, and should have been named as inventors on the '754 Patent.

249. In written assignments, Lamego, as well as Al-Ali, Diab, and Weber, agreed to assign and assigned to Masimo all patentable subject matter (as well as all works of authorship, developments, improvements, or trade

secrets) conceived during their employment at Masimo, including ownership of all patents and patent applications claiming such subject matter.

250. Those assignments vested in Masimo all legal and equitable title to all patents and patent applications reciting inventions made during their employment, such that Masimo is at least a joint owner of the '754 Patent and Masimo has standing to seek correction of inventorship to perfect Masimo's ownership interest in the '754 Patent.

251. In at least one written assignment, Lamego agreed to assign and assigned to Cercacor all patentable subject matter (as well as all works of authorship, developments, improvements, or trade secrets) conceived during his employment at Cercacor, including ownership of all patents and patent applications claiming such subject matter. An exemplary agreement conveying such rights was attached as Exhibit A to Apple's Motion to Dismiss (Doc. No. 16-3). Accordingly, to the extent the evidence establishes that Lamego obtained patentable subject matter claimed in the '754 Patent from, or jointly conceived such subject matter with, Masimo employees while Lamego was an employee of Cercacor, Cercacor would be a joint owner of the '754 Patent and has standing to seek correction of inventorship to perfect Cercacor's ownership interest in the '754 Patent.

252. Pursuant to 28 U.S.C. § 2201 and 35 U.S.C. § 256, Plaintiffs seek an order directing the U.S. Patent and Trademark Office to correct the inventorship of the '754 Patent by adding inventors Al-Ali, Diab, and Weber as named inventors.

XXIV. EIGHTEENTH CAUSE OF ACTION

(CORRECTION OF INVENTORSHIP OF U.S. PATENT NO. 10,524,671)

253. Plaintiffs hereby reallege and incorporate by reference the allegations set forth in paragraphs 1 through 42.

254. Lamego is a named inventor of U.S. Patent 10,524,671 presently recorded as owned by Apple. A true and correct copy of the '671 Patent is attached hereto as Exhibit 31.

255. The '671 Patent claims subject matter that Lamego obtained from discussions with, or jointly conceived with, Masimo employees. For example, Claim 1 of the '671 Patent recites a wearable device, comprising a first light source; a second light source, the second light source operating at a different wavelength than the first light source; at least one light receiver; and a processing unit communicably coupled to the first light source, the second light source, and the at least one light receiver; wherein the processing unit is configured to: use the first light source and the second light source to emit light into a body part of a user; and dependent on the light emitted by the first light source and received by the at least one light receiver, compute a pulse rate of the user using the light emitted by the second light source and received by the at least one light receiver. Lamego obtained this subject matter from discussions with, or jointly conceived it with, Diab. Accordingly, Diab is a joint inventor of any patentable subject matter claimed in the '671 Patent, and should have been named as an inventor on the '671 Patent.

256. In written assignments, Lamego, as well as Diab, agreed to assign and assigned to Masimo all patentable subject matter (as well as all works of authorship, developments, improvements, or trade secrets) conceived during their employment at Masimo, including ownership of all patents and patent applications claiming such subject matter.

257. Those assignments vested in Masimo all legal and equitable title to all patents and patent applications reciting inventions made during their employment, such that Masimo is at least a joint owner of the '671 Patent and Masimo has standing to seek correction of inventorship to perfect Masimo's ownership interest in the '671 Patent.

258. In at least one written assignment, Lamego agreed to assign and assigned to Cercacor all patentable subject matter (as well as all works of authorship, developments, improvements, or trade secrets) conceived during his employment at Cercacor, including ownership of all patents and patent applications claiming such subject matter. An exemplary agreement conveying such rights was attached as Exhibit A to Apple's Motion to Dismiss (Doc. No. 16-3). Accordingly, to the extent the evidence establishes that Lamego obtained patentable subject matter claimed in the '671 Patent from, or jointly conceived such subject matter with, Masimo employees while Lamego was an employee of Cercacor, Cercacor would be a joint owner of the '671 Patent and has standing to seek correction of inventorship to perfect Cercacor's ownership interest in the '671 Patent.

259. Pursuant to 28 U.S.C. § 2201 and 35 U.S.C. § 256, Plaintiffs seek an order directing the U.S. Patent and Trademark Office to correct the inventorship of the '671 Patent by adding inventor Diab as a named inventor.

XXV. NINETEENTH CAUSE OF ACTION
(DECLARATORY JUDGMENT OF OWNERSHIP OF U.S. PATENT NO. 10,078,052)

260. Plaintiffs hereby reallege and incorporate by reference the allegations set forth in paragraphs 1 through 42.

261. U.S. Patent 10,078,052 is recorded as owned by Apple.

262. The '052 Patent claims subject matter that Lamego obtained from discussions with, or jointly conceived with, Masimo employees. For example, Claim 1 of the '052 Patent recites an electronic device comprising a housing defining an aperture; an optical sensing system comprising a light emitter for emitting light through the aperture, the light emitter positioned adjacent the aperture; and a light detector for obtaining a first portion of the light after the first portion of the light reflects from an object; and a reflector disposed about

the aperture and adapted to reflect a second portion of the light back into the object after the second portion of the light reflects from the object. Lamego obtained this subject matter from discussions with, or jointly conceived it with Diab. Accordingly, Diab is a joint inventor of any patentable subject matter claimed in the '052 Patent, and should have been named as an inventor on the '052 Patent

263. Lamego and Diab made any inventive contributions to at least Claim 1 while they were employees of Masimo.

264. In written assignments, Lamego, as well as Diab, agreed to assign and assigned to Masimo all patentable subject matter (as well as all works of authorship, developments, improvements, or trade secrets) conceived during their employment at Masimo, including ownership of all patents and patent applications claiming such subject matter.

265. Those assignments vested in Masimo all legal and equitable title to patents and patent applications reciting inventions made during their employment, such that Masimo is at least a joint owner of the '052 Patent and all applications, patents, continuations, divisionals, and reissues that claim priority to the '052 Patent, including foreign counterparts.

266. In at least one written assignment, Lamego agreed to assign and assigned to Cercacor all patentable subject matter (as well as all works of authorship, developments, improvements, or trade secrets) conceived during his employment at Cercacor, including ownership of all patents and patent applications claiming such subject matter. An exemplary agreement conveying such rights was attached as Exhibit A to Apple's Motion to Dismiss (Doc. No. 16-3). That assignment vested in Cercacor all legal and equitable title to patents and patent applications reciting inventions made during his employment, such that, to the extent the evidence establishes that Lamego obtained patentable subject matter claimed in the '052 Patent from, or jointly conceived such subject

matter with, Cercacor employees while Lamego was an employee of Cercacor, Cercacor would be a joint owner of the '052 Patent and all applications, patents, continuations, divisionals, and reissues that claim priority to the '052 Patent, including foreign counterparts.

267. Based on the forgoing, Plaintiffs seek declaratory relief under at least 28 U.S.C. §§ 2201 & 2202, as well as applicable state contract law and federal patent law, declaring that Masimo is at least a joint owner of the '052 Patent (or, to the extent it is determined that Masimo employees invented all of the patentable subject matter claimed in the '052 Patent, that Masimo is the exclusive owner), and, in the alternative, that Cercacor is a joint owner of the '052 Patent. Plaintiffs also seek an order from the Court directing the Patent Office to amend the Patent Office records to reflect the ownership interest of Masimo and/or Cercacor.

XXVI. TWENTIETH CAUSE OF ACTION (DECLARATORY JUDGMENT OF OWNERSHIP OF U.S. PATENT NO. 10,247,670)

268. Plaintiffs hereby reallege and incorporate by reference the allegations set forth in paragraphs 1 through 42.

269. U.S. Patent 10,247,670 is recorded as owned by Apple.

270. The '670 Patent claims subject matter that Lamego obtained from discussions with, or jointly conceived with, Masimo employees. For example, Claim 1 of the '670 Patent recites an electronic device comprising a housing with a surface; a reflective layer that is formed on the surface, wherein the reflective layer has first and second openings; a light emitter that emits light through the first opening; and a light detector that receives the light emitted by the light emitter through the second opening. Lamego obtained this subject matter from discussions with, or jointly conceived it with, Diab. Accordingly,

Diab is a joint inventor of any patentable subject matter claimed in the '670 Patent, and should have been named as an inventor on the '670 Patent.

271. Lamego and Diab made any inventive contributions to at least Claim 1 while they were employees of Masimo.

272. In written assignments, Lamego, as well as Diab, agreed to assign and assigned to Masimo all patentable subject matter (as well as all works of authorship, developments, improvements, or trade secrets) conceived during their employment at Masimo, including ownership of all patents and patent applications claiming such subject matter.

273. Those assignments vested in Masimo all legal and equitable title to patents and patent applications reciting inventions made during their employment, such that Masimo is at least a joint owner of the '670 Patent and all applications, patents, continuations, divisionals, and reissues that claim priority to the '670 Patent, including foreign counterparts.

274. In at least one written assignment, Lamego agreed to assign and assigned to Cercacor all patentable subject matter (as well as all works of authorship, developments, improvements, or trade secrets) conceived during his employment at Cercacor, including ownership of all patents and patent applications claiming such subject matter. An exemplary agreement conveying such rights was attached as Exhibit A to Apple's Motion to Dismiss (Doc. No. 16-3). That assignment vested in Cercacor all legal and equitable title to patents and patent applications reciting inventions made during his employment, such that, to the extent the evidence establishes that Lamego obtained patentable subject matter claimed in the '670 Patent from, or jointly conceived such subject matter with, Cercacor employees while Lamego was an employee of Cercacor, Cercacor would be a joint owner of the '670 Patent and all applications, patents, continuations, divisionals, and reissues that claim priority to the '670 Patent, including foreign counterparts.

275. Based on the forgoing, Plaintiffs seek declaratory relief under at least 28 U.S.C. §§ 2201 & 2202, as well as applicable state contract law and federal patent law, declaring that Masimo is at least a joint owner of the '670 Patent (or, to the extent it is determined that Masimo employees invented all of the patentable subject matter claimed in the '670 Patent, that Masimo is the exclusive owner), and, in the alternative, that Cercacor is a joint owner of the '670 Patent. Plaintiffs also seek an order from the Court directing the Patent Office to amend the Patent Office records to reflect the ownership interest of Masimo and/or Cercacor.

XXVII. TWENTY-FIRST CAUSE OF ACTION (DECLARATORY JUDGMENT OF OWNERSHIP OF U.S. PATENT NO. 9,952,095)

276. Plaintiffs hereby reallege and incorporate by reference the allegations set forth in paragraphs 1 through 42.

277. U.S. Patent 9,952,095 is recorded as owned by Apple.

278. The '095 Patent claims subject matter that Lamego obtained from discussions with, or jointly conceived with, Masimo employees. For example, Claim 1 of the '095 Patent recites an electronic device comprising a housing comprising a surface adapted to be positioned proximate a measurement site of a subject; a biometric sensor positioned at least partially within the surface and comprising: a plurality of light sources for emitting light toward the measurement site at a selected modulation frequency; and an optical sensor for obtaining light exiting the measurement site; and an input amplifier coupled to the output of the biometric sensor and disposed within the housing; a high pass filter coupled to an output of the input amplifier and disposed within the housing, the high pass filter having a cutoff frequency above that of a periodic biometric property of the measurement site; an output amplifier coupled to an output of the high pass filter and disposed within the housing; and an analog to

digital converter coupled to an output of the output amplifier and disposed within the housing. Lamego obtained this subject matter from discussions with, or jointly conceived it with, Diab. Accordingly, Diab is a joint inventor of any patentable subject matter claimed in the '095 Patent, and should have been named as an inventor on the '095 Patent.

279. Lamego and Diab made any inventive contributions to at least Claim 1 while they were employees of Masimo.

280. In written assignments, Lamego, as well as Diab, agreed to assign and assigned to Masimo all patentable subject matter (as well as all works of authorship, developments, improvements, or trade secrets) conceived during their employment at Masimo, including ownership of all patents and patent applications claiming such subject matter.

281. Those assignments vested in Masimo all legal and equitable title to patents and patent applications reciting inventions made during their employment, such that Masimo is at least a joint owner of the '095 Patent and all applications, patents, continuations, divisionals, and reissues that claim priority to the '095 Patent, including foreign counterparts.

282. In at least one written assignment, Lamego agreed to assign and assigned to Cercacor all patentable subject matter (as well as all works of authorship, developments, improvements, or trade secrets) conceived during his employment at Cercacor, including ownership of all patents and patent applications claiming such subject matter. An exemplary agreement conveying such rights was attached as Exhibit A to Apple's Motion to Dismiss (Doc. No. 16-3). That assignment vested in Cercacor all legal and equitable title to patents and patent applications reciting inventions made during his employment, such that, to the extent the evidence establishes that Lamego obtained patentable subject matter claimed in the '095 Patent from, or jointly conceived such subject matter with, Cercacor employees while Lamego was an employee of Cercacor,

Cercacor would be a joint owner of the '095 Patent and all applications, patents, continuations, divisionals, and reissues that claim priority to the '095 Patent, including foreign counterparts.

283. Based on the forgoing, Plaintiffs seek declaratory relief under at least 28 U.S.C. §§ 2201 & 2202, as well as applicable state contract law and federal patent law, declaring that Masimo is at least a joint owner of the '095 Patent (or, to the extent it is determined that Masimo employees invented all of the patentable subject matter claimed in the '095 Patent, that Masimo is the exclusive owner), and, in the alternative, that Cercacor is a joint owner of the '095 Patent. Plaintiffs also seek an order from the Court directing the Patent Office to amend the Patent Office records to reflect the ownership interest of Masimo and/or Cercacor.

XXVIII. TWENTY-SECOND CAUSE OF ACTION (DECLARATORY JUDGMENT OF OWNERSHIP OF U.S. PATENT NO. 10,219,754)

284. Plaintiffs hereby reallege and incorporate by reference the allegations set forth in paragraphs 1 through 42.

285. U.S. Patent 10,219,754 is recorded as owned by Apple.

286. The '754 Patent claims subject matter that Lamego obtained from discussions with, or jointly conceived with, Masimo employees. For example, Claim 1 of the '754 Patent recites a method for estimating physiological parameters when modulated light from a first light source and a second light source is emitted toward a body part of a user, the method comprising determining a first multiplier value by: turning on the first light source; generating a first initial signal in response to capturing a first light sample corresponding to the first light source; demodulating the first initial signal to produce first initial demodulated signals; filtering and decimating the first initial demodulated signals; and determining the first multiplier value based on the

filtered and decimated first initial demodulated signals; determining a second multiplier value by: turning on the second light source; generating a second initial signal in response to capturing a second light sample corresponding to the second light source; demodulating the second initial signal to produce second initial demodulated signals; filtering and decimating the second initial demodulated signals; and determining the second multiplier value based on the filtered and decimated second initial demodulated signals; capturing multiple light samples while the first light source and the second light source are turned on to emit modulated light toward the body part of the user and converting the multiple light samples into a captured signal; demodulating the captured signal to produce multiple demodulated signals; performing a first decimation stage by: low pass filtering each demodulated signal; and decimating each demodulated signal; performing a second decimation stage after the first decimation stage by: low pass filtering each demodulated signal; and decimating each demodulated signal; demultiplexing each demodulated signal after the second decimation stage to produce a first signal associated with the first light source and a second signal associated with the second light source; multiplying the first signal by the first multiplier value using a first multiplier circuit to obtain a first conditioned signal; multiplying the second signal by the second multiplier value using a second multiplier circuit to obtain a second conditioned signal; and analyzing the first conditioned signal and the second conditioned signal to estimate the physiological parameter of the user. Lamego obtained this subject matter from discussions with, or jointly conceived it with, Al-Ali, Diab, and Weber. Accordingly, Al-Ali, Diab, and Weber are joint inventors of any patentable subject matter claimed in the '754 Patent, and should have been named as inventors on the '754 Patent.

287. Lamego, Al-Ali, Diab, and Weber made any inventive contributions to at least Claim 1 while they were employees of Masimo.

288. In written assignments, Lamego, Al-Ali, Diab, and Weber, agreed to assign and assigned to Masimo all patentable subject matter (as well as all works of authorship, developments, improvements, or trade secrets) conceived during their employment at Masimo, including ownership of all patents and patent applications claiming such subject matter.

289. Those assignments vested in Masimo all legal and equitable title to patents and patent applications reciting inventions made during their employment, such that Masimo is at least a joint owner of the '754 Patent and all applications, patents, continuations, divisionals, and reissues that claim priority to the '754 Patent, including foreign counterparts.

290. In at least one written assignment, Lamego agreed to assign and assigned to Cercacor all patentable subject matter (as well as all works of authorship, developments, improvements, or trade secrets) conceived during his employment at Cercacor, including ownership of all patents and patent applications claiming such subject matter. An exemplary agreement conveying such rights was attached as Exhibit A to Apple's Motion to Dismiss (Doc. No. 16-3). That assignment vested in Cercacor all legal and equitable title to patents and patent applications reciting inventions made during his employment, such that, to the extent the evidence establishes that Lamego obtained patentable subject matter claimed in the '754 Patent from, or jointly conceived such subject matter with, Cercacor employees while Lamego was an employee of Cercacor, Cercacor would be a joint owner of the '754 Patent and all applications, patents, continuations, divisionals, and reissues that claim priority to the '754 Patent, including foreign counterparts.

291. Based on the forgoing, Plaintiffs seek declaratory relief under at least 28 U.S.C. §§ 2201 & 2202, as well as applicable state contract law and federal patent law, declaring that Masimo is at least a joint owner of the '754 Patent (or, to the extent it is determined that Masimo employees invented all of

the patentable subject matter claimed in the '754 Patent, that Masimo is the exclusive owner), and, in the alternative, that Cercacor is a joint owner of the '754 Patent. Plaintiffs also seek an order from the Court directing the Patent Office to amend the Patent Office records to reflect the ownership interest of Masimo and/or Cercacor.

XXIX. TWENTY-THIRD CAUSE OF ACTION (DECLARATORY JUDGMENT OF OWNERSHIP OF U.S. PATENT NO. 10,524,671)

292. Plaintiffs hereby reallege and incorporate by reference the allegations set forth in paragraphs 1 through 42.

293. U.S. Patent 10,524,671 is recorded as owned by Apple.

294. The '671 Patent claims subject matter that Lamego obtained from discussions with, or jointly conceived with, Masimo employees. For example, Claim 1 of the '671 Patent recites a wearable device, comprising a first light source; a second light source, the second light source operating at a different wavelength than the first light source; at least one light receiver; and a processing unit communicably coupled to the first light source, the second light source, and the at least one light receiver; wherein the processing unit is configured to: use the first light source and the second light source to emit light into a body part of a user; and dependent on the light emitted by the first light source and received by the at least one light receiver, compute a pulse rate of the user using the light emitted by the second light source and received by the at least one light receiver. Lamego obtained this subject matter from discussions with, or jointly conceived it with, Diab. Accordingly, Diab is a joint inventor of any patentable subject matter claimed in the '671 Patent, and should have been named as an inventor on the '671 Patent.

295. Lamego and Diab made any inventive contributions to at least Claim 1 while they were employees of Masimo.

296. In written assignments, Lamego, as well as Diab, agreed to assign and assigned to Masimo all patentable subject matter (as well as all works of authorship, developments, improvements, or trade secrets) conceived during their employment at Masimo, including ownership of all patents and patent applications claiming such subject matter.

297. Those assignments vested in Masimo all legal and equitable title to patents and patent applications reciting inventions made during their employment, such that Masimo is at least a joint owner of the '671 Patent and all applications, patents, continuations, divisionals, and reissues that claim priority to the '671 Patent, including foreign counterparts.

298. In at least one written assignment, Lamego agreed to assign and assigned to Cercacor all patentable subject matter (as well as all works of authorship, developments, improvements, or trade secrets) conceived during his employment at Cercacor, including ownership of all patents and patent applications claiming such subject matter. An exemplary agreement conveying such rights was attached as Exhibit A to Apple's Motion to Dismiss (Doc. No. 16-3). That assignment vested in Cercacor all legal and equitable title to patents and patent applications reciting inventions made during his employment, such that, to the extent the evidence establishes that Lamego obtained patentable subject matter claimed in the '671 Patent from, or jointly conceived such subject matter with, Cercacor employees while Lamego was an employee of Cercacor, Cercacor would be a joint owner of the '671 Patent and all applications, patents, continuations, divisionals, and reissues that claim priority to the '671 Patent, including foreign counterparts.

299. Based on the forgoing, Plaintiffs seek declaratory relief under at least 28 U.S.C. §§ 2201 & 2202, as well as applicable state contract law and federal patent law, declaring that Masimo is at least a joint owner of the '671 Patent (or, to the extent it is determined that Masimo employees invented all of

the patentable subject matter claimed in the '671 Patent, that Masimo is the exclusive owner), and, in the alternative, that Cercacor is a joint owner of the '671 Patent. Plaintiffs also seek an order from the Court directing the Patent Office to amend the Patent Office records to reflect the ownership interest of Masimo and/or Cercacor.

