F O R M 3

THE PATENTS ACT, 1970
(39 of 1970)
&
The Patents Rules, 2003
STATEMENT AND UNDERTAKING UNDER SECTION 8
(See Section 8 Rule 13)

1. I, **PEABODY, Steven, R.**, a US Citizen, of 4950 Turkeyfoot Road, Zionsville, IN 46077, United States of America

hereby declare :

(i) ~~that we have not made any application for the same/substantially the same invention outside India.~~

Or

that I who have made this application No. _____ dated 03/04/2017 (Nationalization Date: 22-08-2018) have made for the same/substantially same invention, application(s) for patent in the other countries, the particulars of which are given below :

Name of the Country	Date of Application	Application No	Status of the Application	Date of Publication	Date of Grant
USA	02/04/2016	62/317,543	Inactive		
PCT	03/04/2017	PCT/US2017/025689	Published	05/10/2017	

(ii) that the rights in the application(s) has/have been assigned to : **NONE**

(iii) that I undertake that upto the date of grant of the patent, by the Controller, I would keep him informed in writing the details regarding corresponding applications for patents filed outside India within six months from the date of filing of such application.

Dated this 22nd day of August 2018

ABHISHEK SEN
of S.MAJUMDAR & CO.
Applicant's Agent

To
The Controller of Patents
The Patent Office
At KOLKATA

From the INTERNATIONAL BUREAU

PCT

NOTIFICATION CONCERNING SUBMISSION, OBTENTION OR TRANSMITTAL OF PRIORITY DOCUMENT

(PCT Administrative Instructions, Section 411)

To:

ROBERTS, John, Lawrence
Roberts IP Law
624 3rd St.
Columbus, IN 47201
ÉTATS-UNIS D'AMÉRIQUE

Date of mailing *(day/month/year)* 24 April 2017 (24.04.2017)	
Applicant's or agent's file reference Peabody-002	**IMPORTANT NOTIFICATION**
International application No. PCT/US2017/025689	International filing date *(day/month/year)* 03 April 2017 (03.04.2017)
International publication date *(day/month/year)* **Not yet published**	Priority date *(day/month/year)* 02 April 2016 (02.04.2016)
Applicant PEABODY, Steven, R.	

The applicant is hereby notified of the date of receipt (or of obtaining by the International Bureau) of the priority document(s) relating to all earlier application(s) whose priority is claimed. Unless otherwise indicated by the letters "NR", in the right-hand column or by an asterisk appearing next to the date of receipt, **the priority document concerned was submitted or transmitted to or obtained by the International Bureau in compliance with Rule 17.1(a), (b) or (b-*bis*)**. This Form replaces any previously issued notification concerning submission, transmittal or obtaining of priority documents.

Priority date	Priority application No.	Country or regional Office or PCT receiving Office	Date of receipt of priority document
02 April 2016 (02.04.2016)	62/317,543	US	13 April 2017 (13.04.2017)

The letters "NR" denote a priority document which, on the date of mailing of this Form, had not yet been received or obtained by the International Bureau in compliance with Rule 17.1(a), (b) or (b-*bis*). Where the applicant has failed to either submit, request to prepare and transmit, or to request the International Bureau to obtain the priority document within the applicable time limit under that Rule, the attention of the applicant is directed to Rule 17.1(c) which provides that no designated Office may disregard the priority claim concerned before giving the applicant an opportunity, upon entry into the national phase, to furnish the priority document within a time limit which is reasonable under the circumstances.

An asterisk "*" next to a date of receipt, denotes a priority document submitted or transmitted to or obtained by the International Bureau but not in compliance with Rule 17.1(a), (b) or (b-*bis*) (the priority document was received after the time limit prescribed in Rule 17.1(a); the request to prepare and transmit the priority document was submitted to the receiving Office after the applicable time limit under Rule 17.1(b) or the request to the International Bureau to obtain the priority document was made after the applicable time limit under Rule 17.1(b-*bis*)). Even though the priority document was not furnished in compliance with Rule 17.1(a), (b) or (b-*bis*), the International Bureau will nevertheless transmit a copy of the document to the designated Offices, for their consideration. In case such a copy is not accepted by the designated Office as the priority document, Rule 17.1(c) provides that no designated Office may disregard the priority claim concerned before giving the applicant an opportunity, upon entry into the national phase, to furnish the priority document within a time limit which is reasonable under the circumstances.

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F O R M 1 **THE PATENTS ACT, 1970 (39 of 1970) and** **THE PATENTS RULES, 2003** **APPLICATION FOR GRANT OF A PATENT** **(See section 7, 54 & 135 and sub-rule (1) of rule 20)**	**(FOR OFFICE USE ONLY)**

	Application No :	
	Filing Date :	
	Amount of Fee Paid :	
	CBR No :	
	Signature :	

1. APPLICANT'S REFERENCE / IDENTIFICATION NO. (AS ALLOTTED BY OFFICE)	

2. TYPE OF APPLICATION [Please tick (√) at the appropriate category]

Ordinary ()		Convention ()		PCT-NP (√)	
Divisional ()	Patent Of Addition ( )	Divisional ()	Patent Of Addition ( )	Divisional ()	Patent of Addition ( )

3A.APPLICANT(S)

Name in Full	Nationality	Country of Residence	Address of the Applicant	
PEABODY, Steven, R.	A US Citizen	United States of America	House No.	4950
			Street	Turkeyfoot Road
			City	Zionsville
			State	IN
			Country	United States of America
			Pin Code	46077

3B.CATEGORY OF APPLICANT [Please tick (√) at the appropriate category]

Natural Person (√)	Other than Natural Person		
	Small Entity ( )	Startup( )	Others ( )

4. INVENTOR(S) [Please tick (√) at the appropriate category]

Are all the inventor(s) same as the applicant (s) named above ?	Yes (√)	No ( )

If "NO", furnish the details of the inventor(s)

Name in Full	Nationality	Country of Residence	Address of the Inventor	

5. TITLE OF THE INVENTION	MEDICAL DIAGNOSTIC DEVICE, SYSTEM, AND METHOD OF USE

6. AUTHORISED REGISTERED PATENT AGENT(S)	IN/PA NO.	980
	Name	ABHISHEK SEN
	Mobile No.	9331827882
7. ADDRESS FOR SERVICE OF APPLICANT IN INDIA	Name	S. Majumdar & Co.
	Postal Address	5 Harish Mukherjee Road,First Floor, Kolkata - 700025
	Telephone No.	033 2455 7484 / 2455 7485 / 2455 7486
	Mobile No.	9331827882
	Fax No.	033 2455 7487 / 2455 7488
	E-mail Id	cal@patentindia.com

8. IN CASE OF APPLICATION CLAIMING PRIORITY OF APPLICATION FILED IN CONVENTION COUNTRY, PARTICULARS OF CONVENTION APPLICATION

Country	Application number	Filing Date	Name of the applicant	Title of the Invention	IPC (as classified in the convention country)
USA	62/317,543	02-04-2016	PEABODY, Steven R.	Medical Diagnostic Device, System, and Method of Use	A61B 5/00 (2006.01); A61B 5/02 (2006.01)

9. IN CASE OF PCT NATIONAL PHASE APPLICATION, PARTICULARS OF INTERNATIONAL APPLICATION FILED UNDER PATENT CO-OPERATION TREATY (PCT)

International application number	International filing date
PCT/US2017/025689	03-04-2017

10.IN CASE OF DIVISIONAL APPLICATION FILED UNDER SECTION 16, PARTICULARS OF ORIGINAL (FIRST) APPLICATION

Original (first) application no.	Date of filing of original (first) application

11.IN CASE OF PATENT OF ADDITION FILED UNDER SECTION 54, PARTICULARS OF MAIN APPLICATION OR PATENT

Main Application/Patent No.	Date of filing of main application

12.DECLARATIONS

(i) ~~**Declaration by the inventor(s)**~~

~~**(In case the applicant is an assignee:** the inventor(s) may sign herein below or the applicant may upload the assignment or enclose the assignment with this application for patent or send the assignment by post/electronic transmission duly authenticated within the prescribed period).~~