XXX. TWENTY-FOURTH CAUSE OF ACTION (DECLARATORY JUDGMENT OF OWNERSHIP OF U.S. PATENT APPLICATION NO. 15/960,507)

300. Plaintiffs hereby reallege and incorporate by reference the allegations set forth in paragraphs 1 through 42.

301. U.S. Patent Application 15/960,507 is recorded as owned by Apple.

302. Any inventive contribution that Lamego could have made to the alleged invention of the subject matter claimed in the '507 application was made while he was a Masimo employee during 2000-2001 and 2003-2006, or a Cercacor employee during 2006-2014. This includes, for example, Claim 21 of the '507 Application recites a biometric sensor within a housing of a wearable electronic device, the biometric sensor comprising: an emitter for transmitting modulated light toward a measurement site of a subject through a first aperture in the housing; an optical sensor for receiving modulated light through a second aperture in the housing, the modulated light at least partially exiting the measurement site; a high pass filter to receive an output of the optical sensor, the high pass filter having a cutoff frequency above a frequency of a periodic optical property of the measurement site; and an analog to digital converter to receive an output of the high pass filter."

303. In written assignments, Lamego agreed to assign and assigned to Masimo all patentable subject matter (as well as all works of authorship, developments, improvements, or trade secrets) conceived during their

employment at Masimo, including ownership of all patents and patent applications claiming such subject matter.

304. Those assignments vested in Masimo all legal and equitable title to patents and patent applications reciting inventions made during their employment, such that Masimo is at least a joint owner of the '507 Application and all applications, patents, continuations, divisionals, and reissues that claim priority to the '507 Application, including foreign counterparts.

305. In at least one written assignment, Lamego agreed to assign and assigned to Cercacor all patentable subject matter (as well as all works of authorship, developments, improvements, or trade secrets) conceived during his employment at Cercacor, including ownership of all patents and patent applications claiming such subject matter. An exemplary agreement conveying such rights was attached as Exhibit A to Apple's Motion to Dismiss (Doc. No. 16-3). That assignment vested in Cercacor all legal and equitable title to patents and patent applications reciting inventions made during his employment, such that, to the extent the evidence establishes that Lamego obtained patentable subject matter claimed in the '507 Application from, or jointly conceived such subject matter with, Cercacor employees while Lamego was an employee of Cercacor, Cercacor would be a joint owner of the '507 Application and all applications, patents, continuations, divisionals, and reissues that claim priority to the '507 Application, including foreign counterparts.

306. Based on the forgoing, Plaintiffs seek declaratory relief under at least 28 U.S.C. §§ 2201 & 2202, as well as applicable state contract law and federal patent law, declaring that Masimo is at least a joint owner of the '507 Application (or, to the extent it is determined that Masimo employees invented all of the patentable subject matter claimed in the '507 Application, that Masimo is the exclusive owner), and, in the alternative, that Cercacor is a joint owner of the '507 Application. Plaintiffs also seek an order from the Court directing the

Patent Office to amend the Patent Office records to reflect the ownership interest of Masimo and/or Cercacor.

PRAYER FOR RELIEF

WHEREFORE, Plaintiffs pray for judgment in their favor against Defendant for the following relief:

A. Pursuant to 35 U.S.C. § 271, a determination that Defendant and its officers, agents, servants, employees, attorneys and all others in active concert and/or participation with them have infringed each of the '265, '266, '628, '708, '190, '191, '994, '695, '703, '776, '553, and '554 patents through the manufacture, use, importation, offer for sale, and/or sale of infringing products and/or any of the other acts prohibited by 35 U.S.C. § 271;

B. Pursuant to 35 U.S.C. § 283, an injunction enjoining Defendant and its officers, agents, servants, employees, attorneys and all others in active concert and/or participation with them from infringing the '265, '266, '628, '708, '190, '191, '994, '695, '703, '776, '553, and '554 patents through the manufacture, use, importation, offer for sale, and/or sale of infringing products and/or any of the other acts prohibited by 35 U.S.C. § 271, including preliminary and permanent injunctive relief;

C. Pursuant to 35 U.S.C. § 284, an award compensating Masimo for Defendant's infringement of the '265, '266, '628, '708, '190, '191, '994, '695, '703, '776, '553, and '554 patents through payment of not less than a reasonable royalty on Defendant's sales of infringing products;

D. Pursuant to 35 U.S.C. § 284, an award increasing damages up to three times the amount found or assessed by the jury for Defendant's infringement of each of the '265, '266, '628, '708, '190, '191, '994, '695, '703, '776, '553, and '554 patents in view of the willful and deliberate nature of the infringement;

E. Pursuant to 35 U.S.C. § 285, a finding that this is an exceptional

case, and an award of reasonable attorneys' fees and non-taxable costs;

F. An assessment of prejudgment and post-judgment interest and costs against Defendant, together with an award of such interest and costs, pursuant to 35 U.S.C. § 284;

G. That Defendant be adjudged to have misappropriated Plaintiffs' trade secrets in violation of the California Uniform Trade Secrets Act, Cal. Civ. Code § 3426 *et seq.*, and that Defendant's acts in doing so be adjudged willful, malicious, oppressive, and done knowingly;

H. That Defendant be adjudged to have been unjustly enriched;

I. That Plaintiffs be awarded damages for actual losses, unjust enrichment, and/or a reasonable royalty pursuant to Cal. Civ. Code § 3426.3.

J. That Defendant, its agents, servants, employees, and attorneys, and all those persons in active concert or participation with Defendant, be forthwith temporarily, preliminarily, and thereafter permanently required to return all of Plaintiffs' trade secrets and confidential information and enjoined from further using and disclosing to any third parties any of Plaintiffs' trade secrets and confidential information;

K. That Defendant be enjoined from selling or offering to sell any product, including Defendant's Apple Watch Series 4 and later devices, that includes or uses any of Plaintiffs' trade secrets;

L. That Defendant be directed to file with this Court and to serve on Plaintiffs within thirty (30) days after the service of the injunction, a report in writing, under oath, setting forth in detail the manner and form in which Defendant has complied with the injunction;

M. That Defendant be required to account to Plaintiffs for any and all gains, profits, and advantages derived by it, and all damages sustained by Plaintiffs, by reason of Defendant's acts complained herein;

N. That Plaintiffs be awarded exemplary damages and reasonable attorneys' fees pursuant to Cal. Civ. Code § 3426.3(c) and 3426.4;

O. That the U.S. Patent and Trademark Office be directed to correct the inventorship of the '052, '670, '095, '754 and '671 patents to add the correct inventors;

P. An order imposing a constructive trust for the benefit of Plaintiffs over: (1) any trade secrets Defendants obtained from Plaintiffs; (2) any profits, revenues, or other benefits obtained by Defendants as a result of any disclosure or use of trade secrets obtained from Plaintiffs; and (3) the Lamego Patents and the Lamego Patent Applications;

Q. That Plaintiffs be declared exclusive owners, or at least joint owners, of the patents and patent applications that are based on Plaintiffs' developments, including the '052, '670, '095, '754 and '671 patents, and the '507 application, and all applications, patents, continuations, divisionals, and reissues that claim priority to those patents and that patent application, including foreign counterparts;

R. An award of taxable costs; and

S. That this Court award such other and further relief as this Court may deem just.

Respectfully submitted,

KNOBBE, MARTENS, OLSON & BEAR, LLP

Dated: March 25, 2020

By: */s/ Perry D. Oldham*
Joseph R. Re
Stephen C. Jensen
Perry D. Oldham
Stephen W. Larson

Attorneys for Plaintiffs,
Masimo Corporation and
Cercacor Laboratories, Inc.

DEMAND FOR JURY TRIAL

Pursuant to Rule 38(b) of the Federal Rules of Civil Procedure, Plaintiffs Masimo Corporation and Cercacor Laboratories, Inc. hereby demands a trial by jury on all issues so triable.

Respectfully submitted,

KNOBBE, MARTENS, OLSON & BEAR, LLP

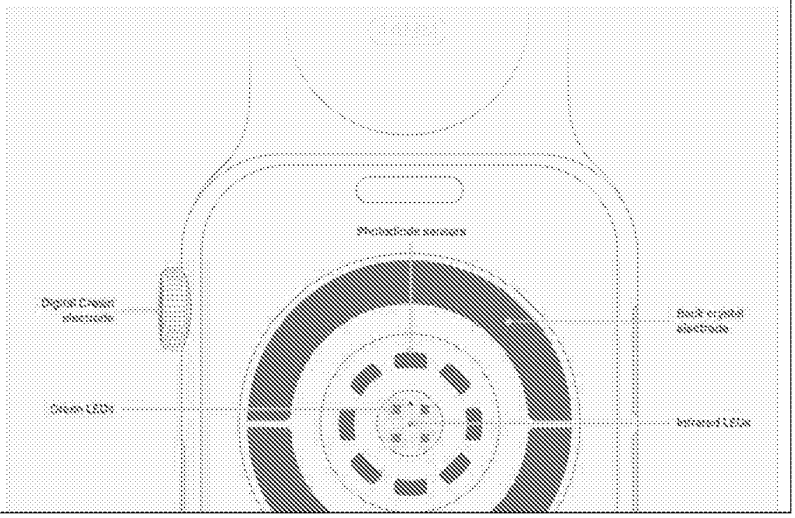
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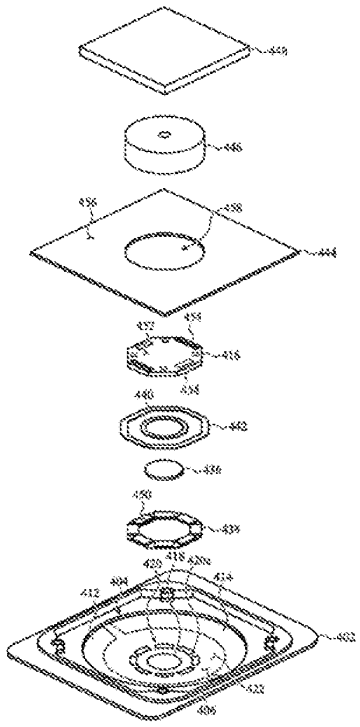
By: */s/ Perry D. Oldham*
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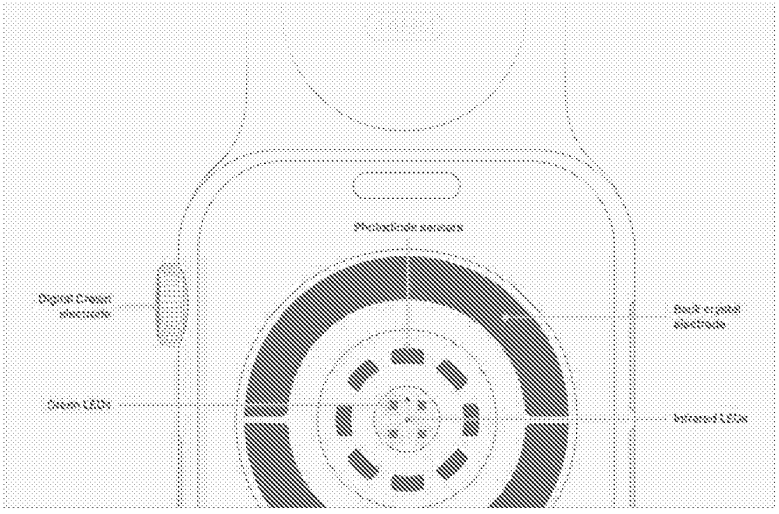
Attorneys for Plaintiffs,
Masimo Corporation and
Cercacor Laboratories, Inc.

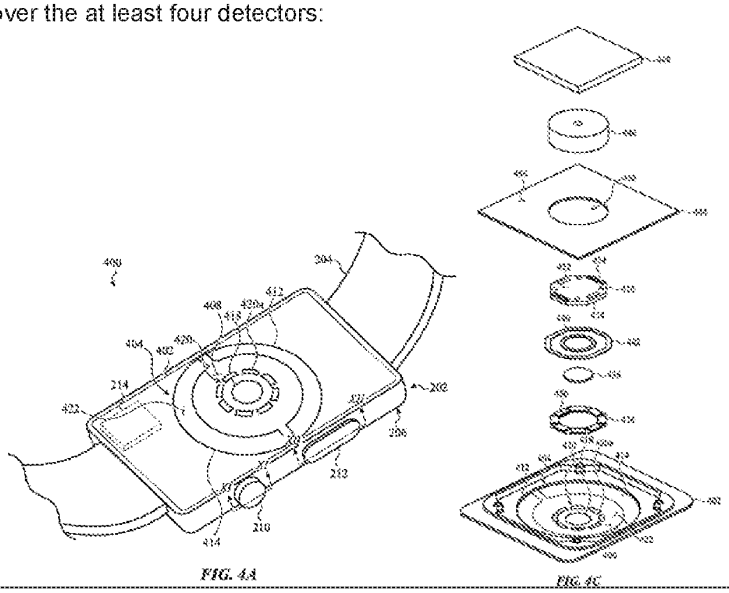
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U.S. Patent No. 10,258,265 Claim 1	Description of Accused Products
1. A noninvasive optical physiological measurement device adapted to be worn by a wearer, the noninvasive optical physiological measurement device providing an indication of a physiological parameter of the wearer comprising:	The Apple Watch Series 4 and later devices are noninvasive optical physiological measurement devices adapted to be worn by a wearer, and provide an indication of a physiological parameter. The Apple Watch Series 4 and later devices include a plurality of emitters of different wavelengths (for example, green and infrared LEDs) and at least four detectors (for example, photodiode sensors) spaced apart from each other as shown in the image below found on the Apple website at https://support.apple.com/en-us/HT204666:  The emitters and detectors are used to monitor physiological parameters, such as pulse rate. *See* https://support.apple.com/en-us/HT204666.

U.S. Patent No. 10,258,265 Claim 1	Description of Accused Products
a plurality of emitters of different wavelengths;	The Apple Watch Series 4 and later devices include a plurality of emitters of different wavelengths. The Apple Watch Series 4 and later devices include green and infrared LEDs as shown in the image below found on the Apple website at https://support.apple.com/en-us/HT204666: 

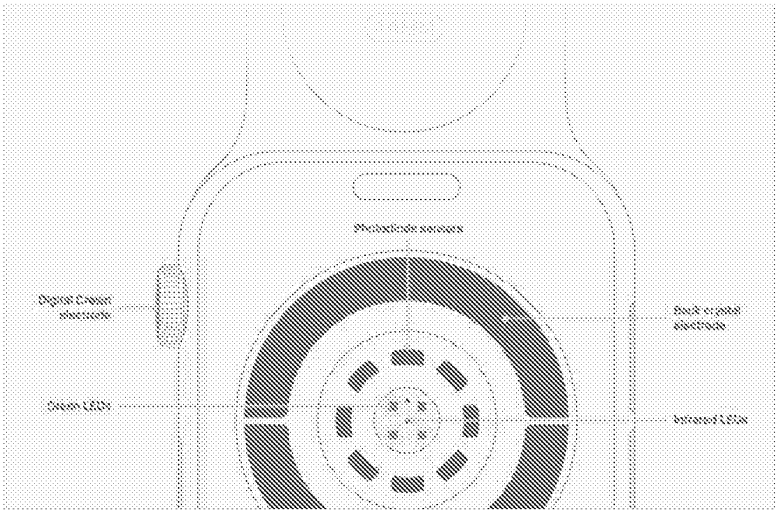
U.S. Patent No. 10,258,265 Claim 1	Description of Accused Products
a housing having a surface and a circular wall protruding from the surface;	The Apple Watch Series 4 and later devices include a housing having a surface and a circular wall protruding from the surface. Fig. 4C of Apple's U.S. Patent Application Publication 2019/0072912 (the '912 publication) is illustrative of the Apple Watch Series 4 and later devices. The Apple Watch Series 4 and later devices have, for example, an outer ring surrounding photodiode sensors arranged on substrate:  FIG. 4C

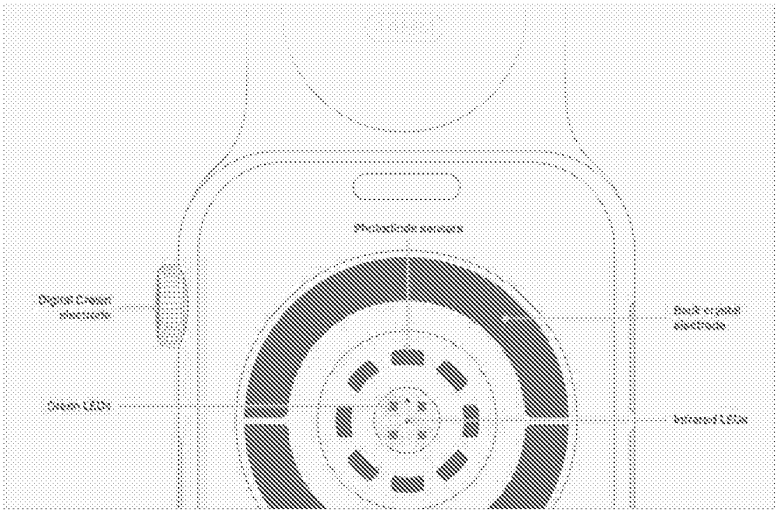
U.S. Patent No. 10,258,265 Claim 1	Description of Accused Products
at least four detectors arranged on the surface and spaced apart from each other, the at least four detectors configured to output one or more signals responsive to light from the one or more light emitters attenuated by body tissue, the one or more signals indicative of a physiological parameter of the wearer; and	The Apple Watch Series 4 and later devices include at least four detectors arranged on the surface and spaced apart from each other, the at least four detectors configured to output one or more signals responsive to light from the one or more light emitters attenuated by body tissue, the one or more signals indicative of a physiological parameter of the wearer. The Apple Watch Series 4 and later devices include eight photodiode sensors as shown in the image below found on the Apple website at https://support.apple.com/en-us/HT204666:  The Apple Watches Series 4 and later devices are worn on the wrist such that the detectors are configured to detect light that has passed through tissue and is indicative of a physiological parameter of the wearer: > The optical heart sensor in Apple Watch uses what is known as photoplethysmography. This technology, while difficult to pronounce, is based on a very simple fact: Blood is red because it reflects red light and absorbs green light. Apple Watch uses green LED lights paired with light-sensitive photodiodes to detect the amount of blood flowing through your wrist at any given moment. When your heart beats, the blood flow in your wrist — and the green light absorption — is greater. Between beats, it's less. By flashing its LED lights hundreds of times per second, Apple Watch can calculate the number of times the heart beats each minute — your heart rate. The optical heart sensor supports a range of 30–210 beats per minute. In addition, the optical heart sensor is designed to compensate for low signal levels by increasing both LED brightness and sampling rate. https://support.apple.com/en-us/HT204666.

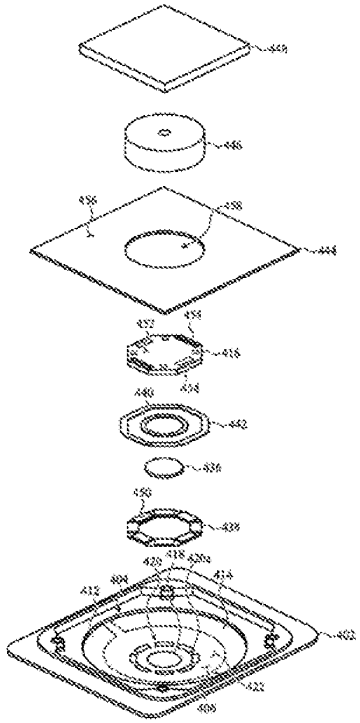
U.S. Patent No. 10,258,265 Claim 1	Description of Accused Products
a light permeable cover arranged above at least a portion of the housing, the light permeable cover comprising a protrusion arranged to cover the at least four detectors.	The Apple Watch Series 4 and later devices include a light permeable cover arranged above at least a portion of the housing, the light permeable cover comprising a protrusion arranged to cover the at least four detectors. Figs. 4A and 4C of Apple's '912 publication are illustrative of the Apple Watch Series 4 and later devices. The Apple Watch Series 4 and later devices have, for example, a dome-shaped carrier having a surface that protrudes from the back of the watch. The dome-shaped carrier is arranged above at least a portion of the housing and is arranged to cover the at least four detectors:  FIG. 4A FIG. 4C

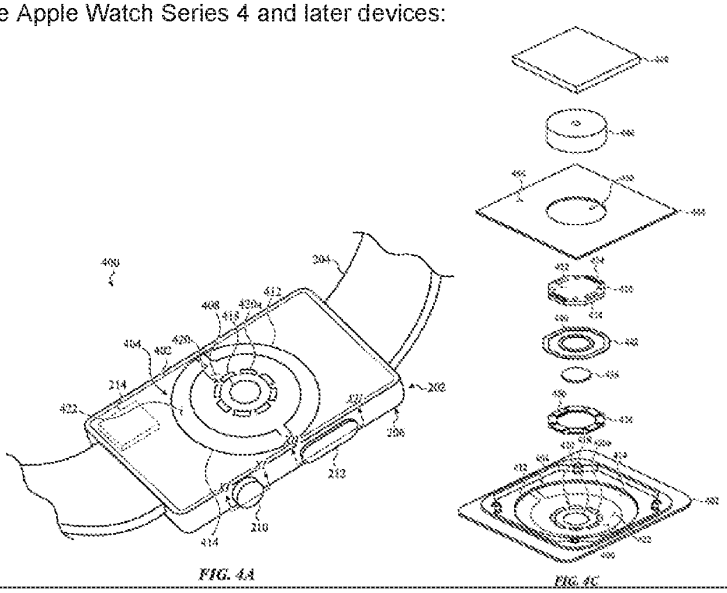
32461800

U.S. Patent No. 10,258,266 Claim 1	Description of Accused Products
1. A noninvasive optical physiological sensor comprising:	The Apple Watch Series 4 and later devices are noninvasive optical physiological sensors. The Apple Watch Series 4 and later devices include a plurality of emitters of different wavelengths (for example, green and infrared LEDs) and at least four detectors (for example, photodiode sensors) spaced apart from each other as shown in the image below found on the Apple website at https://support.apple.com/en-us/HT204666:  The emitters and detectors are used to monitor physiological parameters, such as pulse rate. *See* https://support.apple.com/en-us/HT204666.