~~I/We, the above named inventor(s) is/are the true & first inventor(s) for this Invention and declare that the applicant(s) herein is/are my/our assignee or legal representative.~~

~~(a) Date~~

~~(b) Signature(s)~~

~~(c) Name(s) :~~

(ii) ~~**Declaration by the Applicant(s) in the convention country**~~

~~**(In case the applicant in India is different than the applicant in the convention country :** the applicant in the convention country may sign herein below or applicant in India may upload~~

~~the assignment from the applicant in the convention country or enclose the said assignment with this application for patent or send the assignment by post/electronic transmission duly authenticated within the prescribed period).~~

~~I/We, the applicant(s) in the convention country declare that the applicant(s) herein is/are my/our assignee or legal representative.~~

~~(a) Date~~

~~(b) Signature(s)~~

~~(c) Name(s) of the signatory :~~

(iii) Declaration by the Applicant(s)

I/We the applicant(s) hereby declare(s) that : -

- ☑ I am/ We are in possession of the above-mentioned invention.
- ☑ The provisional/complete specification relating to the invention is filed with this application.
- ☒ The invention as disclosed in the specification uses the biological material from India and the necessary permission from the competent authority shall be submitted by me / us before the grant of patent to me / us.
- ☑ There is no lawful ground of objection(s) to the grant of the Patent to me/us.
- ☑ I am/we are the true & first inventor(s).
- ☒ I am/we are the assignee or legal representative of true & first inventor(s).
- ☑ The application or each of the applications, particulars of which are given in Paragraph-8, was the first application in convention country/countries in respect of my/our invention(s).
- ☑ I/We claim the priority from the above mentioned application(s) filed in convention country/countries and state that no application for protection in respect of the invention had been made in a convention country before that date by me/us or by any person from which I/We derive the title.
- ☑ My/our application in India is based on international application under Patent Cooperation Treaty (PCT) as mentioned in Paragraph-9.
- ☒ The application is divided out of my /our application particulars of which is given in Paragraph-10 and pray that this application may be treated as deemed to have been filed on DD/MM/YYYY under section 16 of the Act.
- ☒ The said invention is an improvement in or modification of the invention particulars of which are given in Paragraph-11.

13.FOLLOWING ARE THE ATTACHMENTS WITH THE APPLICATION :

(a) Form 2

Item	Details	Fee	Remarks
Complete/Provisional specification)#	29	2720.00	
Abstract	1		
No. Of Drawing(s) No. of Pages	24 10		
No. Of Claim(s) No. of Pages	20 7	3200.00	
No. of Sequence pages	0	0.00	

In case of a complete specification, if the applicant desires to adopt the drawings filed with his provisional specification as the drawings or part of the drawings for the complete specification under rule 13(4), the number of such pages filed with the provisional specification are required to be mentioned here.

(b)	Complete specification (in conformation with the international application)/as amended before the International Preliminary Examination Authority (IPEA), as applicable (2 copies).
(d)	Drawings (in conformation with the international application)/as amended before the International Preliminary Examination Authority (IPEA), as applicable (2 copies).
(e)	Priority document(s) or a request to retrieve the priority document(s) from DAS (Digital Access Service) if the applicant had already requested the office of first filing to make the priority document(s) available to DAS.
(g)	Statement and Undertaking on Form 3
(h)	Declaration of Inventorship on Form 5
(i)	Power of Authority to follow
(j)	Fee for Excess Priority Exceeding 1 = 0
(k)	Fee for application =Rs. 1600.00 Total fee Rs. 7520.00 in Cash/ Banker's Cheque /Bank Draft bearing No..... Date August 22, 2018 on..... Bank.

I/We hereby declare that to the best of my/our knowledge, information and belief the fact and matters slated herein are correct and I/We request that a patent may be granted to me/us for the said invention.

Dated this 22nd day of August 2018

ABHISHEK SEN
of S.MAJUMDAR & CO.
Applicant's Agent

To,
The Controller of Patents
The Patent Office, at KOLKATA

Note: -
* Repeat boxes in case of more than one entry.
* To be signed by the applicant(s) or by authorized registered patent agent otherwise where mentioned.
* Tick (√)/cross (x) whichever is applicable/not applicable in declaration in paragraph-12.
* Name of the inventor and applicant should be given in full, family name in the beginning.
* Strike out the portion which is/are not applicable.
* For fee: See First Schedule";

F O R M 5
THE PATENTS ACT, 1970
(39 of 1970)
&
The Patents Rules, 2003
DECLARATION AS TO INVENTORSHIP
[See section 10(6); rule 13(6)]

1. NAME OF APPLICANT(s)	**PEABODY, Steven, R.**, a US Citizen, of 4950 Turkeyfoot Road, Zionsville, IN 46077, United States of America

hereby declare that the true and first inventor(s) of the invention disclosed in the complete specification filed in pursuance of my/our application numbered _____ dated 03/04/2017 (Nationalization Date: 22-08-2018) are

2. INVENTOR(s)

(a) NAME	PEABODY, Steven, R.
(b) NATIONALITY	A US Citizen
(c) ADDRESS	4950 Turkeyfoot Road, Zionsville, IN 46077, United States of America

Dated this 22nd day of August 2018

ABHISHEK SEN
of S.MAJUMDAR & CO.
Applicant's Agent

To
The Controller of Patents
The Patent Office
At KOLKATA

3. DECLARATION TO BE GIVEN WHEN THE APPLICATION IN INDIA IS FILED BY THE APPLICANT(S) IN THE CONVENTION COUNTRY :-

I the applicant(s) in the convention country hereby declare that my right to apply for a patent in India is by way of inventorship.

Dated this 22nd day of August 2018

ABHISHEK SEN
of S.MAJUMDAR & CO.
Applicant's Agent

To
The Controller of Patents
The Patent Office
At KOLKATA

F O R M 2

THE PATENTS ACT, 1970
(39 of 1970)
&
The Patents Rules, 2003
COMPLETE SPECIFICATION
(See section 10; rule 13)

1. Title of the invention. –

MEDICAL DIAGNOSTIC DEVICE, SYSTEM, AND METHOD OF USE

2. **Applicant(s)**

(a) NAME : **PEABODY, Steven, R.**

(b) NATIONALITY : A US Citizen

(c) ADDRESS : 4950 Turkeyfoot Road, Zionsville, IN 46077, United States of America

3. **PREAMBLE TO THE DESCRIPTION**

The following specification particularly describes the invention and the manner in which it is to be performed :

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wirelessly receive, display, and wirelessly communicate data corresponding to physiological measurements taken by a peripheral device not physically connected to the mobile device, wherein the peripheral device is selected from the group consisting of: a scale configured to measure and wirelessly communicate data corresponding to the weight of the patient; a fall detection device configured to be worn by the patient and to detect and to wirelessly communicate data indicating when the patient has fallen; and an activity tracker configured to be worn by the patient and to measure and wirelessly communicate data corresponding to an amount of physical activity engaged in by the patient over a period of time;

communicate with and display information from the Internet;

wirelessly communicate an alert to the user and to someone located remotely from the user when said data corresponding to said physiological measurements exceeds a predetermined threshold; and

be selectably operable in a plurality of modes, wherein in at least one mode the mobile device is configured to display visual indications of data corresponding to said physiological measurements and to associate with said data: a patient identifier; time stamp; and GPS location; and to automatically wirelessly communicate said data for each patient securely to a network.

Dated this 22nd day of August 2018

ABHISHEK SEN
of S. MAJUMDAR & CO.
Applicant's Agent

F O R M 18 **THE PATENTS ACT, 1970** **(39 of 1970)** **&** **The Patent Rules** **REQUEST/EXPRESS REQUEST FOR EXAMINATION OF APPLICATION FOR PATENT** **[See Section 11B and rule 20(4)(ii), 24B(1)(i)]**	**(FOR OFFICE USE ONLY)** **RQ. No :** **Filing Date :** **Amount of Fee Paid :** **CBR No :** **Signature :**

1. APPLICANT(S)/~~OTHER INTERESTED PERSON~~

(a) NAME : PEABODY, Steven, R.
(b) NATIONALITY : **US**
(c) ADDRESS : **4950 Turkeyfoot Road, Zionsville, IN - 46077, USA**

(d) Date of publication of the application under section 11A : _____.