U.S. Patent No. 10,258,266 Claim 1	Description of Accused Products
a plurality of emitters configured to emit light into tissue of a user;	The Apple Watch Series 4 and later devices include a plurality of emitters configured to emit light into tissue of a user. The Apple Watch Series 4 and later devices include green and infrared LEDs as shown in the image below found on the Apple website at https://support.apple.com/en-us/HT204666:  The Apple Watches Series 4 and later devices are worn on the wrist such that the detectors are configured to detect light that has passed through tissue and is indicative of a physiological parameter of the wearer: > The optical heart sensor in Apple Watch uses what is known as photoplethysmography. This technology, while difficult to pronounce, is based on a very simple fact: Blood is red because it reflects red light and absorbs green light. Apple Watch uses green LED lights paired with light-sensitive photodiodes to detect the amount of blood flowing through your wrist at any given moment. When your heart beats, the blood flow in your wrist — and the green light absorption — is greater. Between beats, it's less. By flashing its LED lights hundreds of times per second, Apple Watch can calculate the number of times the heart beats each minute — your heart rate. The optical heart sensor supports a range of 30–210 beats per minute. In addition, the optical heart sensor is designed to compensate for low signal levels by increasing both LED brightness and sampling rate. https://support.apple.com/en-us/HT204666.

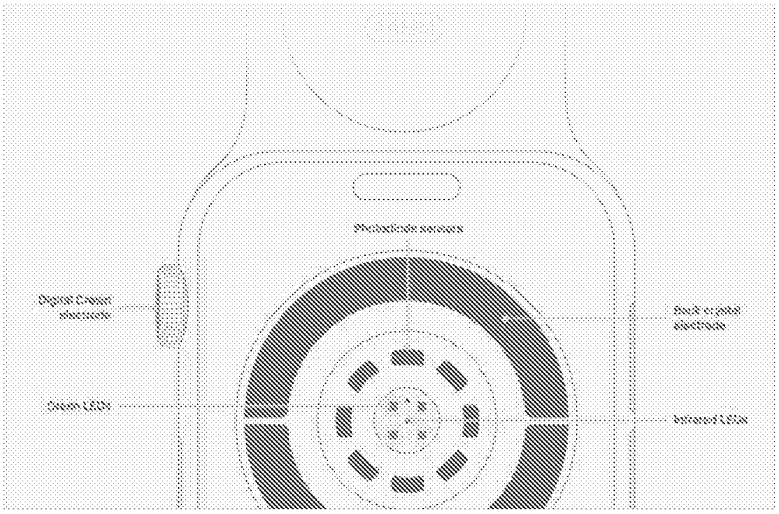
U.S. Patent No. 10,258,266 Claim 1	Description of Accused Products
a plurality of detectors configured to detect light that has been attenuated by tissue of the user, wherein the plurality of detectors comprise at least four detectors;	The Apple Watch Series 4 and later devices include a plurality of detectors configured to detect light that has been attenuated by tissue of the user, wherein the plurality of detectors comprise at least four detectors. The Apple Watch Series 4 and later devices include eight photodiode sensors as shown in the image below found on the Apple website at https://support.apple.com/en-us/HT204666:  The Apple Watches Series 4 and later devices are worn on the wrist such that the detectors are configured to detect light that has passed through tissue and is indicative of a physiological parameter of the wearer: > The optical heart sensor in Apple Watch uses what is known as photoplethysmography. This technology, while difficult to pronounce, is based on a very simple fact: Blood is red because it reflects red light and absorbs green light. Apple Watch uses green LED lights paired with light-sensitive photodiodes to detect the amount of blood flowing through your wrist at any given moment. When your heart beats, the blood flow in your wrist — and the green light absorption — is greater. Between beats, it's less. By flashing its LED lights hundreds of times per second, Apple Watch can calculate the number of times the heart beats each minute — your heart rate. The optical heart sensor supports a range of 30–210 beats per minute. In addition, the optical heart sensor is designed to compensate for low signal levels by increasing both LED brightness and sampling rate. https://support.apple.com/en-us/HT204666.

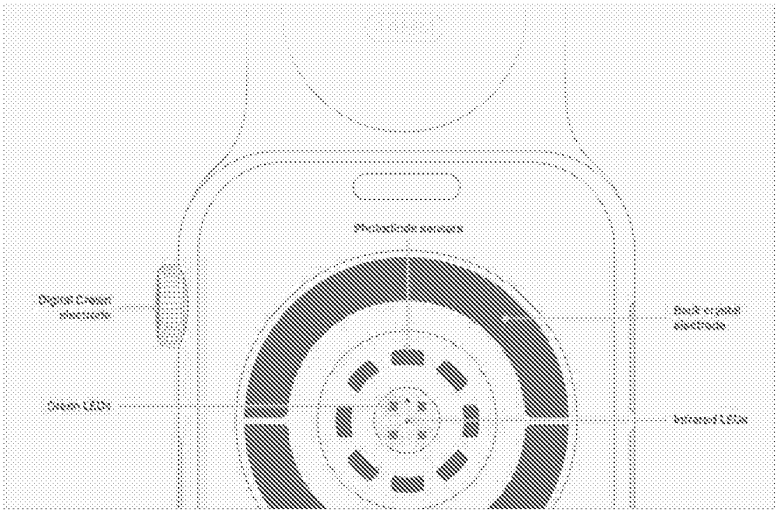
U.S. Patent No. 10,258,266 Claim 1	Description of Accused Products
a housing configured to house at least the plurality of detectors; and	The Apple Watch Series 4 and later devices include a housing configured to house at least the plurality of detectors. Fig. 4C of Apple's U.S. Patent Application Publication 2019/0072912 (the '912 publication), is illustrative of the Apple Watch Series 4 and later devices. The Apple Watch Series 4 and later devices have, for example, an outer ring surrounding photodiode sensors arranged on substrate:  FIG. 4C

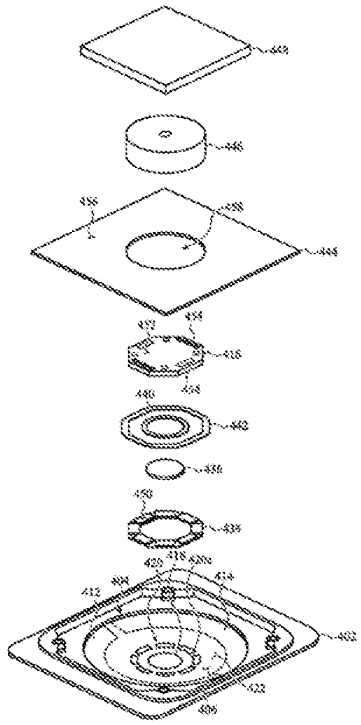
U.S. Patent No. 10,258,266 Claim 1	Description of Accused Products
a lens configured to be located between the tissue of the user and the plurality of detectors when the noninvasive optical physiological sensor is worn by the user, wherein the lens comprises a single outwardly protruding convex surface configured to cause tissue of the user to conform to at least a portion of the single outwardly protruding convex surface when the noninvasive optical physiological sensor worn by the user and during operation of the noninvasive optical physiological sensor.	The Apple Watch Series 4 and later devices include a lens 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 lens comprises a single outwardly protruding convex surface configured to cause tissue of the user to conform to at least a portion of the single outwardly protruding convex surface when the noninvasive optical physiological sensor worn by the user and during operation of the noninvasive optical physiological sensor. Figs. 4A and 4C of Apple's '912 publication are illustrative of the lens in the Apple Watch Series 4 and later devices:  FIG. 4A FIG. 4C

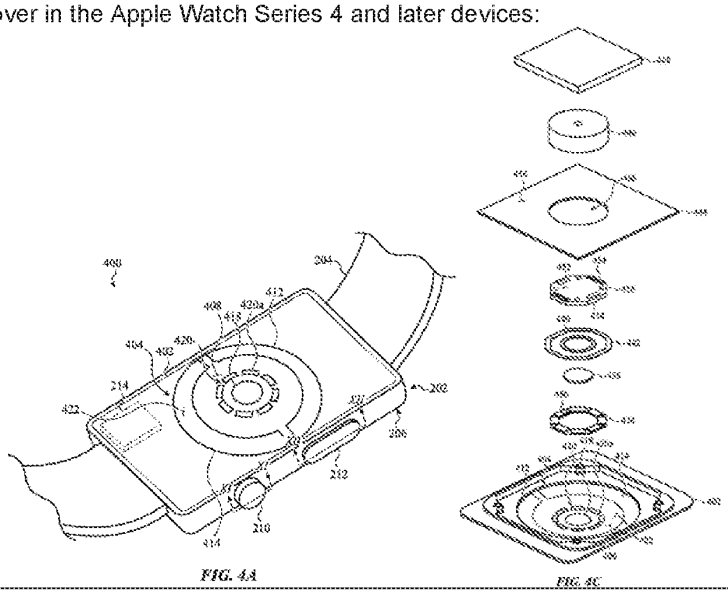
32463937

U.S. Patent No. 10,292,628 Claim 1	Description of Accused Products
1. A noninvasive optical physiological sensor comprising:	The Apple Watch Series 4 and later devices are noninvasive optical physiological sensors. The Apple Watch Series 4 and later devices include a plurality of emitters of different wavelengths (for example, green and infrared LEDs) and at least four detectors (for example, photodiode sensors) spaced apart from each other as shown in the image below found on the Apple website at https://support.apple.com/en-us/HT204666:  The emitters and detectors are used to monitor physiological parameters, such as pulse rate. *See* https://support.apple.com/en-us/HT204666.

U.S. Patent No. 10,292,628 Claim 1	Description of Accused Products
a plurality of emitters configured to emit light into tissue of a user;	The Apple Watch Series 4 and later devices include a plurality of emitters configured to emit light into tissue of a user. The Apple Watch Series 4 and later devices include green and infrared LEDs as shown in the image below found on the Apple website at https://support.apple.com/en-us/HT204666:  The Apple Watches Series 4 and later devices are worn on the wrist such that the detectors are configured to detect light that has passed through tissue and is indicative of a physiological parameter of the wearer: > The optical heart sensor in Apple Watch uses what is known as photoplethysmography. This technology, while difficult to pronounce, is based on a very simple fact: Blood is red because it reflects red light and absorbs green light. Apple Watch uses green LED lights paired with light-sensitive photodiodes to detect the amount of blood flowing through your wrist at any given moment. When your heart beats, the blood flow in your wrist — and the green light absorption — is greater. Between beats, it's less. By flashing its LED lights hundreds of times per second, Apple Watch can calculate the number of times the heart beats each minute — your heart rate. The optical heart sensor supports a range of 30–210 beats per minute. In addition, the optical heart sensor is designed to compensate for low signal levels by increasing both LED brightness and sampling rate. https://support.apple.com/en-us/HT204666.

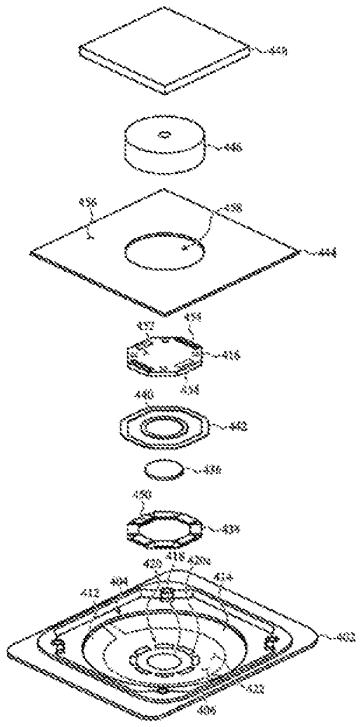
U.S. Patent No. 10,292,628 Claim 1	Description of Accused Products
a plurality of detectors configured to detect light that has been attenuated by tissue of the user, wherein the plurality of detectors comprise at least four detectors;	The Apple Watch Series 4 and later devices include a plurality of detectors configured to detect light that has been attenuated by tissue of the user, wherein the plurality of detectors comprise at least four detectors. The Apple Watch Series 4 and later devices include photodiode sensors as shown in the image below found on the Apple website at https://support.apple.com/en-us/HT204666:  The Apple Watches Series 4 and later devices are worn on the wrist such that the detectors are configured to detect light that has passed through tissue and is indicative of a physiological parameter of the wearer: > The optical heart sensor in Apple Watch uses what is known as photoplethysmography. This technology, while difficult to pronounce, is based on a very simple fact: Blood is red because it reflects red light and absorbs green light. Apple Watch uses green LED lights paired with light-sensitive photodiodes to detect the amount of blood flowing through your wrist at any given moment. When your heart beats, the blood flow in your wrist — and the green light absorption — is greater. Between beats, it's less. By flashing its LED lights hundreds of times per second, Apple Watch can calculate the number of times the heart beats each minute — your heart rate. The optical heart sensor supports a range of 30–210 beats per minute. In addition, the optical heart sensor is designed to compensate for low signal levels by increasing both LED brightness and sampling rate. https://support.apple.com/en-us/HT204666.

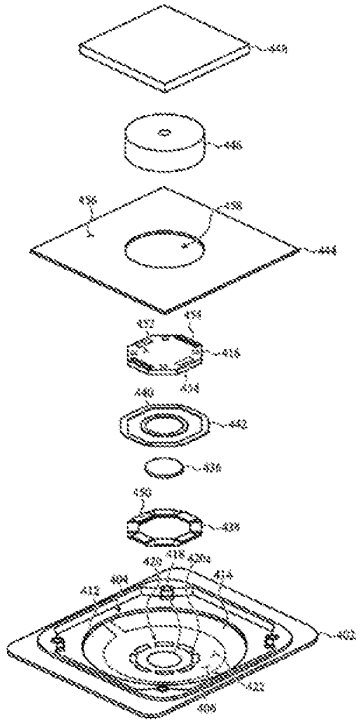
U.S. Patent No. 10,292,628 Claim 1	Description of Accused Products
a housing configured to house at least the plurality of detectors; and	The Apple Watch Series 4 and later devices include a housing configured to house at least the plurality of detectors. Fig. 4C of Apple's U.S. Patent Application Publication 2019/0072912 (the '912 publication), shows, for example, such housing:  FIG. 4C

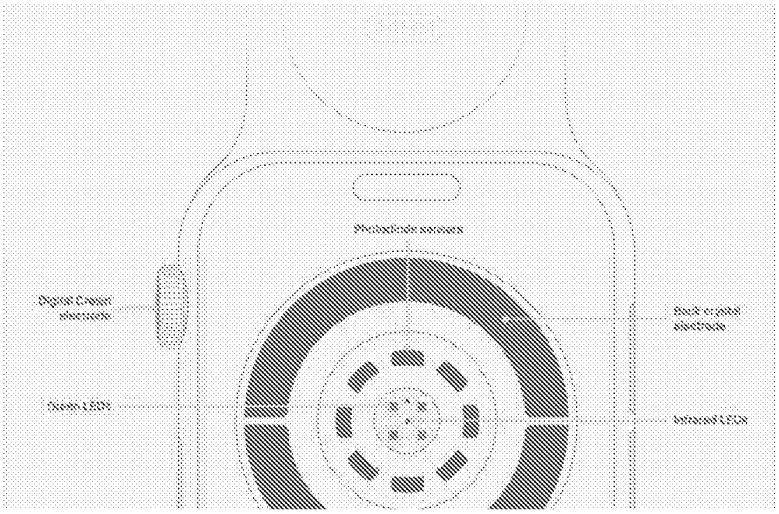
U.S. Patent No. 10,292,628 Claim 1	Description of Accused Products
a light permeable cover configured to be located between tissue of the user and the plurality of detectors when the noninvasive optical physiological sensor is worn by the user, wherein the cover comprises an outwardly protruding convex 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.	The Apple Watch Series 4 and later devices include a light permeable cover configured to be located between 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. Figs. 4A and 4C of Apple's '912 publication are illustrative of such a cover in the Apple Watch Series 4 and later devices:  FIG. 4A FIG. 4C

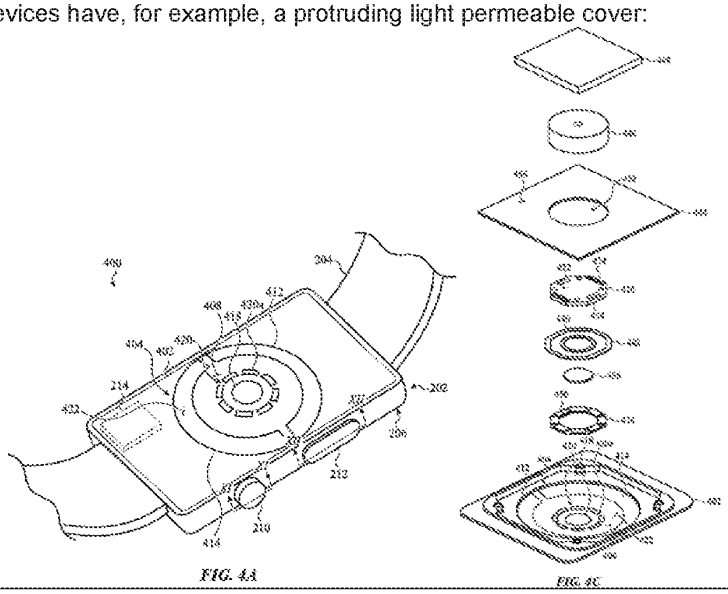
32464047

U.S. Patent No. 10,299,708 Claim 1	Description of Accused Products
1. A noninvasive optical physiological sensing system comprising:	The Apple Watch Series 4 and later devices are noninvasive optical physiological sensing systems. The Apple Watch Series 4 and later devices include a plurality of emitters of different wavelengths (for example, green and infrared LEDs) and at least four detectors (for example, photodiode sensors) spaced apart from each other as shown in the image below found on the Apple website at https://support.apple.com/en-us/HT204666:  The emitters and detectors are used to monitor physiological parameters, such as pulse rate. *See* https://support.apple.com/en-us/HT204666.

U.S. Patent No. 10,299,708 Claim 1	Description of Accused Products
a platform including a planar surface;	The Apple Watch Series 4 and later devices include a platform including a planar surface. Fig. 4C of Apple's U.S. Patent Application Publication 2019/0072912 (the '912 publication) is illustrative of the Apple Watch Series 4 and later devices. The Apple Watch Series 4 and later devices have, for example, an outer ring 442 surrounding photodiode sensors arranged on substrate 452:  FIG. 4C

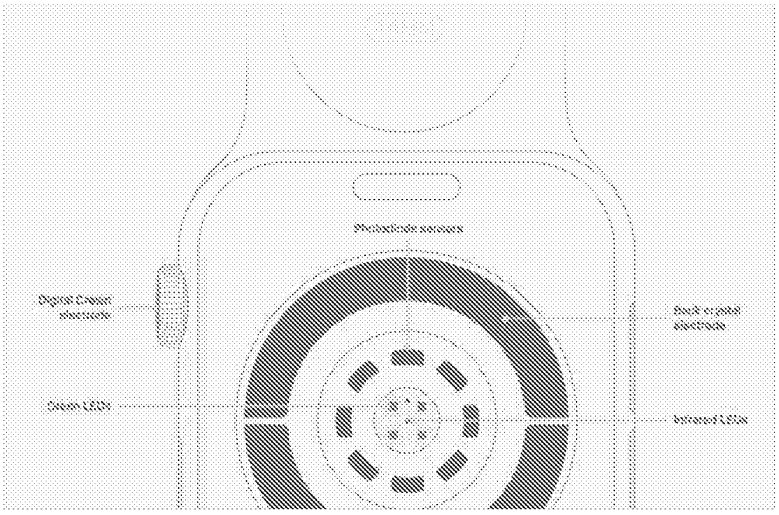
U.S. Patent No. 10,299,708 Claim 1	Description of Accused Products
a housing including a raised edge portion extending from and enclosing at least a portion of the planar surface;	The Apple Watch Series 4 and later devices include a housing with a raised edge portion extending from and enclosing at least a portion of the planar surface. Fig. 4C of Apple's U.S. Patent Application Publication 2019/0072912 (the '912 publication) is illustrative of the Apple Watch Series 4 and later devices. The Apple Watch Series 4 and later devices have, for example, an outer ring surrounding photodiode sensors arranged on substrate:  FIG. 4C

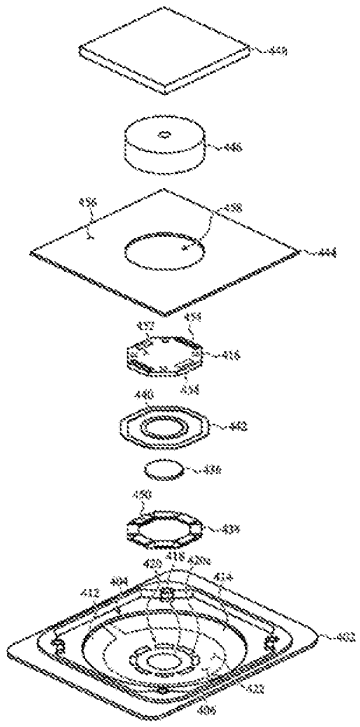
U.S. Patent No. 10,299,708 Claim 1	Description of Accused Products
at least four detectors arranged on the planar surface of the platform and within the housing, wherein the at least four detectors are arranged in a grid pattern such that a first detector and a second detector are arranged across from each other on opposite sides of a central point along a first axis, and a third detector and a fourth detector are arranged across from each other on opposite sides of the central point along a second axis which is perpendicular to the first axis; and	The Apple Watch Series 4 and later devices include at least four detectors arranged on the planar surface of the platform and within the housing, wherein the at least four detectors are arranged in a grid pattern such that a first detector and a second detector are arranged across from each other on opposite sides of a central point along a first axis, and a third detector and a fourth detector are arranged across from each other on opposite sides of the central point along a second axis which is perpendicular to the first axis. The Apple Watch Series 4 and later devices include eight photodiode sensors as shown in the image below found on the Apple website at https://support.apple.com/en-us/HT204666: 