2. Statement in case of request for examination made by the applicant(s)

We hereby request that our application for patent No. 201837031468 filed on 03/04/2017 (Nationalization date: 22/08/2018) for the invention titled MEDICAL DIAGNOSTIC DEVICE, SYSTEM, AND METHOD OF USE shall be examined under sections 12 and 13 of the Act.

Or

~~I/We hereby made an express request that my/our application for patent No. _____ filed on _____ based on Patent Cooperation Treaty (PCT) application No. _____ dated _____ made in country India shall be examined under sections 12 and 13 of the Act, immediately without waiting for the expiry of 31 months as specified in rule 20(4)(ii)~~

3. Statement in case of request for examination made by any other interested person

~~I/We hereby interested person request for the examination of the Application No. _____ dated (Nationalisation Date: _____) filed by the applicant _____ title _____ under sections 12 and 13 of the Act.~~

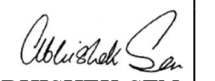
~~As an evidence of my/our interest in the application for patent following documents are submitted.~~

~~(a) _____~~
~~(b) _____~~

4. Address for service :

S. Majumdar & Co., 5 Harish Mukherjee Road, First Floor, Kolkata 700025, Phone : 033 2455 7484 / 2455 7485 / 2455 7486, Fax : 033 2455 7487 / 2455 7488, E-mail : cal@patentindia.com

Dated this 25th day of August 2018



ABHISHEK SEN
of S. MAJUMDAR & CO.
Applicants' Agent

To
The Controller of Patents
The Patent Office
At KOLKATA

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
5 October 2017 (05.10.2017)

WIPO | PCT

(10) International Publication Number
WO 2017/173434 A1

(51) International Patent Classification:
A61B 5/00 (2006.01) *A61B 5/02* (2006.01)

(21) International Application Number:
PCT/US2017/025689

(22) International Filing Date:
3 April 2017 (03.04.2017)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
62/317,543 2 April 2016 (02.04.2016) US

(72) Inventor; and
(71) Applicant : **PEABODY, Steven, R.** [US/US]; 4950 Turkeyfoot Road, Zionsville, IN 46077 (US).

(74) Agent: **ROBERTS, John, Lawrence**; Roberts IP Law, 624 3rd St., Columbus, IN 47201 (US).

(81) Designated States *(unless otherwise indicated, for every kind of national protection available)*: AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DJ, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IR, IS, JP, KE, KG, KH, KN, KP, KR, KW, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States *(unless otherwise indicated, for every kind of regional protection available)*: ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, ST, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG).

Declarations under Rule 4.17:

— *of inventorship (Rule 4.17(iv))*

Published:

— *with international search report (Art. 21(3))*

(54) Title: MEDICAL DIAGNOSTIC DEVICE, SYSTEM, AND METHOD OF USE

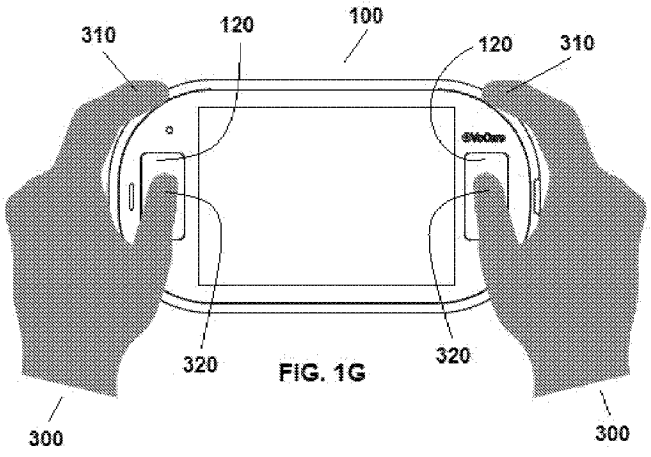


FIG. 1G

(57) Abstract: Provided in various example embodiments a mobile device integrated in a body that is sized and shaped to be held in a palm of a hand of a user, the mobile device configured to take a plurality of physiological measurements of a patient, including electrocardiographic measurements, blood oxygen saturation level measurements, pulse rate measurements, body temperature measurements, blood pressure measurements when connected with a removable inflatable cuff, and blood glucose measurements when connected with an elongated test strip, and to display and wirelessly communicate data corresponding to said physiological measurements. The mobile device may comprise some or all of the features of an Internet enabled smartphone. The mobile device may be provided with selectable modes of operation for use with one or more patients. Wireless peripherals may provide additional physiological data to the device. Systems are provided for secure communication and storage of data.