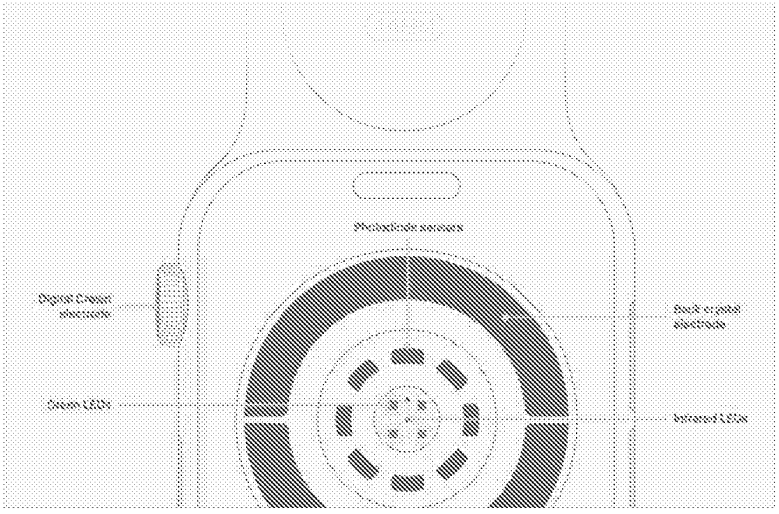
U.S. Patent No. 10,299,708 Claim 1	Description of Accused Products
the housing including a protruding light permeable cover.	The Apple Watch Series 4 and later devices include a housing with a protruding light permeable cover. Figs. 4A and 4C of Apple's '912 publication is illustrative of the Apple Watch Series 4 and later devices. The Apple Watch Series 4 and later devices have, for example, a protruding light permeable cover:  FIG. 4A FIG. 4C

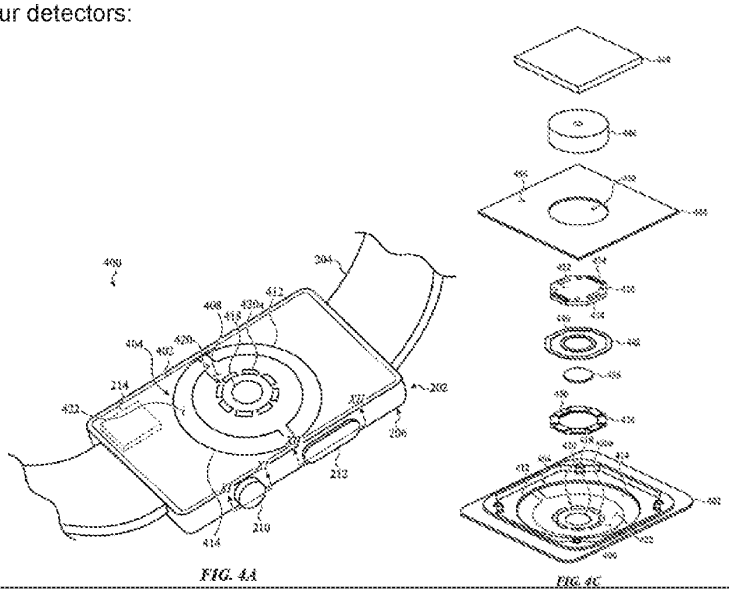
32464205

U.S. Patent No. 10,376,190 Claim 1	Description of Accused Products
1. A noninvasive optical physiological measurement device adapted to be worn by a wearer, the noninvasive optical physiological measurement device providing an indication of a physiological parameter of the wearer comprising:	The Apple Watch Series 4 and later devices are noninvasive optical physiological measurement devices adapted to be worn by a wearer, and that provide an indication of a physiological parameter of the wearer. The Apple Watch Series 4 and later devices include a plurality of emitters of different wavelengths (for example, green and infrared LEDs) and at least four detectors (for example, photodiode sensors) spaced apart from each other as shown in the image below found on the Apple website at https://support.apple.com/en-us/HT204666:  The emitters and detectors are used to monitor physiological parameters, such as pulse rate. *See* https://support.apple.com/en-us/HT204666.

U.S. Patent No. 10,376,190 Claim 1	Description of Accused Products
one or more light emitters;	The Apple Watch Series 4 and later devices include one or more light emitters. The Apple Watch Series 4 and later devices include green and infrared LEDs as shown in the image below found on the Apple website at https://support.apple.com/en-us/HT204666:  The Apple Watches Series 4 and later devices are worn on the wrist such that the detectors are configured to detect light that has passed through tissue and is indicative of a physiological parameter of the wearer: The optical heart sensor in Apple Watch uses what is known as photoplethysmography. This technology, while difficult to pronounce, is based on a very simple fact: Blood is red because it reflects red light and absorbs green light. Apple Watch uses green LED lights paired with light-sensitive photodiodes to detect the amount of blood flowing through your wrist at any given moment. When your heart beats, the blood flow in your wrist — and the green light absorption — is greater. Between beats, it's less. By flashing its LED lights hundreds of times per second, Apple Watch can calculate the number of times the heart beats each minute — your heart rate. The optical heart sensor supports a range of 30–210 beats per minute. In addition, the optical heart sensor is designed to compensate for low signal levels by increasing both LED brightness and sampling rate. https://support.apple.com/en-us/HT204666.

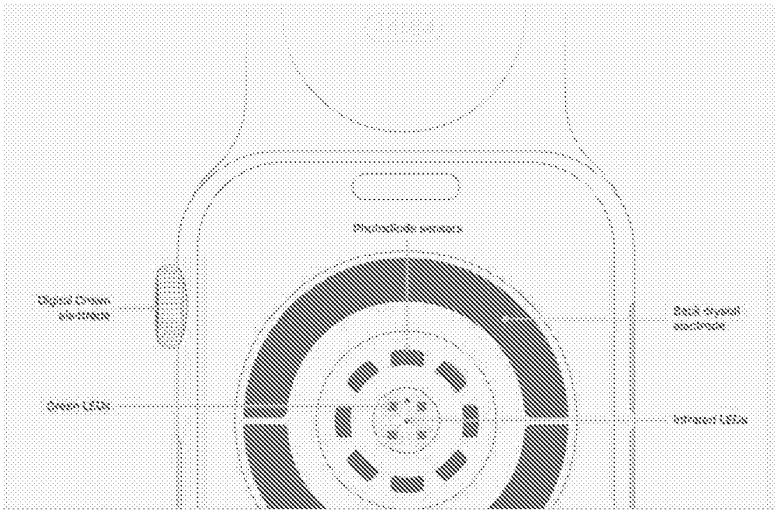
U.S. Patent No. 10,376,190 Claim 1	Description of Accused Products
a housing having a surface and a circular raised edge extending from the surface;	The Apple Watch Series 4 and later devices include a housing having a surface and a circular raised edge extending from the surface. Fig. 4C of Apple's U.S. Patent Application Publication 2019/0072912 (the '912 publication) is illustrative of the Apple Watch Series 4 and later devices. The Apple Watch Series 4 and later devices have, for example, an outer ring surrounding photodiode sensors arranged on substrate:  FIG. 4C

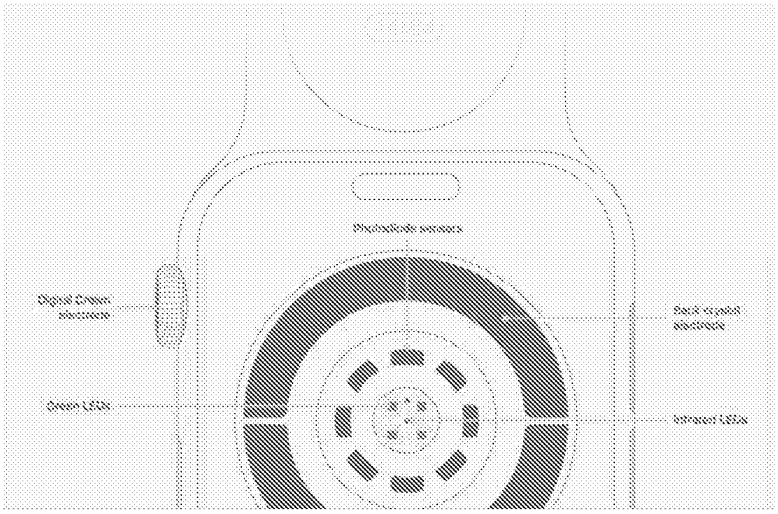
U.S. Patent No. 10,376,190 Claim 1	Description of Accused Products
at least four detectors arranged on the surface and spaced apart from each other, the at least four detectors configured to output one or more signals responsive to light from the one or more light emitters attenuated by body tissue, the one or more signals indicative of a physiological parameter of the wearer; and	The Apple Watch Series 4 and later devices include at least four detectors arranged on the surface and spaced apart from each other, the at least four detectors configured to output one or more signals responsive to light from the one or more light emitters attenuated by body tissue, the one or more signals indicative of a physiological parameter of the wearer. The Apple Watch Series 4 and later devices include eight photodiode sensors as shown in the image below found on the Apple website at https://support.apple.com/en-us/HT204666:  The Apple Watches Series 4 and later devices are worn on the wrist such that the detectors are configured to detect light that has passed through tissue and is indicative of a physiological parameter of the wearer: > The optical heart sensor in Apple Watch uses what is known as photoplethysmography. This technology, while difficult to pronounce, is based on a very simple fact: Blood is red because it reflects red light and absorbs green light. Apple Watch uses green LED lights paired with light-sensitive photodiodes to detect the amount of blood flowing through your wrist at any given moment. When your heart beats, the blood flow in your wrist — and the green light absorption — is greater. Between beats, it's less. By flashing its LED lights hundreds of times per second, Apple Watch can calculate the number of times the heart beats each minute — your heart rate. The optical heart sensor supports a range of 30–210 beats per minute. In addition, the optical heart sensor is designed to compensate for low signal levels by increasing both LED brightness and sampling rate. https://support.apple.com/en-us/HT204666.

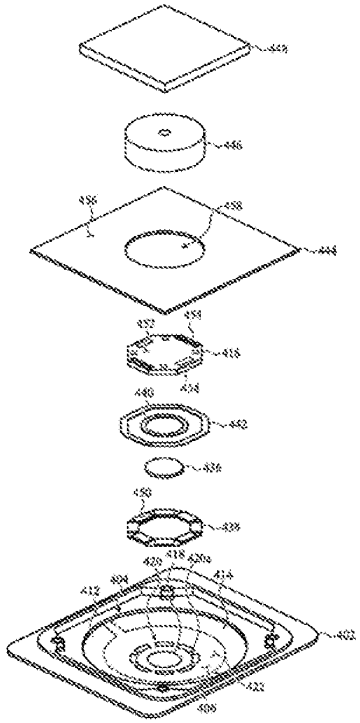
U.S. Patent No. 10,376,190 Claim 1	Description of Accused Products
a light permeable cover arranged above at least a portion of the housing, the light permeable cover comprising a protrusion arranged to cover the at least four detectors.	The Apple Watch Series 4 and later devices include a light permeable cover arranged above at least a portion of the housing, the light permeable cover comprising a protrusion arranged to cover the at least four detectors. Figs. 4A and 4C of Apple's '912 publication are illustrative of the Apple Watch Series 4 and later devices. The Apple Watch Series 4 and later devices have, for example, a protrusion arranged to cover the at least four detectors:  FIG. 4A FIG. 4C

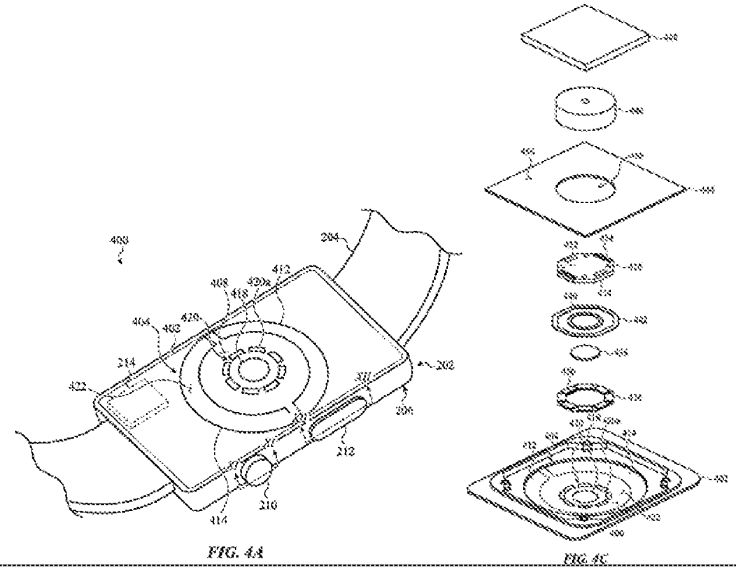
32464396

U.S. Patent No. 10,376,191 Claim 1	Description of Accused Products
1. A noninvasive optical physiological sensor comprising:	The Apple Watch Series 4 and later devices are noninvasive optical physiological sensors. The Apple Watch Series 4 and later devices include a plurality of emitters of different wavelengths (for example, green and infrared LEDs) and at least four detectors (for example, photodiode sensors) spaced apart from each other as shown in the image below found on the Apple website at https://support.apple.com/en-us/HT204666:  The emitters and detectors are used to monitor physiological parameters, such as pulse rate. *See* https://support.apple.com/en-us/HT204666.

U.S. Patent No. 10,376,191 Claim 1	Description of Accused Products
a plurality of emitters configured to emit light into tissue of a user;	The Apple Watch Series 4 and later devices include a plurality of emitters configured to emit light into tissue of a user. The Apple Watch Series 4 and later devices include green and infrared LEDs as shown in the image below found on the Apple website at https://support.apple.com/en-us/HT204666:  The Apple Watches Series 4 and later devices are worn on the wrist such that the detectors are configured to detect light that has passed through tissue and is indicative of a physiological parameter of the wearer: The optical heart sensor in Apple Watch uses what is known as photoplethysmography. This technology, while difficult to pronounce, is based on a very simple fact: Blood is red because it reflects red light and absorbs green light. Apple Watch uses green LED lights paired with light-sensitive photodiodes to detect the amount of blood flowing through your wrist at any given moment. When your heart beats, the blood flow in your wrist — and the green light absorption — is greater. Between beats, it's less. By flashing its LED lights hundreds of times per second, Apple Watch can calculate the number of times the heart beats each minute — your heart rate. The optical heart sensor supports a range of 30–210 beats per minute. In addition, the optical heart sensor is designed to compensate for low signal levels by increasing both LED brightness and sampling rate. https://support.apple.com/en-us/HT204666.

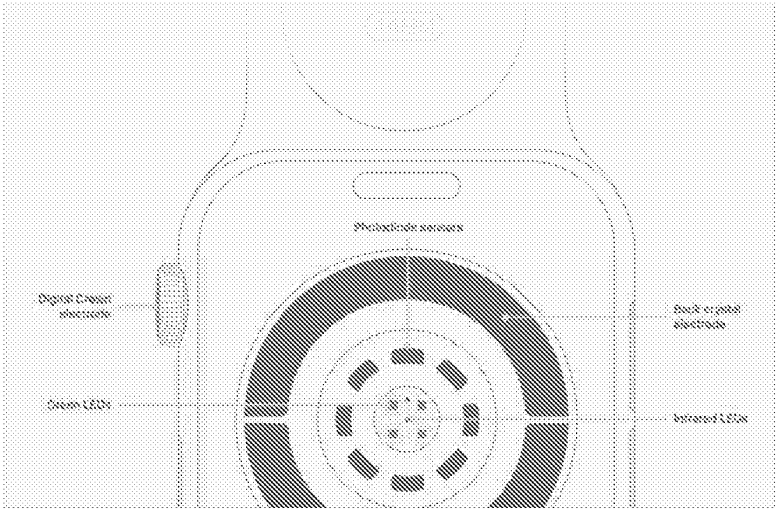
U.S. Patent No. 10,376,191 Claim 1	Description of Accused Products
a plurality of detectors configured to detect light that has been attenuated by tissue of the user, wherein the plurality of detectors comprise at least four detectors;	The Apple Watch Series 4 and later devices include a plurality of detectors configured to detect light that has been attenuated by tissue of the user, wherein the plurality of detectors comprise at least four detectors. The Apple Watch Series 4 and later devices include eight photodiode sensors as shown in the image below found on the Apple website at https://support.apple.com/en-us/HT204666:  The Apple Watches Series 4 and later devices are worn on the wrist such that the detectors are configured to detect light that has passed through tissue and is indicative of a physiological parameter of the wearer: The optical heart sensor in Apple Watch uses what is known as photoplethysmography. This technology, while difficult to pronounce, is based on a very simple fact: Blood is red because it reflects red light and absorbs green light. Apple Watch uses green LED lights paired with light-sensitive photodiodes to detect the amount of blood flowing through your wrist at any given moment. When your heart beats, the blood flow in your wrist — and the green light absorption — is greater. Between beats, it's less. By flashing its LED lights hundreds of times per second, Apple Watch can calculate the number of times the heart beats each minute — your heart rate. The optical heart sensor supports a range of 30–210 beats per minute. In addition, the optical heart sensor is designed to compensate for low signal levels by increasing both LED brightness and sampling rate. https://support.apple.com/en-us/HT204666.

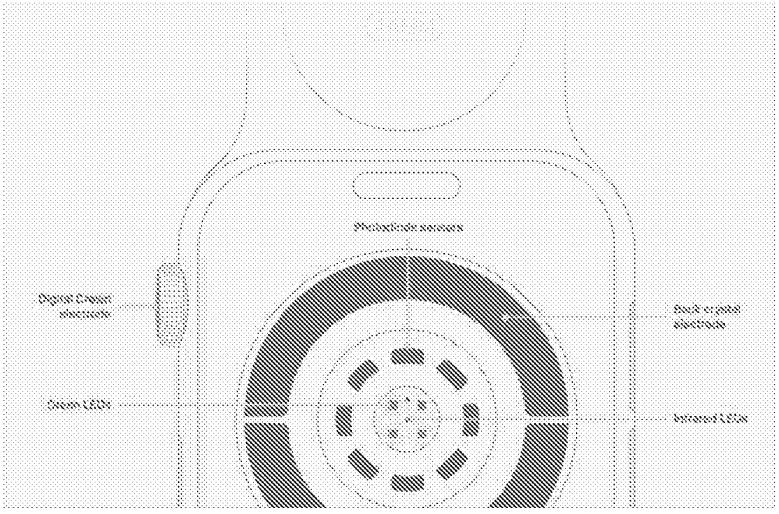
U.S. Patent No. 10,376,191 Claim 1	Description of Accused Products
a housing configured to house at least the plurality of detectors in a circular portion of the housing; and	The Apple Watch Series 4 and later devices include a housing configured to house at least the plurality of detectors in a circular portion of the housing. Fig. 4C of Apple's U.S. Patent Application Publication 2019/0072912 (the '912 publication) is illustrative of the Apple Watch Series 4 and later devices. The Apple Watch Series 4 and later devices have, for example, an outer ring surrounding photodiode sensors arranged on substrate:  FIG. 4C

U.S. Patent No. 10,376,191 Claim 1	Description of Accused Products
a lens configured to be located between tissue of the user and the plurality of detectors when the noninvasive optical physiological sensor is worn by the user, wherein the lens comprises a single outwardly protruding convex surface configured to cause tissue of the user to conform to at least a portion of the single outwardly protruding convex surface when the noninvasive optical physiological sensor is worn by the user and during operation of the noninvasive optical physiological sensor.	The Apple Watch Series 4 and later devices include a lens configured to be located between tissue of the user and the plurality of detectors when the noninvasive optical physiological sensor is worn by the user, wherein the lens comprises a single outwardly protruding convex surface configured to cause tissue of the user to conform to at least a portion of the single outwardly protruding convex surface when the noninvasive optical physiological sensor is worn by the user and during operation of the noninvasive optical physiological sensor. Figs. 4A and 4C of Apple's '912 publication are illustrative of the Apple Watch Series 4 and later devices. The Apple Watch Series 4 and later devices have, for example, a lens having a surface that protrudes from the back of the watch:  FIG. 4A FIG. 4C

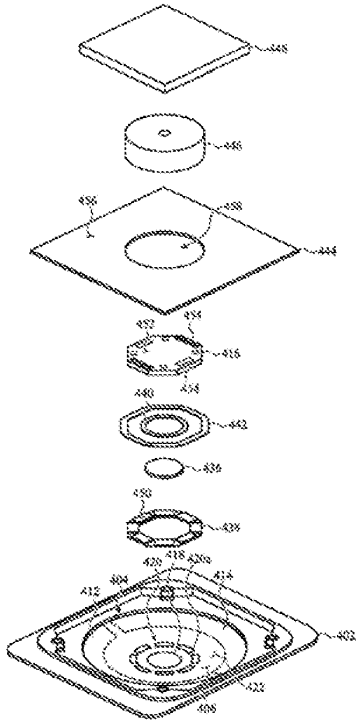
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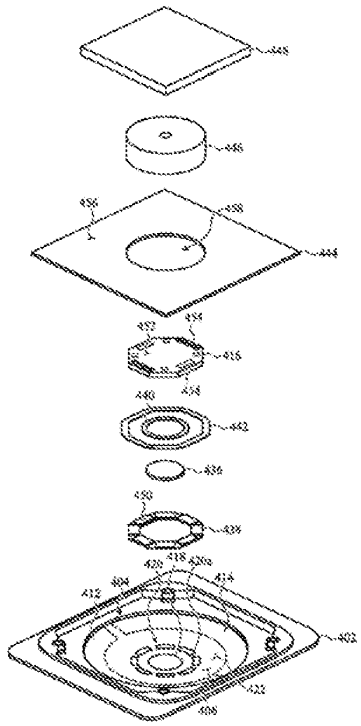
U.S. Patent No. 10,470,695 Claim 1	Description of Accused Products
1. A wrist-worn physiological monitoring device configured for placement on a user at a tissue measurement site, the device comprising:	The Apple Watch Series 4 and later devices are wrist-worn physiological monitoring devices configured for placement on a user at a tissue measurement site. The Apple Watch Series 4 and later devices include a plurality of emitters of different wavelengths (for example, green and infrared LEDs) and at least four detectors (for example, photodiode sensors) spaced apart from each other as shown in the image below found on the Apple website at https://support.apple.com/en-us/HT204666:  The emitters and detectors are used to monitor physiological parameters, such as pulse rate. *See* https://support.apple.com/en-us/HT204666

U.S. Patent No. 10,470,695 Claim 1	Description of Accused Products
a light emission source comprising a plurality of emitters configured to irradiate the tissue measurement site by emitting light towards the tissue measurement site, the tissue measurement site being located on a wrist of the user, the plurality of emitters configured to emit one or more wavelengths;	The Apple Watch Series 4 and later devices include a light emission source comprising a plurality of emitters configured to irradiate the tissue measurement site by emitting light towards the tissue measurement site, the tissue measurement site being located on a wrist of the user, the plurality of emitters configured to emit one or more wavelengths. The Apple Watch Series 4 and later devices include green and infrared LEDs as shown in the image below found on the Apple website at https://support.apple.com/en-us/HT204666:  The Apple Watches Series 4 and later devices are worn on the wrist such that the detectors are configured to detect light that has passed through tissue and is indicative of a physiological parameter of the wearer: > The optical heart sensor in Apple Watch uses what is known as photoplethysmography. This technology, while difficult to pronounce, is based on a very simple fact: Blood is red because it reflects red light and absorbs green light. Apple Watch uses green LED lights paired with light-sensitive photodiodes to detect the amount of blood flowing through your wrist at any given moment. When your heart beats, the blood flow in your wrist — and the green light absorption — is greater. Between beats, it's less. By flashing its LED lights hundreds of times per second, Apple Watch can calculate the number of times the heart beats each minute — your heart rate. The optical heart sensor supports a range of 30–210 beats per minute. In addition, the optical heart sensor is designed to compensate for low signal levels by increasing both LED brightness and sampling rate. https://support.apple.com/en-us/HT204666.

U.S. Patent No. 10,470,695 Claim 1	Description of Accused Products
a plurality of detectors configured to detect the light emitted by the plurality of emitters after attenuation by a circular portion of the tissue measurement site, the plurality of detectors further configured to output at least one signal responsive to the detected light;	The Apple Watch Series 4 and later devices include a plurality of detectors configured to detect the light emitted by the plurality of emitters after attenuation by a circular portion of the tissue measurement site, the plurality of detectors further configured to output at least one signal responsive to the detected light. The Apple Watch Series 4 and later devices include eight photodiode sensors as shown in the image below found on the Apple website at https://support.apple.com/en-us/HT204666:  The Apple Watches Series 4 and later devices are worn on the wrist such that the detectors are configured to detect light that has passed through tissue and is indicative of a physiological parameter of the wearer: > The optical heart sensor in Apple Watch uses what is known as photoplethysmography. This technology, while difficult to pronounce, is based on a very simple fact: Blood is red because it reflects red light and absorbs green light. Apple Watch uses green LED lights paired with light-sensitive photodiodes to detect the amount of blood flowing through your wrist at any given moment. When your heart beats, the blood flow in your wrist — and the green light absorption — is greater. Between beats, it's less. By flashing its LED lights hundreds of times per second, Apple Watch can calculate the number of times the heart beats each minute — your heart rate. The optical heart sensor supports a range of 30–210 beats per minute. In addition, the optical heart sensor is designed to compensate for low signal levels by increasing both LED brightness and sampling rate. https://support.apple.com/en-us/HT204666.

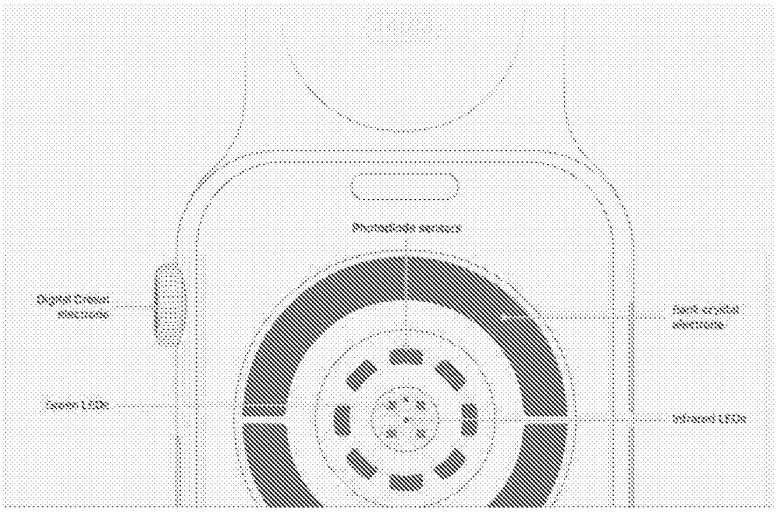
U.S. Patent No. 10,470,695 Claim 1	Description of Accused Products
a processor configured to receive the at least one signal responsive to the output and determine a physiological parameter of the user; and	The Apple Watch Series 4 and later devices include a processor configured to receive the at least one signal responsive to the output and determine a physiological parameter of the user. The processor is used to monitor physiological parameters, such as pulse rate. *See* https://support.apple.com/en-us/HT204666: The optical heart sensor in Apple Watch uses what is known as photoplethysmography. This technology, while difficult to pronounce, is based on a very simple fact: Blood is red because it reflects red light and absorbs green light. Apple Watch uses green LED lights paired with light-sensitive photodiodes to detect the amount of blood flowing through your wrist at any given moment. When your heart beats, the blood flow in your wrist — and the green light absorption — is greater. Between beats, it's less. By flashing its LED lights hundreds of times per second, Apple Watch can calculate the number of times the heart beats each minute — your heart rate. The optical heart sensor supports a range of 30–210 beats per minute. In addition, the optical heart sensor is designed to compensate for low signal levels by increasing both LED brightness and sampling rate.

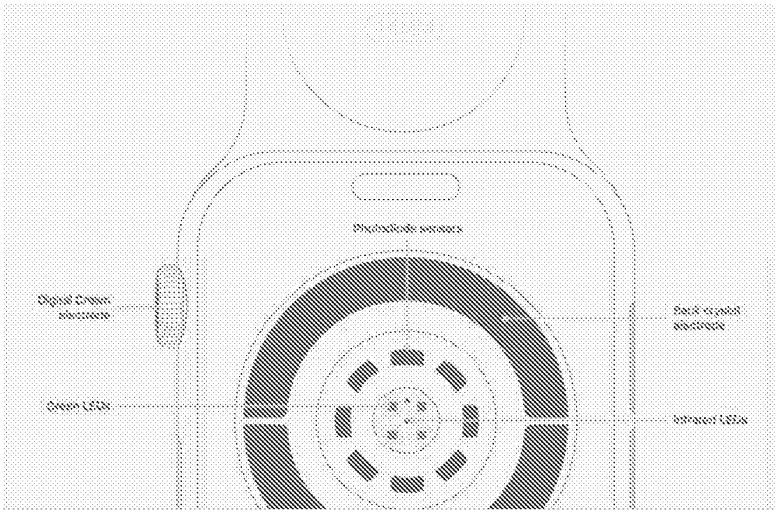
U.S. Patent No. 10,470,695 Claim 1	Description of Accused Products
a light block forming an enclosing wall between the light emission source and the plurality of detectors, the light block defining the circular portion of the tissue measurement site, the light emission source arranged proximate a first side of the enclosing wall and the plurality of detectors arranged proximate a second side of the enclosing wall, the first side being different than the second side,	The Apple Watch Series 4 and later devices include a light block forming an enclosing wall between the light emission source and the plurality of detectors, the light block defining the circular portion of the tissue measurement site, the light emission source arranged proximate a first side of the enclosing wall and the plurality of detectors arranged proximate a second side of the enclosing wall, the first side being different than the second side. Fig. 4C of Apple's U.S. Patent Application Publication 2019/0072912 (the '912 publication) is illustrative of the Apple Watch Series 4 and later devices. The Apple Watch Series 4 and later devices have, for example, a wall with LEDs arranged in the interior of the enclosing wall and photodiode sensors arranged on the exterior of the enclosing wall:  FIG. 4C

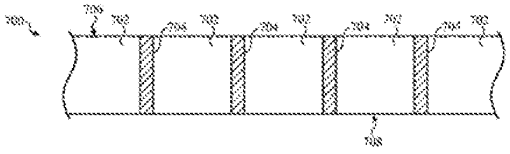
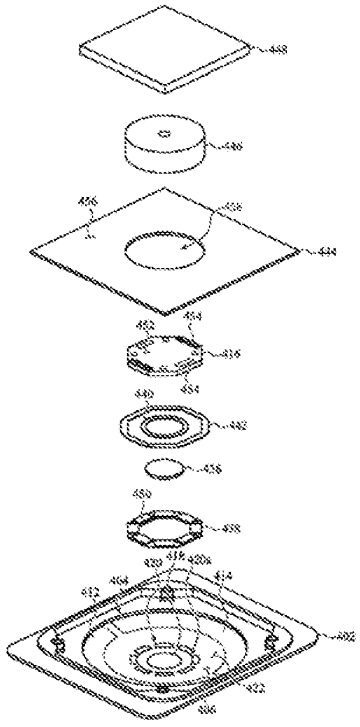
U.S. Patent No. 10,470,695 Claim 1	Description of Accused Products
wherein the enclosing wall prevents at least a portion of light emitted from the light emission source from being detected by the plurality of detectors without attenuation by the tissue, and wherein the plurality of detectors are arranged in an array having a spatial configuration corresponding to the circular portion of the tissue measurement site.	The Apple Watch Series 4 and later devices have an enclosing wall prevents at least a portion of light emitted from the light emission source from being detected by the plurality of detectors without attenuation by the tissue, and wherein the plurality of detectors are arranged in an array having a spatial configuration corresponding to the circular portion of the tissue measurement site. Fig. 4C of Apple's U.S. Patent Application Publication 2019/0072912 (the '912 publication) is illustrative of the Apple Watch Series 4 and later devices. The Apple Watch Series 4 and later devices have, for example, a wall with LEDs arranged in the interior of the enclosing wall and photodiode sensors arranged on the exterior of the circular enclosing wall:  FIG. 4C

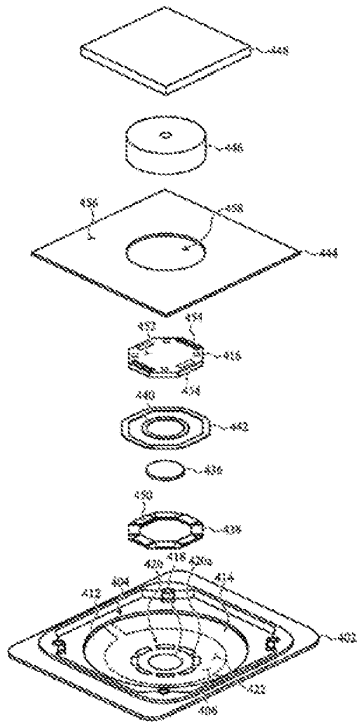
32464625

U.S. Patent No. 6,771,994 Claim 15	Description of Accused Products
15. A sensor which generates at least first and second intensity signals from a light-sensitive detector which detects light of at least first and second wavelengths transmitted through body tissue carrying pulsing blood; the sensor comprising:	The Apple Watch Series 4 and later devices are sensors that generate at least first and second intensity signals from a light-sensitive detector which detects light of at least first and second wavelengths transmitted through body tissue carrying pulsing blood. The Apple Watch Series 4 and later devices include a plurality of emitters of different wavelengths (for example, green and infrared LEDs) and at least four detectors (for example, photodiode sensors) spaced apart from each other as shown in the image below found on the Apple website at https://support.apple.com/en-us/HT204666:  The emitters and detectors are used to monitor physiological parameters, such as pulse rate. *See* https://support.apple.com/en-us/HT204666.

U.S. Patent No. 6,771,994 Claim 15	Description of Accused Products
at least one light emission device;	The Apple Watch Series 4 and later devices include at least one light emission device. The Apple Watch Series 4 and later devices include green and infrared LEDs as shown in the image below found on the Apple website at https://support.apple.com/en-us/HT204666:  The Apple Watches Series 4 and later devices are worn on the wrist such that the detectors are configured to detect light that has passed through tissue and is indicative of a physiological parameter of the wearer: The optical heart sensor in Apple Watch uses what is known as photoplethysmography. This technology, while difficult to pronounce, is based on a very simple fact: Blood is red because it reflects red light and absorbs green light. Apple Watch uses green LED lights paired with light-sensitive photodiodes to detect the amount of blood flowing through your wrist at any given moment. When your heart beats, the blood flow in your wrist — and the green light absorption — is greater. Between beats, it's less. By flashing its LED lights hundreds of times per second, Apple Watch can calculate the number of times the heart beats each minute — your heart rate. The optical heart sensor supports a range of 30–210 beats per minute. In addition, the optical heart sensor is designed to compensate for low signal levels by increasing both LED brightness and sampling rate. https://support.apple.com/en-us/HT204666.

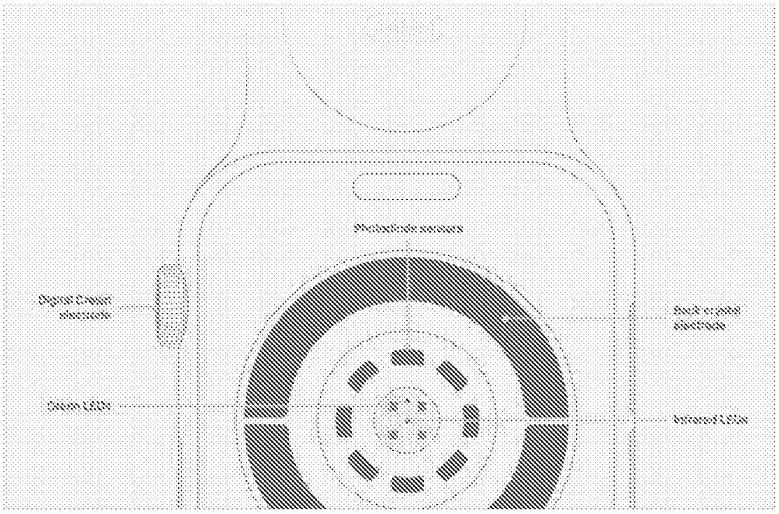
U.S. Patent No. 6,771,994 Claim 15	Description of Accused Products
a light sensitive detector; and	The Apple Watch Series 4 and later devices include a light sensitive detector. The Apple Watch Series 4 and later devices include eight photodiode sensors as shown in the image below found on the Apple website at https://support.apple.com/en-us/HT204666:  The Apple Watches Series 4 and later devices are worn on the wrist such that the detectors are configured to detect light that has passed through tissue and is indicative of a physiological parameter of the wearer: > The optical heart sensor in Apple Watch uses what is known as photoplethysmography. This technology, while difficult to pronounce, is based on a very simple fact: Blood is red because it reflects red light and absorbs green light. Apple Watch uses green LED lights paired with light-sensitive photodiodes to detect the amount of blood flowing through your wrist at any given moment. When your heart beats, the blood flow in your wrist — and the green light absorption — is greater. Between beats, it's less. By flashing its LED lights hundreds of times per second, Apple Watch can calculate the number of times the heart beats each minute — your heart rate. The optical heart sensor supports a range of 30–210 beats per minute. In addition, the optical heart sensor is designed to compensate for low signal levels by increasing both LED brightness and sampling rate. https://support.apple.com/en-us/HT204666.
a plurality of louvers positioned over the light sensitive detector to accept light from the at least one light emission device originating from a general direction of the at least one light emission device and then transmitting through	The Apple Watch Series 4 and later devices include a plurality of louvers positioned over the light sensitive detector to accept light from the at least one light emission device originating from a general direction of the at least one light emission device and then transmitting through body tissue carrying pulsing blood, wherein the louvers accept the light when the sensor is properly applied to tissue of a patient. Fig. 7 of Apple's U.S. Patent Application Publication 2019/0090806 (the '806 publication) is illustrative of the Apple Watch Series 4 and later devices. The Apple Watch Series 4 and later devices have, for example, a

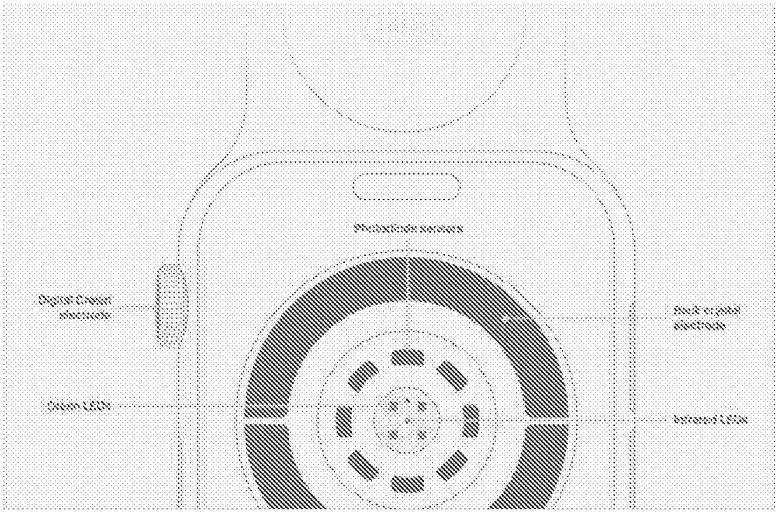
U.S. Patent No. 6,771,994 Claim 15	Description of Accused Products
body tissue carrying pulsing blood, wherein the louvers accept the light when the sensor is properly applied to tissue of a patient.	plurality of louvers positioned over the light sensitive detector to accept light from the at least one light emission device originating from a general direction of the at least one light emission device and then transmitting through body tissue carrying pulsing blood:  FIG. 7
a light block forming an enclosing wall between the light emission source and the plurality of detectors, the light block defining the circular portion of the tissue measurement site, the light emission source arranged proximate a first side of the enclosing wall and the plurality of detectors arranged proximate a second side of the enclosing wall, the first side being different than the second side,	The Apple Watch Series 4 and later devices include a light block forming an enclosing wall between the light emission source and the plurality of detectors, the light block defining the circular portion of the tissue measurement site, the light emission source arranged proximate a first side of the enclosing wall and the plurality of detectors arranged proximate a second side of the enclosing wall, the first side being different than the second side. Fig. 4C of Apple's U.S. Patent Application Publication 2019/0072912 (the '912 publication) is illustrative of the Apple Watch Series 4 and later devices. The Apple Watch Series 4 and later devices have, for example, a wall with LEDs arranged in the interior of the enclosing wall and photodiode sensors arranged on the exterior of the enclosing wall:  FIG. 4C

U.S. Patent No. 6,771,994 Claim 15	Description of Accused Products
wherein the enclosing wall prevents at least a portion of light emitted from the light emission source from being detected by the plurality of detectors without attenuation by the tissue, and wherein the plurality of detectors are arranged in an array having a spatial configuration corresponding to the circular portion of the tissue measurement site.	The Apple Watch Series 4 and later devices have an enclosing wall that prevents at least a portion of light emitted from the light emission source from being detected by the plurality of detectors without attenuation by the tissue, and wherein the plurality of detectors are arranged in an array having a spatial configuration corresponding to the circular portion of the tissue measurement site. Fig. 4C of Apple's U.S. Patent Application Publication 2019/0072912 (the '912 publication) is illustrative of the Apple Watch Series 4 and later devices. The Apple Watch Series 4 and later devices have, for example, a wall with LEDs arranged in the interior of the enclosing wall and photodiode sensors arranged on the exterior of the circular enclosing wall:  FIG. 4C

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U.S. Patent No. 8,457,703 Claim 1	Description of Accused Products
1. A method of managing power consumption during continuous patient monitoring by adjusting behavior of a patient monitor, the method comprising:	The Apple Watch Series 4 and later devices manage power consumption during continuous patient monitoring by adjusting behavior of a patient monitor. The Apple Watch Series 4 and later devices include a plurality of emitters of different wavelengths (for example, green and infrared LEDs) and detectors (for example, photodiode sensors) spaced apart from each other as shown in the image below found on the Apple website at https://support.apple.com/en-us/HT204666:  The emitters and detectors are used to monitor physiological parameters, such as pulse rate. *See* https://support.apple.com/en-us/HT204666.

U.S. Patent No. 8,457,703 Claim 1	Description of Accused Products
driving one or more light sources configured to emit light into tissue of a monitored patient;	The Apple Watch Series 4 and later devices drive one or more light sources configured to emit light into tissue of a monitored patient. The Apple Watch Series 4 and later devices include green and infrared LEDs as shown in the image below found on the Apple website at https://support.apple.com/en-us/HT204666:  The Apple Watches Series 4 and later devices are worn on the wrist such that the detectors are configured to detect light that has passed through tissue and is indicative of a physiological parameter of the wearer: The optical heart sensor in Apple Watch uses what is known as photoplethysmography. This technology, while difficult to pronounce, is based on a very simple fact: Blood is red because it reflects red light and absorbs green light. Apple Watch uses green LED lights paired with light-sensitive photodiodes to detect the amount of blood flowing through your wrist at any given moment. When your heart beats, the blood flow in your wrist — and the green light absorption — is greater. Between beats, it's less. By flashing its LED lights hundreds of times per second, Apple Watch can calculate the number of times the heart beats each minute — your heart rate. The optical heart sensor supports a range of 30–210 beats per minute. In addition, the optical heart sensor is designed to compensate for low signal levels by increasing both LED brightness and sampling rate. The optical heart sensor can also use infrared light. This mode is what Apple Watch uses when it measures your heart rate in the background, and for heart rate notifications. Apple Watch uses green LED lights to measure your heart rate during workouts and Breathe sessions, and to calculate walking average and Heart Rate Variability (HRV). https://support.apple.com/en-us/HT204666.

U.S. Patent No. 8,457,703 Claim 1	Description of Accused Products
receiving one or more signals from one or more detectors configured to detect said light after attenuation by said tissue;	The Apple Watch Series 4 and later devices receive one or more signals from one or more detectors configured to detect said light after attenuation by said tissue. The Apple Watch Series 4 and later devices include eight photodiode sensors as shown in the image below found on the Apple website at https://support.apple.com/en-us/HT204666:  The Apple Watches Series 4 and later devices are worn on the wrist such that the detectors are configured to detect light that has passed through tissue and is indicative of a physiological parameter of the wearer: The optical heart sensor in Apple Watch uses what is known as photoplethysmography. This technology, while difficult to pronounce, is based on a very simple fact: Blood is red because it reflects red light and absorbs green light. Apple Watch uses green LED lights paired with light-sensitive photodiodes to detect the amount of blood flowing through your wrist at any given moment. When your heart beats, the blood flow in your wrist — and the green light absorption — is greater. Between beats, it's less. By flashing its LED lights hundreds of times per second, Apple Watch can calculate the number of times the heart beats each minute — your heart rate. The optical heart sensor supports a range of 30–210 beats per minute. In addition, the optical heart sensor is designed to compensate for low signal levels by increasing both LED brightness and sampling rate. The optical heart sensor can also use infrared light. This mode is what Apple Watch uses when it measures your heart rate in the background, and for heart rate notifications. Apple Watch uses green LED lights to measure your heart rate during workouts and Breathe sessions, and to calculate walking average and Heart Rate Variability (HRV). https://support.apple.com/en-us/HT204666.

U.S. Patent No. 8,457,703 Claim 1	Description of Accused Products
continuously operating a patient monitor at a lower power consumption level to determine measurement values for one or more physiological parameters of a patient;	The Apple Watch Series 4 and later devices continuously operate a patient monitor at a lower power consumption level to determine measurement values for one or more physiological parameters of a patient. The Apple Watches Series 4 and later devices transmit recorded data to the Health App on iOS devices. Upon information and belief, the pulse rate determination, the types of LEDs used to determine pulse rate, and the operation of the LEDs varies with pulse rate activity and heart rate context (e.g., background, sedentary, streaming, etc.). *See also* https://developer.apple.com/documentation/healthkit/hkquantitytypeidentifier/1615138-heartrate.
comparing processing characteristics to a predetermined threshold; and	Upon information and belief, the Apple Watches Series 4 and later devices compare processing characteristics to a predetermined threshold. The Apple Watches Series 4 and later devices transmit recorded data to the Health App on iOS devices. Upon information and belief, the pulse rate determination, the types of LEDs used to determine pulse rate, and the operation of the LEDs varies with pulse rate activity and heart rate context (e.g., background, sedentary, streaming, etc.). *See also* https://developer.apple.com/documentation/healthkit/hkquantitytypeidentifier/1615138-heartrate.
when said processing characteristics pass said threshold, transitioning to continuously operating said patient monitor at a higher power consumption level, wherein said continuously operating at said lower power consumption level comprises reducing activation of an attached sensor, said sensor positioning said light sources and said detectors proximate said tissue.	Upon information and belief, the Apple Watches Series 4 and later devices transition to continuously operating said patient monitor at a higher power consumption level. Upon information and belief, the Apple Watches Series 4 and later devices continuously operating at said lower power consumption level corresponds with reducing activation of an attached sensor, said sensor positioning said light sources and said detectors proximate said tissue. The Apple Watches Series 4 and later devices transmit recorded data to the Health App on iOS devices. Upon information and belief, the pulse rate determination, the types of LEDs used to determine pulse rate, and the operation of the LEDs varies with pulse rate activity and heart rate context (e.g., background, sedentary, streaming, etc.). *See also* https://developer.apple.com/documentation/healthkit/hkquantitytypeidentifier/1615138-heartrate.

U.S. Patent No. 10,433,776 Claim 1	Description of Accused Products
1. A method of operating a patient monitor configured to monitor at least a pulse rate of a patient by processing signals responsive to light attenuated by body tissue, the method comprising:	The Apple Watch Series 4 and later devices monitor at least a pulse rate of a patient by processing signals responsive to light attenuated by body tissue. The Apple Watch Series 4 and later devices include a plurality of emitters of different wavelengths (for example, green and infrared LEDs) and detectors (for example, photodiode sensors) spaced apart from each other as shown in the image below found on the Apple website at https://support.apple.com/en-us/HT204666:  The emitters and detectors are used to monitor physiological parameters, such as pulse rate. *See* https://support.apple.com/en-us/HT204666
operating the patient monitor according to a first control protocol, wherein said operating includes activating a first control protocol light source in accordance with the first control protocol, the first control protocol light source including one or more of a plurality of light sources;	The Apple Watch Series 4 and later devices operate according to a first control protocol, wherein said operating includes activating a first control protocol light source in accordance with the first control protocol, the first control protocol light source including one or more of a plurality of light sources. The Apple Watches Series 4 and later devices transmit recorded data to the Health App on iOS devices. Upon information and belief, the pulse rate determination, the types of LEDs used to determine pulse rate, and the operation of the LEDs varies with pulse rate activity and heart rate context (e.g., background, sedentary, streaming, etc.). *See also* https://developer.apple.com/documentation/healthkit/hkquantitytypeidentifier/1615138-heartrate.

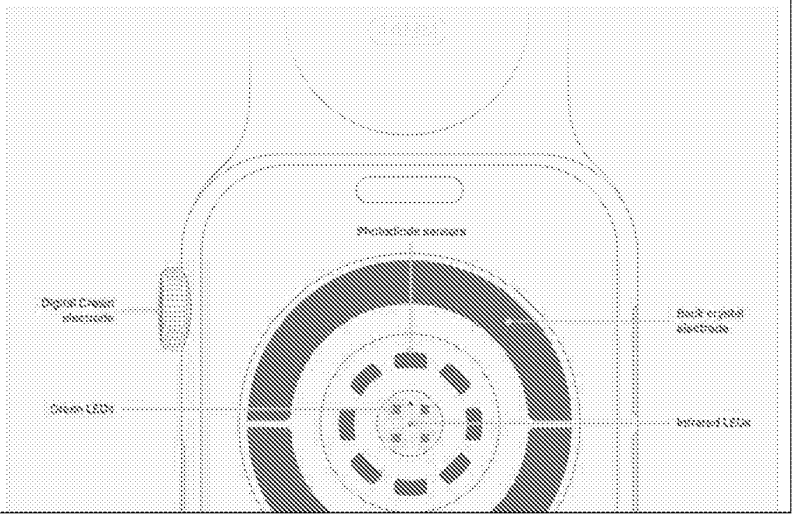
U.S. Patent No. 10,433,776 Claim 1	Description of Accused Products
when operating according to the first control protocol, calculating, by the patient monitor, measurement values of the pulse rate, the measurement values responsive to light from the first control protocol light source, detected by a detector of an optical sensor after attenuation by body tissue of the patient using the patient monitor;	The Apple Watch Series 4 and later devices calculate measurement values of the pulse rate, the measurement values responsive to light from the first control protocol light source, detected by a detector of an optical sensor after attenuation by body tissue of the patient using the patient monitor: The optical heart sensor in Apple Watch uses what is known as photoplethysmography. This technology, while difficult to pronounce, is based on a very simple fact: Blood is red because it reflects red light and absorbs green light. Apple Watch uses green LED lights paired with light-sensitive photodiodes to detect the amount of blood flowing through your wrist at any given moment. When your heart beats, the blood flow in your wrist — and the green light absorption — is greater. Between beats, it's less. By flashing its LED lights hundreds of times per second, Apple Watch can calculate the number of times the heart beats each minute — your heart rate. The optical heart sensor supports a range of 30–210 beats per minute. In addition, the optical heart sensor is designed to compensate for low signal levels by increasing both LED brightness and sampling rate. The optical heart sensor can also use infrared light. This mode is what Apple Watch uses when it measures your heart rate in the background, and for heart rate notifications. Apple Watch uses green LED lights to measure your heart rate during workouts and Breathe sessions, and to calculate walking average and Heart Rate Variability (HRV). https://support.apple.com/en-us/HT204666.
generating a trigger signal, wherein generating said trigger signal is responsive to at least one of: a comparison of processing characteristics to a predetermined threshold, a physiological event, or signal quality characteristics of signals received from the detector;	The Apple Watch Series 4 and later devices generate a trigger signal, wherein generating said trigger signal is responsive to at least one of: a comparison of processing characteristics to a predetermined threshold, a physiological event, or signal quality characteristics of signals received from the detector. The Apple Watches Series 4 and later devices transmit recorded data to the Health App on iOS devices. Upon information and belief, the pulse rate determination, the types of LEDs used to determine pulse rate, and the operation of the LEDs varies with pulse rate activity and heart rate context (e.g., background, sedentary, streaming, etc.). *See also* https://developer.apple.com/documentation/healthkit/hkquantitytypeidentifier/1615138-heartrate.

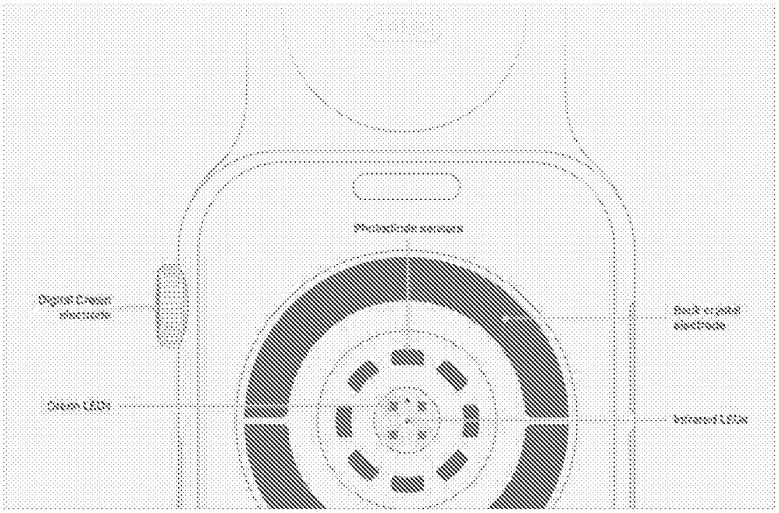
U.S. Patent No. 10,433,776 Claim 1	Description of Accused Products
in response to receiving the trigger signal, operating the patient monitor according to a second control protocol different from the first control protocol, wherein said operating includes activating a second control protocol light source in accordance with the second control protocol, the second control protocol light source including one or more of the plurality of light sources; and	The Apple Watch Series 4 and later devices in response to receiving the trigger signal, operate according to a second control protocol different from the first control protocol, wherein said operating includes activating a second control protocol light source in accordance with the second control protocol, the second control protocol light source including one or more of the plurality of light sources. The Apple Watches Series 4 and later devices transmit recorded data to the Health App on iOS devices. Upon information and belief, the pulse rate determination, the types of LEDs used to determine pulse rate, and the operation of the LEDs varies with pulse rate activity and heart rate context (e.g., background, sedentary, streaming, etc.). *See also* https://developer.apple.com/documentation/healthkit/hkquantitytypeidentifier/1615138-heartrate.
when operating the patient monitor according to the second control protocol, calculating the measurement values of the pulse rate, the measurement values responsive to light from the second control protocol light source, detected by the detector after attenuation by the body tissue of the patient using the patient monitor,	The Apple Watch Series 4 and later devices, when operating according to the second control protocol, calculate the measurement values of the pulse rate, the measurement values responsive to light from the second control protocol light source, detected by the detector after attenuation by the body tissue of the patient using the patient monitor: The optical heart sensor in Apple Watch uses what is known as photoplethysmography. This technology, while difficult to pronounce, is based on a very simple fact: Blood is red because it reflects red light and absorbs green light. Apple Watch uses green LED lights paired with light-sensitive photodiodes to detect the amount of blood flowing through your wrist at any given moment. When your heart beats, the blood flow in your wrist — and the green light absorption — is greater. Between beats, it's less. By flashing its LED lights hundreds of times per second, Apple Watch can calculate the number of times the heart beats each minute — your heart rate. The optical heart sensor supports a range of 30–210 beats per minute. In addition, the optical heart sensor is designed to compensate for low signal levels by increasing both LED brightness and sampling rate. The optical heart sensor can also use infrared light. This mode is what Apple Watch uses when it measures your heart rate in the background, and for heart rate notifications. Apple Watch uses green LED lights to measure your heart rate during workouts and Breathe sessions, and to calculate walking average and Heart Rate Variability (HRV). https://support.apple.com/en-us/HT204666. The Apple Watches Series 4 and later devices transmit recorded data to the Health App on iOS devices. Upon information and belief, the pulse rate determination, the types of LEDs used to determine pulse rate, and the operation of the LEDs varies with pulse rate activity and heart rate context (e.g., background, sedentary, streaming, etc.). *See also* https://developer.apple.com/documentation/healthkit/hkquantitytypeidentifier/1615138-heartrate.

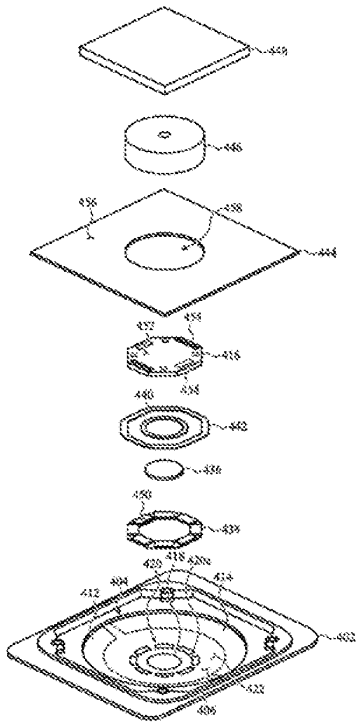
U.S. Patent No. 10,433,776 Claim 1	Description of Accused Products
wherein said operating of the patient monitor according to the first control protocol operates the first control protocol light source according to a first duty cycle and said operating of the patient monitor according to the second control protocol operates the second control protocol light source according to a second duty cycle, wherein power consumption of the first control protocol light source according to the first duty cycle is different than power consumption of the second control protocol light source according to the second duty cycle.	The Apple Watch Series 4 and later devices operates the first control protocol light source according to a first duty cycle and operates the second control protocol light source according to a second duty cycle, wherein power consumption of the first control protocol light source according to the first duty cycle is different than power consumption of the second control protocol light source according to the second duty cycle. The Apple Watches Series 4 and later devices transmit recorded data to the Health App on iOS devices. Upon information and belief, the pulse rate determination, the types of LEDs used to determine pulse rate, and the operation of the LEDs varies with pulse rate activity and heart rate context (e.g., background, sedentary, streaming, etc.). *See also* https://developer.apple.com/documentation/healthkit/hkquantitytypeidentifier/1615138-heartrate.

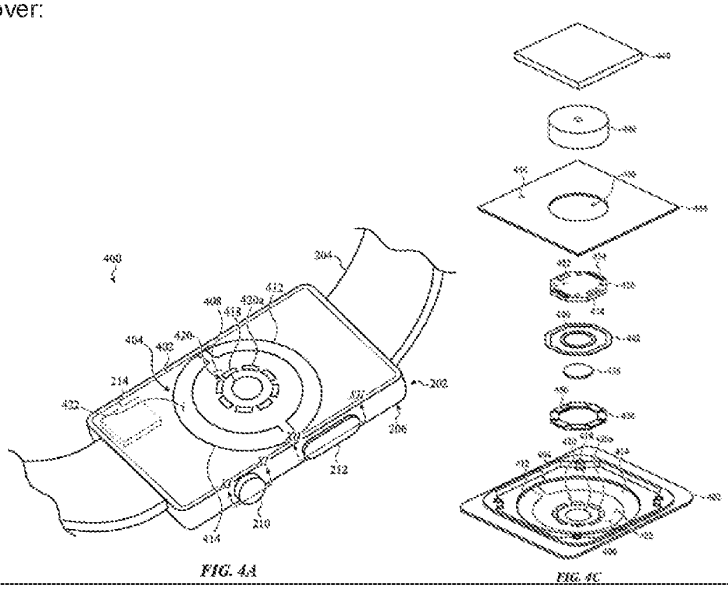
32466089

U.S. Patent No. 10,588,553 Claim 1	Description of Accused Products
A noninvasive optical physiological sensor comprising:	The Apple Watch Series 4 and 5 devices are noninvasive optical physiological sensors. The Apple Watch Series 4 and 5 devices include a plurality of emitters of different wavelengths (for example, green and infrared LEDs) and at least four detectors (for example, photodiode sensors) spaced apart from each other as shown in the image below found on the Apple website at https://support.apple.com/en-us/HT204666:  The emitters and detectors are used to monitor physiological parameters, such as pulse rate. *See* https://support.apple.com/en-us/HT204666

U.S. Patent No. 10,588,553 Claim 1	Description of Accused Products
a plurality of emitters configured to emit light into tissue of a user;	The Apple Watch Series 4 and 5 devices include a plurality of emitters configured to emit light into tissue of a user. The Apple Watch Series 4 and 5 devices include green and infrared LEDs as shown in the image below found on the Apple website at https://support.apple.com/en-us/HT204666: 

U.S. Patent No. 10,588,553 Claim 1	Description of Accused Products
at least four detectors, wherein at least one of the at least four detectors is configured to detect light that has been attenuated by tissue of the user, and wherein the at least four detectors are arranged on a substrate;	The Apple Watch Series 4 and 5 devices include at least four detectors, wherein at least one of the at least four detectors is configured to detect light that has been attenuated by tissue of the user, and wherein the at least four detectors are arranged on a substrate. The Apple Watch Series 4 and 5 devices include eight photodiode sensors on a substrate, as shown in the image below found on the Apple website at https://support.apple.com/en-us/HT204666:  The Apple Watches Series 4 and 5 devices are worn on the wrist such that the detectors are configured to detect light that has passed through tissue: > The optical heart sensor in Apple Watch uses what is known as photoplethysmography. This technology, while difficult to pronounce, is based on a very simple fact: Blood is red because it reflects red light and absorbs green light. Apple Watch uses green LED lights paired with light-sensitive photodiodes to detect the amount of blood flowing through your wrist at any given moment. When your heart beats, the blood flow in your wrist — and the green light absorption — is greater. Between beats, it's less. By flashing its LED lights hundreds of times per second, Apple Watch can calculate the number of times the heart beats each minute — your heart rate. The optical heart sensor supports a range of 30–210 beats per minute. In addition, the optical heart sensor is designed to compensate for low signal levels by increasing both LED brightness and sampling rate. https://support.apple.com/en-us/HT204666.

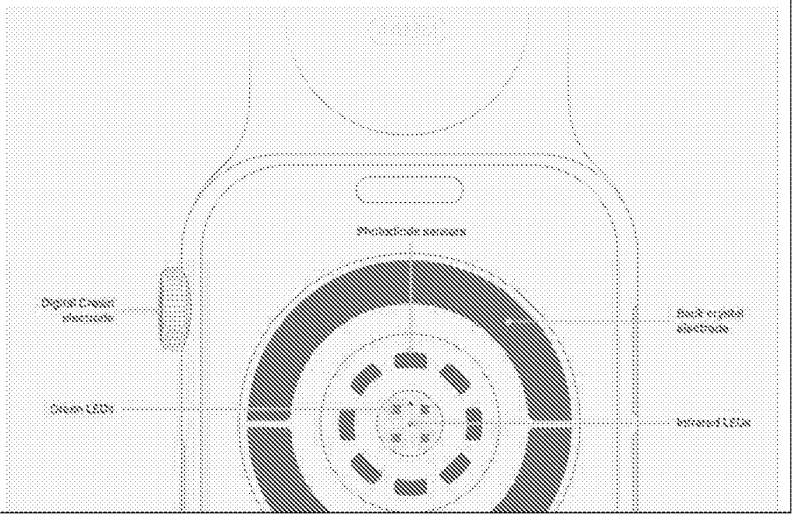
U.S. Patent No. 10,588,553 Claim 1	Description of Accused Products
a wall configured to circumscribe at least the at least four detectors; and	The Apple Watch Series 4 and 5 devices include a wall configured to circumscribe at least the at least four detectors. Fig. 4C of Apple's U.S. Patent Application Publication 2019/0072912 (the '912 publication) is illustrative of the Apple Watch Series 4 and later devices. The Apple Watch Series 4 and later devices have, for example, wall circumscribing photodiode sensors arranged on a substrate:  FIG. 4C

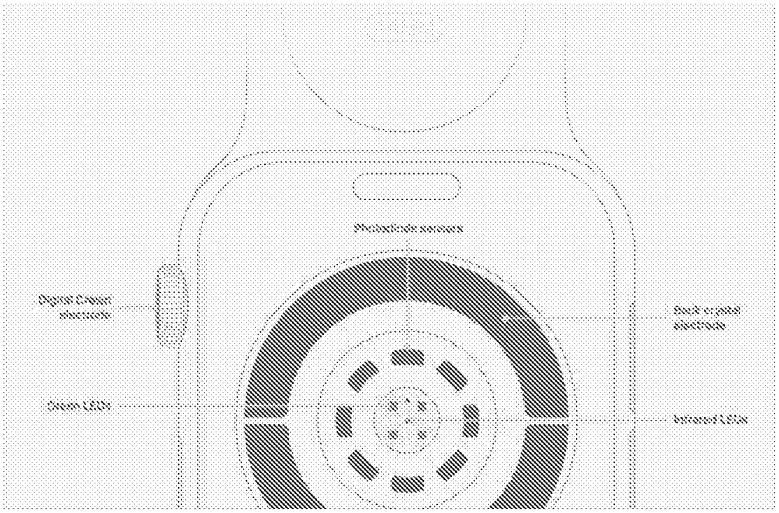
U.S. Patent No. 10,588,553 Claim 1	Description of Accused Products
a cover configured to be located between tissue of the user and the at least four detectors when the noninvasive optical physiological sensor is worn by the user, wherein the cover comprises a single protruding convex surface operable to conform tissue of the user to at least a portion of the single protruding convex surface when the noninvasive optical physiological sensor is worn by the user, and wherein the wall operably connects to the substrate and the cover.	The Apple Watch Series 4 and later devices include a cover configured to be located between tissue of the user and the at least four detectors when the noninvasive optical physiological sensor is worn by the user, wherein the cover comprises a single protruding convex surface operable to conform tissue of the user to at least a portion of the single protruding convex surface when the noninvasive optical physiological sensor is worn by the user, and wherein the wall operably connects to the substrate and the cover. The dome-shaped carrier in Figs. 4A and 4C of Apple's '912 publication is illustrative of the Apple Watch Series 4 and later devices. The dome-shaped carrier has a surface that protrudes from the back of the watch, is located between tissue of the user and the at least four detectors when the noninvasive optical physiological sensor is worn by the user, and comprises a single protruding convex surface operable to conform tissue of the user to at least a portion of the single protruding convex surface when the noninvasive optical physiological sensor is worn by the user, wherein the wall operably connects to the substrate and the cover:  FIG. 4A FIG. 4C

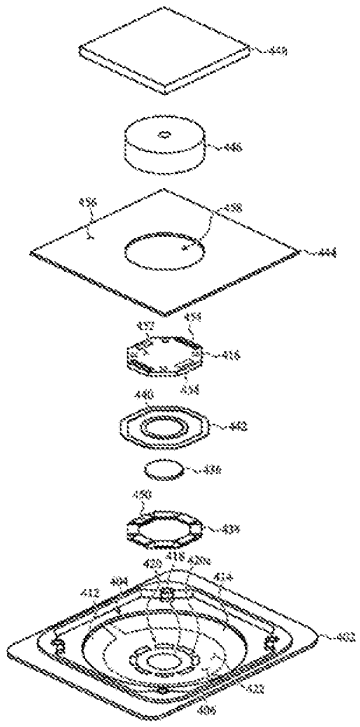
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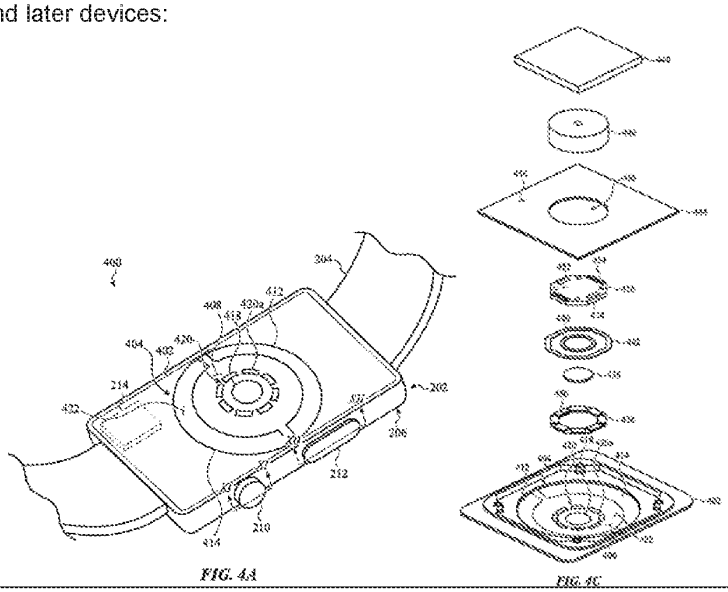
U.S. Patent No. 10,588,554 Claim 20	Description of Accused Products
A physiological measurement system comprising:	The Apple Watch Series 4 and later devices paired with iOS devices are physiological measurement systems. The Apple Watch Series 4 and later devices include a plurality of emitters of different wavelengths (for example, green and infrared LEDs) and at least four detectors (for example, photodiode sensors) spaced apart from each other as shown in the image below found on the Apple website at https://support.apple.com/en-us/HT204666:  The emitters and detectors are used to monitor physiological parameters, such as pulse rate. *See* https://support.apple.com/en-us/HT204666.

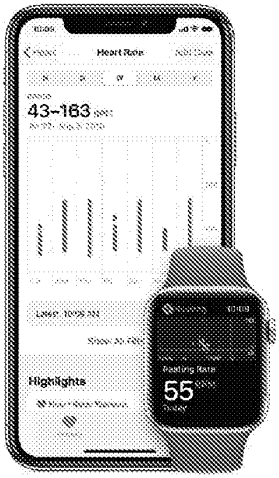
U.S. Patent No. 10,588,554 Claim 20	Description of Accused Products
a physiological sensor device comprising:	The Apple Watch Series 4 and later devices are physiological sensor devices. The Apple Watch Series 4 and later devices include a plurality of emitters of different wavelengths (for example, green and infrared LEDs) and at least four detectors (for example, photodiode sensors) spaced apart from each other as shown in the image below found on the Apple website at https://support.apple.com/en-us/HT204666:  The emitters and detectors are used to monitor physiological parameters, such as pulse rate. *See* https://support.apple.com/en-us/HT204666.

U.S. Patent No. 10,588,554 Claim 20	Description of Accused Products
a plurality of emitters configured to emit light into tissue of a user;	The Apple Watch Series 4 and later devices include a plurality of emitters configured to emit light into tissue of a user. The Apple Watch Series 4 and later devices include green and infrared LEDs as shown in the image below found on the Apple website at https://support.apple.com/en-us/HT204666: 

U.S. Patent No. 10,588,554 Claim 20	Description of Accused Products
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;	The Apple Watch Series 4 and later devices include 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. The Apple Watch Series 4 and later devices include eight photodiode sensors with corresponding windows that allow light to pass through to the detector, as shown in the image below found on the Apple website at https://support.apple.com/en-us/HT204666:  The Apple Watches Series 4 and later devices are worn on the wrist such that the detectors are configured to detect light that has passed through tissue: > The optical heart sensor in Apple Watch uses what is known as photoplethysmography. This technology, while difficult to pronounce, is based on a very simple fact: Blood is red because it reflects red light and absorbs green light. Apple Watch uses green LED lights paired with light-sensitive photodiodes to detect the amount of blood flowing through your wrist at any given moment. When your heart beats, the blood flow in your wrist — and the green light absorption — is greater. Between beats, it's less. By flashing its LED lights hundreds of times per second, Apple Watch can calculate the number of times the heart beats each minute — your heart rate. The optical heart sensor supports a range of 30–210 beats per minute. In addition, the optical heart sensor is designed to compensate for low signal levels by increasing both LED brightness and sampling rate. https://support.apple.com/en-us/HT204666.

U.S. Patent No. 10,588,554 Claim 20	Description of Accused Products
a wall that surrounds at least the at least four detectors; and	The Apple Watch Series 4 and later devices include a wall that surrounds at least the at least four detectors. Fig. 4C of Apple's U.S. Patent Application Publication 2019/0072912 (the '912 publication) is illustrative of the Apple Watch Series 4 and later devices. The Apple Watch Series 4 and later devices have, for example, a wall surrounding photodiode sensors arranged on substrate:  FIG. 4C

U.S. Patent No. 10,588,554 Claim 20	Description of Accused Products
a cover comprising a single protruding convex surface, wherein the single protruding convex surface is configured to be located between tissue of the user and the at least four detectors when the physiological sensor device is worn by the user, wherein at least a portion of the single protruding convex surface is sufficiently rigid to cause tissue of the user to conform to at least a portion of a shape of the single protruding convex surface when the physiological sensor device is worn by the user, and wherein the cover operably connects to the wall; and	The Apple Watch Series 4 and later devices include a cover comprising a single protruding convex surface, wherein the single protruding convex surface is configured to be located between tissue of the user and the at least four detectors when the physiological sensor device is worn by the user, wherein at least a portion of the single protruding convex surface is sufficiently rigid to cause tissue of the user to conform to at least a portion of a shape of the single protruding convex surface when the physiological sensor device is worn by the user, and wherein the cover operably connects to the wall; and. The Apple Watch Series 4 and later devices include a dome-shaped carrier having a surface that protrudes from the back of the watch. The dome-shaped carrier is located between tissue of the user and the at least four detectors when the noninvasive optical physiological sensor is worn by the user, and comprises a single protruding convex surface operable to conform tissue of the user to at least a portion of the single protruding convex surface when the noninvasive optical physiological sensor is worn by the user, and wherein the wall operably connects to the substrate and the cover. Figs. 4A and 4C of Apple's '912 publication are illustrative of the dome-shaped cover in the Apple Watch Series 4 and later devices:  FIG. 4A FIG. 4C

U.S. Patent No. 10,588,554 Claim 20	Description of Accused Products
a handheld computing device in wireless communication with the physiological sensor device.	The Apple Watch Series 4 and later devices are physiological sensor devices that communicate wirelessly with handheld computing devices. The Apple Watch Series 4 and later devices communicate wirelessly with Apple iOS devices as shown in the image below found on the Apple website at https://support.apple.com/en-us/HT204666:  The Apple Watch Series 4 and later devices communicate wirelessly with Apple iOS devices as described on the Apple website at https://support.apple.com/en-us/HT204505: To set up and use your Apple Watch, you need an iPhone with the latest version of iOS. watchOS 6 is compatible with Apple Watch Series 1 and later. Upgrading to watchOS 6 requires an iPhone 6s or later running iOS 13 or later. You also need to make sure that your iPhone has Bluetooth turned on, and that it's connected to Wi-Fi or a cellular network. If you already set up your Apple Watch but want to use it with a different iPhone, you can transfer your Apple Watch and its content to your new iPhone.

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Electronic Acknowledgement Receipt	
EFS ID:	39098333
Application Number:	16791955
International Application Number:	
Confirmation Number:	3106
Title of Invention:	PHYSIOLOGICAL MEASUREMENT DEVICES, SYSTEMS, AND METHODS
First Named Inventor/Applicant Name:	Ammar Al-Ali
Customer Number:	64735
Filer:	Jarom D. Kesler/Melanie Terrazas
Filer Authorized By:	Jarom D. Kesler
Attorney Docket Number:	MAS.1007C4
Receipt Date:	08-APR-2020
Filing Date:	14-FEB-2020
Time Stamp:	14:43:40
Application Type:	Utility under 35 USC 111(a)

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Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		IDS_MAS1007C4.pdf	41794 bfb1498a56a225a7925051f298cadf5314e82d94	yes	4

	Multipart Description/PDF files in .zip description				
	Document Description		**Start**	**End**	
	Information Disclosure Statement (IDS) Form (SB08)		4	4	
	Transmittal Letter		1	3	
Warnings:					
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2	Non Patent Literature	2020-03-25_First-Amended-Complaint-w-Claim-Chart-Exhibits.pdf	15192161 cbc9107d75f618a2b41e3e3e33f7b40f917770d8	no	156
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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/791,955	02/14/2020	Ammar Al-Ali	MAS.1007C4	3106

TITLE OF INVENTION: PHYSIOLOGICAL MEASUREMENT DEVICES, SYSTEMS, AND METHODS

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	$1000	$0.00	$0.00	$1000	07/09/2020

EXAMINER	ART UNIT	CLASS-SUBCLASS
FARDANESH, MARJAN	3791	600-323000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.

☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-09 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list
(1) The names of up to 3 registered patent attorneys or agents OR, alternatively,
(2) The name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

1 Knobbe, Martens,
2 Olson & Bear, LLP
3

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document must have been previously recorded, or filed for recordation, as set forth in 37 CFR 3.11 and 37 CFR 3.81(a). Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE: Masimo Corporation

(B) RESIDENCE: (CITY and STATE OR COUNTRY): Irvine, California

Please check the appropriate assignee category or categories (will not be printed on the patent) : ☐ Individual ☒ Corporation or other private group entity ☐ Government

4a. Fees submitted: ☒ Issue Fee ☐ Publication Fee (if required) ☐ Advance Order - # of Copies _____

4b. Method of Payment: *(Please first reapply any previously paid fee shown above)*

☒ Electronic Payment via EFS-Web ☐ Enclosed check ☐ Non-electronic payment by credit card (Attach form PTO-2038)

☒ The Director is hereby authorized to charge [redacted] any deficiency, or credit any overpayment to Deposit Account No. 11-1410

5. **Change in Entity Status** (from status indicated above)

☐ Applicant certifying micro entity status. See 37 CFR 1.29

☐ Applicant asserting small entity status. See 37 CFR 1.27

☐ Applicant changing to regular undiscounted fee status.

NOTE: Absent a valid certification of Micro Entity Status (see forms PTO/SB/15A and 15B), issue fee payment in the micro entity amount will not be accepted at the risk of application abandonment.
NOTE: If the application was previously under micro entity status, checking this box will be taken to be a notification of loss of entitlement to micro entity status.
NOTE: Checking this box will be taken to be a notification of loss of entitlement to small or micro entity status, as applicable.

NOTE: This form must be signed in accordance with 37 CFR 1.31 and 1.33. See 37 CFR 1.4 for signature requirements and certifications.

Authorized Signature _____ Date 2020-04-09

Typed or printed name Jarom D. Kesler Registration No. 57,046

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Inventor	:	Ammar Al-Ali
App. No.	:	16/791,955
Filed	:	February 14, 2020
For	:	PHYSIOLOGICAL MEASUREMENT DEVICES, SYSTEMS, AND METHODS
Examiner	:	Fardanesh, Marjan
Art Unit	:	3791
Conf. No.	:	3106

COMMENTS ON STATEMENT OF REASONS FOR ALLOWANCE

Mail Stop Issue Fee
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Commissioner:

Applicant makes the following comments in response to the Examiner's description of allowable subject matter in the Notice of Allowance mailed April 9, 2020. Applicant acknowledges the Statement of Reasons for Allowance in the above-referenced patent application and agrees that the claimed subject matter is patentable. However, Applicant takes no position regarding the Reasons for Allowance presented by the Examiner and therefore respectfully traverses them. Therefore, the Examiner's Reasons for Allowance should not be attributed to Applicant as an indication of the basis for Applicant's belief that the claims are patentable.

To the extent that the paraphrasing of the subject matter of the claims deviates from the actual language of the claims, the Applicant respectfully reserves the right to disagree with the Reasons for Allowance. Applicant respectfully disagrees with the Examiner's Statement of Reasons for Allowance to the extent it may suggest that a given claim requires limitations that are not explicitly recited therein. To the extent that there is any implication that the patentability of the claims rests on the recitation of a single feature or sub-group of elements, Applicant respectfully disagrees with the Examiner's Reasons for Allowance because it is the combination

of elements that makes the claims patentable. Moreover, to the extent that the Reasons for Allowance include a characterization of any reference that deviates from the actual disclosure or teaching of that reference, the Applicant respectfully reserves the right to disagree with the Reasons for Allowance.

To the extent there is any implication that the patentability of the dependent claims is solely attributable to those claims being dependent on allowable independent claims, Applicant respectfully disagrees with the Examiner's Reasons for Allowance. The dependent claims are patentable for the additional reason that they recite additional features that further distinguish the claims from the prior art of record.

Applicant reserves the right to pursue at a later date any previously pending or other broader or narrower claims that capture any subject matter supported by the application's disclosure. Accordingly, reviewers of this or any child or related prosecution history shall not reasonably infer that the Applicant has made any disclaimers or disavowals of any subject matter.

Respectfully submitted,

KNOBBE, MARTENS, OLSON & BEAR, LLP

Dated: April 15, 2020

By: /Jarom Kesler/
Jarom D. Kesler
Registration No. 57,046
Registered Practitioner
Customer No. 64735
(949) 760-0404

Electronic Patent Application Fee Transmittal

Application Number:	16791955
Filing Date:	14-Feb-2020
Title of Invention:	PHYSIOLOGICAL MEASUREMENT DEVICES, SYSTEMS, AND METHODS
First Named Inventor/Applicant Name:	Ammar Al-Ali
Filer:	Jarom D. Kesler/Daniel Escajeda
Attorney Docket Number:	MAS.1007C4

Filed as Large Entity

Filing Fees for Utility under 35 USC 111(a)

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
UTILITY APPL ISSUE FEE	1501	1	1000	1000

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Extension-of-Time:				
Miscellaneous:				
			Total in USD ($)	**1000**

Electronic Acknowledgement Receipt	
EFS ID:	39164036
Application Number:	16791955
International Application Number:	
Confirmation Number:	3106
Title of Invention:	PHYSIOLOGICAL MEASUREMENT DEVICES, SYSTEMS, AND METHODS
First Named Inventor/Applicant Name:	Ammar Al-Ali
Customer Number:	64735
Filer:	Jarom D. Kesler/Evelyn Salcido
Filer Authorized By:	Jarom D. Kesler
Attorney Docket Number:	MAS.1007C4
Receipt Date:	15-APR-2020
Filing Date:	14-FEB-2020
Time Stamp:	14:30:41
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	CARD
Payment was successfully received in RAM	$1000
RAM confirmation Number	E20204EE30573567
Deposit Account	111410
Authorized User	Evelyn Salcido
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows: 37 CFR 1.16 (National application filing, search, and examination fees) 37 CFR 1.17 (Patent application and reexamination processing fees)	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Issue Fee Payment (PTO-85B)	ISSUE-FEE-TRANS_MAS1007C4.pdf	179847 76b7db2f8ce0af0e88bf579fd5e5baa0f225a30f	no	1
Warnings:					
Information:					
2	Post Allowance Communication - Incoming	COMMENTS_MAS1007C4.pdf	22642 a30ef616bb35a621bb84a6fc63d5a9953287f678	no	2
Warnings:					
Information:					
3	Fee Worksheet (SB06)	fee-info.pdf	30284 b4551837edf0c2479865b439c7a611c9a72729bc	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	232773		

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.
National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.
New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

PRINTER RUSH
(PTO ASSISTANCE)

Application: 16791955	**Examiner:** FARDANESH	**GAU:** 3791
From:	**Location:** RTFM	**Creation Date:** 04/23/2020

Week Date: 4/6/2020

DOC CODE	DOC DATE	MISCELLANEOUS
[ ] 1449		[ ] Continuing Data
[X] IDS	04/08/2020	[ ] Foreign Priority
[ ] CLM		[ ] Document Legibility
[ ] IIFW/FWCLM		[ ] Fees
[ ] SRFW		[ ] Petition (TC)
[ ] DRW		[ ] Other
[ ] OATH		
[ ] 312		
[ ] SPEC		

[RUSH] Message:

Please respond to the 4/8/20 IDS.

Thank you

[XRUSH] Response:

Initials: _____

Examiner: PUBS contact - James Leija, (703) 756-1197
NOTE: This form will be included as part of the official USPTO record with the response document coded as XRUSH.
REV: AUG 16

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
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P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/791,955	02/14/2020	Ammar Al-Ali	MAS.1007C4	3106

64735 7590 05/22/2020

KNOBBE, MARTENS, OLSON & BEAR, LLP
MASIMO CORPORATION (MASIMO)
2040 MAIN STREET
FOURTEENTH FLOOR
IRVINE, CA 92614

EXAMINER	
FARDANESH, MARJAN	

ART UNIT	PAPER NUMBER
3791	

NOTIFICATION DATE	DELIVERY MODE
05/22/2020	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

efiling@knobbe.com
jayna.cartee@knobbe.com

Corrected ***Notice of Allowability***	**Application No.** 16/791,955	**Applicant(s)** Al-Ali, Ammar	
	Examiner MARJAN FARDANESH	**Art Unit** 3791	**AIA (FITF) Status** Yes

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☑ This communication is responsive to IDS filed on 04/08/2020.
   ☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

2. ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

3. ☑ The allowed claim(s) is/are 3-27 . As a result of the allowed claim(s), you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see **http://www.uspto.gov/patents/init_events/pph/index.jsp** or send an inquiry to **PPHfeedback@uspto.gov.**

4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

   Certified copies:

   a) ☐ All b) ☐ Some *c) ☐ None of the:

   1. ☐ Certified copies of the priority documents have been received.
   2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
   3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

   * Certified copies not received: _____ .

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
   ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____ .

   Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☑ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date 04/08/2020, 04/08/2020.
3. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material _____.
4. ☐ Interview Summary (PTO-413), Paper No./Mail Date. _____.
5. ☐ Examiner's Amendment/Comment
6. ☐ Examiner's Statement of Reasons for Allowance
7. ☐ Other _____.

/MARJAN FARDANESH/ Examiner, Art Unit 3791	/ERIC F WINAKUR/ Primary Examiner, Art Unit 3791

PRINTER RUSH
(PTO ASSISTANCE)

Application: 16791955	**Examiner:** FARDANESH	**GAU:** 3791
From:	**Location:** RTFM	**Creation Date:** 04/23/2020

Week Date: 4/6/2020

DOC CODE	DOC DATE	MISCELLANEOUS
[ ] 1449		[ ] Continuing Data
[X] IDS	04/08/2020	[ ] Foreign Priority
[ ] CLM		[ ] Document Legibility
[ ] IIFW/FWCLM		[ ] Fees
[ ] SRFW		[ ] Petition (TC)
[ ] DRW		[ ] Other
[ ] OATH		
[ ] 312		
[ ] SPEC		

[RUSH] Message:

Please respond to the 4/8/20 IDS.

Thank you

[XRUSH] Response:

The IDS(s) filed on 04/08/2020 were considered and fully entered. Claims 3-27 remain allowable.

Initials: MF

Examiner: PUBS contact - James Leija, (703) 756-1197
NOTE: This form will be included as part of the official USPTO record with the response document coded as XRUSH.
REV: AUG 16

PTO/SB/08 Equivalent

INFORMATION DISCLOSURE STATEMENT BY APPLICANT	Application No.	16/791955
	Filing Date	February 14, 2020
	First Named Inventor	Ammar Al-Ali
	Art Unit	3791
(Multiple sheets used when necessary)	Examiner	FARDANESH, MARJAN
SHEET 1 OF 1	Attorney Docket No.	MAS.1007C4

U.S. PATENT DOCUMENTS					
Examiner Initials	Cite No.	Document Number *Number - Kind Code (if known)* Example: 1,234,567 B1	Publication Date MM-DD-YYYY	Name	Pages, Columns, Lines Where Relevant Passages or Relevant Figures Appear

FOREIGN PATENT DOCUMENTS						
Examiner Initials	Cite No.	Foreign Patent Document *Country Code-Number-Kind Code* Example: JP 1234567 A1	Publication Date MM-DD-YYYY	Name	Pages, Columns, Lines Where Relevant Passages or Relevant Figures Appear	T[1]

NON PATENT LITERATURE DOCUMENTS			
Examiner Initials	Cite No.	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T[1]
	1	2020-03-25 First Amended Complaint for (1) Patent Infringement (2) Trade Secret Misappropriation (3) Correction of Inventorship and (4) Ownership of Patents and Demand for Jury Trial, and including Exhibits 13-24 (Exhibits 1-12 and 25-31 comprise copies of publicly available U.S. patents and U.S. patent application publications, and are not included herein for ease of transmission), Masimo Corporation and Cercacor Laboratories, Inc. v. Apple Inc., Case No. 8:20-cv-00048, pgs. 1-94, 983-1043 (total of 156 pages).	

Examiner Signature /MARJAN FARDANESH/	Date Considered 04/25/2020

*__Examiner:__ Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

T[1] - Place a check mark in this area when an English language Translation is attached.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /M.F/

INFORMATION DISCLOSURE STATEMENT
AND NOTICE OF CONCURRENT LITIGATION

First Inventor	:	Ammar Al-Ali
App. No.	:	16/791955
Filed	:	February 14, 2020
For	:	PHYSIOLOGICAL MEASUREMENT DEVICES, SYSTEMS, AND METHODS
Examiner	:	Fardanesh, Marjan
Art Unit	:	3791
Conf. No.	:	3106

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

References and Listing

Pursuant to 37 CFR 1.56, an Information Disclosure Statement listing references is provided herewith. Copies of any listed foreign and non-patent literature references are being submitted.

Pursuant to 37 CFR 1.97(g) and (h), Applicant makes no representation that the information is considered to be material to patentability. Additionally, inclusion on this list is not an admission that any of the cited documents are prior art in this application. Further, Applicant makes no representation regarding the completeness of this list, or that better art does not exist.

Related Proceedings

Pursuant to M.P.E.P § 2001.06(c), Applicant provides this notification of related litigation proceedings. On January 9, 2020, Applicant, Masimo Corporation, and Cercacor Laboratories, Inc., filed a complaint in the United States Court for the Central District of California (Case No. 8:20-cv-00048) against Apple Inc.. On March 25, 2020 an amended complaint was filed. The complaint alleges infringement of U.S. Patent Nos. 10,258,265; 10,258,266; 10,292,628; 10,299,708; 10,376,190; 10,376,191; 10,588,553; 10,588,554; 10,470,695; 6,771,994; 8,457,703; and 10,433,776. At least U.S. Patent No. 10,470,695 shares a

common priority claim with the present application. Copies of related documents in the proceeding are being submitted herewith.

For convenience in reviewing this submission, the following chart is provided showing the pending applications which share at least one common priority claim with each of the asserted patents. It should be noted that other family members that share at least one common priority claim may have issued as well.

Patent No.	**Pending Family Members**
10,258,265	16/449143
10,258,266	16/534956
10,292,628	16/541987
10,299,708	16/725478
10,376,190	16/725292
10,376,191	16/829510
10,588,553	16/829578
10,588,554	16/829536
	16/834467
	16/834538
	16/834533
10,470,695	16/532061
	16/532065
	16/791955
	16/791963
	16/835712
	16/835772
6,771,994	
8,457,703	15/820082
10,433,776	16/174130

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /M.F/

No Disclaimers

To the extent that anything in the Information Disclosure Statement or the listed references could be construed as a disclaimer of any subject matter supported by the present application, Applicant hereby rescinds and retracts such disclaimer.

Timing of Disclosure

This Information Disclosure Statement is being filed before the receipt of a First Office Action on the merits, and presumably no fee is required. If a First Office Action on the merits was mailed before the mailing date of this Statement, the Commissioner is authorized to charge the fee set forth in 37 CFR 1.17(p) to Deposit Account No. 11-1410.

Respectfully submitted,

KNOBBE, MARTENS, OLSON & BEAR, LLP

Dated: April 8, 2020

By: /Jarom Kesler/
Jarom D. Kesler
Registration No. 57,046
Registered Practitioner
(949) 760-0404

/MARJAN FARDANESH/

04/25/2020

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /M.F/

To: jayna.cartee@knobbe.com,efiling@knobbe.com,
From: PAIR_eOfficeAction@uspto.gov
Cc: PAIR_eOfficeAction@uspto.gov
Subject: Private PAIR Correspondence Notification for Customer Number 64735

May 22, 2020 03:44:28 AM

Dear PAIR Customer:

KNOBBE, MARTENS, OLSON & BEAR, LLP
MASIMO CORPORATION (MASIMO)
2040 MAIN STREET
FOURTEENTH FLOOR
IRVINE, CA 92614
UNITED STATES

The following USPTO patent application(s) associated with your Customer Number, 64735 , have new outgoing correspondence. This correspondence is now available for viewing in Private PAIR.

The official date of notification of the outgoing correspondence will be indicated on the form PTOL-90 accompanying the correspondence.

Disclaimer:
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Application	Document	Mailroom Date	Attorney Docket No.
16791955	NOA	05/22/2020	MAS.1007C4
	1449	05/22/2020	MAS.1007C4
	1449	05/22/2020	MAS.1007C4

To view your correspondence online or update your email addresses, please visit us anytime at https://sportal.uspto.gov/secure/myportal/privatepair.

If you have any questions, please email the Electronic Business Center (EBC) at EBC@uspto.gov with 'e-Office Action' on the subject line or call 1-866-217-9197 during the following hours:

Monday - Friday 6:00 a.m. to 12:00 a.m.

Thank you for prompt attention to this notice,

UNITED STATES PATENT AND TRADEMARK OFFICE

PATENT APPLICATION INFORMATION RETRIEVAL SYSTEM

PTO/SB/08 Equivalent

INFORMATION DISCLOSURE STATEMENT BY APPLICANT	Application No.	16/791955
	Filing Date	February 14, 2020
	First Named Inventor	Ammar Al-Ali
	Art Unit	2875
(Multiple sheets used when necessary)	Examiner	Unassigned
SHEET 38 OF 50	Attorney Docket No.	MAS.1007C4

U.S. PATENT DOCUMENTS

Examiner Initials	Cite No.	Document Number *Number - Kind Code (if known)* Example: 1,234,567 B1	Publication Date MM-DD-YYYY	Name	Pages, Columns, Lines Where Relevant Passages or Relevant Figures Appear
	1074	2018/0055390	3/1/2018	Kiani et al.	
	1075	2018/0055430	3/1/2018	Diab et al.	
	1076	2018/0055439	3/1/2018	Pham et al.	
	1077	2018/0056129	~~1/1/2018~~ 03/2018	NARASIMHA RAO et al.	
	1078	2018/0064381	3/8/2018	Shakespeare et al.	
	1079	2018/0069776	3/8/2018	Lamego et al.	
	1080	2018/0070867	3/15/2018	Smith et al.	
	1081	2018/0078151	3/22/2018	ALLEC et al.	
	1082	2018/0078182	3/22/2018	CHEN et al.	
	1083	2018/0082767	3/22/2018	Al-Ali et al.	
	1084	2018/0085068	3/29/2018	Telfort	
	1085	2018/0087937	3/29/2018	Al-Ali et al.	
	1086	2018/0103874	4/19/2018	Lee et al.	
	1087	2018/0103905	4/19/2018	Kiani	
	1088	2018/0110469	4/26/2018	MAANI et al.	
	1089	2018/0110478	4/26/2018	Al-Ali	
	1090	2018/0116575	5/3/2018	Perea et al.	
	1091	2018/0125368	5/10/2018	Lamego et al.	
	1092	2018/0125430	5/10/2018	Al-Ali et al.	
	1093	2018/0125445	5/10/2018	Telfort et al.	
	1094	2018/0130325	5/10/2018	Kiani et al.	
	1095	2018/0132769	5/17/2018	Weber et al.	
	1096	2018/0132770	5/17/2018	Lamego	
	1097	2018/0146901	5/31/2018	Al-Ali et al.	
	1098	2018/0146902	5/31/2018	Kiani et al.	
	1099	2018/0153418	6/7/2018	SULLIVAN et al.	
	1100	2018/0153442	6/7/2018	Eckerbom, et al.	
	1101	2018/0153446	6/7/2018	Kiani	
	1102	2018/0153447	6/7/2018	Al-Ali et al.	

Change(s) applied to document, /M.H.E./ 4/21/2020

Examiner Signature	/MARJAN FARDANESH/	Date Considered	03/19/2020

***Examiner:** Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

T[1] - Place a check mark in this area when an English language Translation is attached.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /M.F/

To: jayna.cartee@knobbe.com,efiling@knobbe.com,
From: PAIR_eOfficeAction@uspto.gov
Cc: PAIR_eOfficeAction@uspto.gov
Subject: Private PAIR Correspondence Notification for Customer Number 64735

May 24, 2020 08:48:00 AM

Dear PAIR Customer:

KNOBBE, MARTENS, OLSON & BEAR, LLP
MASIMO CORPORATION (MASIMO)
2040 MAIN STREET
FOURTEENTH FLOOR
IRVINE, CA 92614
UNITED STATES

The following USPTO patent application(s) associated with your Customer Number, 64735 , have new outgoing correspondence. This correspondence is now available for viewing in Private PAIR.

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Application	Document	Mailroom Date	Attorney Docket No.
16791955	1449	05/22/2020	MAS.1007C4

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APPLICATION NO.	ISSUE DATE	PATENT NO.	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/791,955	06/23/2020	10687743	MAS.1007C4	3106

64735 7590 06/03/2020

KNOBBE, MARTENS, OLSON & BEAR, LLP
MASIMO CORPORATION (MASIMO)
2040 MAIN STREET
FOURTEENTH FLOOR
IRVINE, CA 92614

ISSUE NOTIFICATION

The projected patent number and issue date are specified above.

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)
(application filed on or after May 29, 2000)

The Patent Term Adjustment is 0 day(s). Any patent to issue from the above-identified application will include an indication of the adjustment on the front page.

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (http://pair.uspto.gov).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Application Assistance Unit (AAU) of the Office of Data Management (ODM) at (571)-272-4200.

APPLICANT(s) (Please see PAIR WEB site http://pair.uspto.gov for additional applicants):

Ammar Al-Ali, San Juan Capistrano, CA;
MASIMO CORPORATION, Irvine, CA;

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Jun 04, 2020 04:23:56 AM

Dear PAIR Customer:

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UNITED STATES

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Application	Document	Mailroom Date	Attorney Docket No.
16791955	ISSUE.NTF	06/03/2020	MAS.1007C4

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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
16/791,955	02/14/2020	Ammar Al-Ali	MAS.1007C4

CONFIRMATION NO. 3106

64735
KNOBBE, MARTENS, OLSON & BEAR, LLP
MASIMO CORPORATION (MASIMO)
2040 MAIN STREET
FOURTEENTH FLOOR
IRVINE, CA 92614

PUBLICATION NOTICE

OC000000117665121

Title:PHYSIOLOGICAL MEASUREMENT DEVICES, SYSTEMS, AND METHODS

Publication No.US-2020-0178866-A1
Publication Date:06/11/2020

NOTICE OF PUBLICATION OF APPLICATION

The above-identified application will be electronically published as a patent application publication pursuant to 37 CFR 1.211, et seq. The patent application publication number and publication date are set forth above.

The publication may be accessed through the USPTO's publically available Searchable Databases via the Internet at www.uspto.gov. The direct link to access the publication is currently http://www.uspto.gov/patft/.

The publication process established by the Office does not provide for mailing a copy of the publication to applicant. A copy of the publication may be obtained from the Office upon payment of the appropriate fee set forth in 37 CFR 1.19(a)(1). Orders for copies of patent application publications are handled by the USPTO's Public Records Division. The Public Records Division can be reached by telephone at (571) 272-3150 or (800) 972-6382, by facsimile at (571) 273-3250, by mail addressed to the United States Patent and Trademark Office, Public Records Division, Alexandria, VA 22313-1450 or via the Internet.

In addition, information on the status of the application, including the mailing date of Office actions and the dates of receipt of correspondence filed in the Office, may also be accessed via the Internet through the Patent Electronic Business Center at www.uspto.gov using the public side of the Patent Application Information and Retrieval (PAIR) system. The direct link to access this status information is currently https://portal.uspto.gov/pair/PublicPair. Prior to publication, such status information is confidential and may only be obtained by applicant using the private side of PAIR.

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Application	Document	Mailroom Date	Attorney Docket No.
16791955	NTC.PUB	06/11/2020	MAS.1007C4

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PATENT APPLICATION INFORMATION RETRIEVAL SYSTEM

REQUEST FOR CERTIFICATE OF CORRECTION

First Inventor	:	Ammar Al-Ali
App. No.	:	16/791955
Filed	:	February 14, 2020
Patent No.	:	10,687,743
Issue Date	:	June 23, 2020
Title	:	PHYSIOLOGICAL MEASUREMENT DEVICES, SYSTEMS, AND METHODS
Conf. No.	:	3106

Commissioner for Patents
Office of Data Management
Attention: Certificates of Correction Branch
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Commissioner:

Enclosed for filing is a Certificate of Correction in connection with the above-identified patent.

Some of the errors cited in the Certificate of Correction appear to have been incurred through the fault of the PTO (see 35 USC § 254, 37 CFR § 1.322, and MPEP § 1480). However, because this may not apply to each item in the Certificate of Correction, the $150 fee under 37 CFR § 1.20(a) is submitted herewith. Please charge any additional fees to our Deposit Account No. 11-1410.

Respectfully submitted,

KNOBBE, MARTENS, OLSON & BEAR, LLP

Dated: August 10, 2020

By: /Jarom Kesler/
Jarom D. Kesler
Registration No. 57,046
Registered Practitioner
(949) 760-0404

33262929

UNITED STATES PATENT AND TRADEMARK OFFICE
CERTIFICATE OF CORRECTION

PATENT NO. : 10,687,743

APPLICATION NO. : 16/791955

ISSUE DATE : June 23, 2020

INVENTOR(S) : Ammar Al-Ali

It is certified that an error appears or errors appear in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

On Page 6, Column 2, Item (56), Line 73, under U.S. Patent Documents,

delete "Al-Ali et al." and insert --Kiani et al.--.

On Page 6, Column 2, Item (56), Line 74, under U.S. Patent Documents,

delete "Kiani et al." and insert --Al-Ali et al.--.

On Page 10, Column 2, Item (56), Line 63, under Other Publications, delete "SPo2" and insert --SpO2--.

On Page 10, Column 2, Item (56), Line 65, under Other Publications, delete "Issn:" and insert --ISSN:--.

On Page 10, Column 2, Item (56), Line 72, under Other Publications,

delete "Cigilant" and insert --Vigilant--.

On Page 11, Column 1, Item (56), Line 32, under Other Publications,

delete "Placementon" and insert --Placement on--.

On Page 11, Column 1, Item (56), Line 55, under Other Publications,

delete "Conferemce" and insert --Conference--.

On Page 11, Column 2, Item (56), Line 8, under Other Publications,

delete "Depolyable," and insert --Deployable,--.

On Page 11, Column 2, Item (56), Line 62, under Other Publications,

delete "Corporationand" and insert --Corporation and--.

On Sheet 7 of 7, FIG. 8, Reference Number 810, Line 2 (Approx.),

delete "PROCESOR" and insert --PROCESSOR--.

In Column 7, Line 52, delete "(also" and insert --also--.

In Column 8, Line 1, delete "Gausian" and insert --Gaussian--.

MAILING ADDRESS OF SENDER:

Jarom D. Kesler
KNOBBE, MARTENS, OLSON & BEAR, LLP
2040 Main Street, 14th Floor
Irvine, California 92614

DOCKET NO. MAS.1007C4

PTO/SB/44 Equivalent

UNITED STATES PATENT AND TRADEMARK OFFICE
CERTIFICATE OF CORRECTION

PATENT NO. : 10,687,743

APPLICATION NO. : 16/791955

ISSUE DATE : June 23, 2020

INVENTOR(S) : Ammar Al-Ali

In Column 12, Line 37, delete “light emitting” and insert --light-emitting--.

MAILING ADDRESS OF SENDER:

Jarom D. Kesler
KNOBBE, MARTENS, OLSON & BEAR, LLP
2040 Main Street, 14th Floor
Irvine, California 92614

DOCKET NO. MAS.1007C4

PTO/SB/44 Equivalent

Electronic Patent Application Fee Transmittal

Application Number:	16791955
Filing Date:	14-Feb-2020
Title of Invention:	PHYSIOLOGICAL MEASUREMENT DEVICES, SYSTEMS, AND METHODS
First Named Inventor/Applicant Name:	Ammar Al-Ali
Filer:	Jarom D. Kesler/Lorraine Yoo Lin
Attorney Docket Number:	MAS.1007C4

Filed as Large Entity

Filing Fees for Utility under 35 USC 111(a)

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
CERTIFICATE OF CORRECTION	1811	1	150	150

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Extension-of-Time:				
Miscellaneous:				
			Total in USD ($)	**150**

Electronic Acknowledgement Receipt	
EFS ID:	40238277
Application Number:	16791955
International Application Number:	
Confirmation Number:	3106
Title of Invention:	PHYSIOLOGICAL MEASUREMENT DEVICES, SYSTEMS, AND METHODS
First Named Inventor/Applicant Name:	Ammar Al-Ali
Customer Number:	64735
Filer:	Jarom D. Kesler/Kealani Aguon
Filer Authorized By:	Jarom D. Kesler
Attorney Docket Number:	MAS.1007C4
Receipt Date:	10-AUG-2020
Filing Date:	14-FEB-2020
Time Stamp:	14:42:25
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	CARD
Payment was successfully received in RAM	$150
RAM confirmation Number	E202080E42480411
Deposit Account	111410
Authorized User	Kealani Aguon
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows: 37 CFR 1.16 (National application filing, search, and examination fees) 37 CFR 1.17 (Patent application and reexamination processing fees)	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Request for Certificate of Correction	1007c4.pdf	30457 4bb36f341646366245c34cf1fc99a841abf3b8b9	no	3
Warnings:					
Information:					
2	Fee Worksheet (SB06)	fee-info.pdf	30280 92b7841646e81096d2b76e876f8495ba19e2a94c	no	2
Warnings:					
Information:					
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If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.
National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.
New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

UNITED STATES PATENT AND TRADEMARK OFFICE

CERTIFICATE OF CORRECTION

PATENT NO. : 10,687,743 B1
APPLICATION NO. : 16/791955
DATED : June 23, 2020
INVENTOR(S) : Ammar Al-Ali

It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

On the Title Page

On Page 6, Column 2, Item (56), Line 73, under U.S. Patent Documents, delete "Al-Ali et al." and insert --Kiani et al.--.

On Page 6, Column 2, Item (56), Line 74, under U.S. Patent Documents, delete "Kiani et al." and insert --Al-Ali et al.--.

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On Page 11, Column 2, Item (56), Line 8, under Other Publications, delete "Depolyable," and insert --Deployable,--.

On Page 11, Column 2, Item (56), Line 62, under Other Publications, delete "Corporationand" and insert --Corporation and--.

Signed and Sealed this
Twenty-second Day of September, 2020

Andrei Iancu
Director of the United States Patent and Trademark Office

In the Drawings

On Sheet 7 of 7, FIG. 8, Reference Number 810, Line 2, delete "PROCESOR" and insert --PROCESSOR--.

In the Specification

In Column 7, Line 52, delete "(also" and insert --also--.

In Column 8, Line 1, delete "Gausian" and insert --Gaussian--.

In Column 12, Line 37, delete "light emitting" and insert --light-emitting--.