WO 2017/173434 A1

Medical Diagnostic Device, System, and Method of Use

Cross-Reference to Related Applications

[0001] This application claims priority to, incorporates herein by reference, and is a non-provisional of US provisional patent application no. 62/317,543 to Steven R. Peabody, filed April 2, 2016, and entitled Medical Diagnostic Device, System, and Method of Use (herein "the '543 Application").

Federally Sponsored Research or Development

[0002] None.

Technical Field

[0003] The present invention relates to the field of diagnostic medicine and more particularly to a hand-held mobile medical diagnostic device and comprehensive remote patient telehealth monitoring system for measuring and wirelessly communicating a number of physiologic parameters.

Background

[0004] Millions of elderly patients are cared for by home healthcare, nursing homes, and assisted living. According to The National Association for Home Care & Hospice, approximately twelve million individuals in the United States currently receive care from more than 33,000 agencies for causes including acute illness, long-term health conditions, permanent disability, or terminal illness. Additionally, there are millions of homebound and home-limited individuals who are unable to access the healthcare system due to combinations of functional impairment, chronic illness, and poverty. There is an urgent need for improved tools to help these persons obtain home health care more effectively and efficiently. In working to address these needs, innovations were discovered that have applicability to not only home health care but also to healthcare generally, and to health conscious individuals and those engaged in sports and exercise activities.

Summary

[0005] Provided is a new treatment modality that consolidates into one hand-held device a multiplicity of medical measurement capabilities plus a hub for automatic wireless data

transmission. In various example embodiments the hand-held device may be configured to measure and wirelessly communicate a plurality of physiologic parameters for one or more patients, including for instance any or all of blood pressure, blood glucose, body temperature, pulse rate, blood oxygen saturation level (SpO_2), and electrocardiogram (ECG). Additional peripheral devices may also be provided, either separately or along with the device as part of a kit, that automatically interface with and wirelessly transmit data to the hand-held device, such as fall detection, activity tracking, and smart scale peripherals. A carrying case may also be provided for the device, or for the device and one or more of its peripherals, either separately or along with the device as part of a kit. Also provided is an online network and interface for securely receiving, storing, compiling, and displaying data in a variety of formats selectively to patients, physicians, or other caretakers. The device and system simplify and improve management of multiple and often co-occurring chronic conditions such as diabetes, congestive heart failure, (CHF), chronic obstructive pulmonary disease (COPD), and hypertension, for example.

[0006] The device minimizes or eliminates human data entry errors since all readings are typically automatically uploaded after every use to a HIPAA-compliant (i.e., compliant with the Health Insurance Portability and Accountability Act of 1996) cloud network via cellular (e.g., 4G) and WiFi connectivity. Alternatively or additionally, the data can be sent directly to a provider's management solution directly through an application program interface (API). This replaces or minimizes the time-consuming and error-prone step of manually entering data, and patients no longer have to obtain and keep track of multiple devices. The device efficiently and effectively improves clinical outcomes, enhances patient engagement, and reduces total cost of care by reducing equipment costs, expanding the productivity of health care workers, and having patients self-report their medical data in an automatically accurate and timely fashion.

[0007] In various example embodiments the device may be configured to operate in a plurality of modes. For example, three modes might be provided, such as: guest or single test; point of care; and remote patient monitoring. In a guest mode, the device may operate as a stand-

alone device providing visual indications of test results without communicating the test results to a network. In a point-of-care mode, the device may be configured to perform tests on and collect data separately for multiple patients whom may be at the same location (in the case of a hospital or care facility, for instance) or various different locations (in the case of a traveling nurse or other care provider, for instance), and to automatically and securely record and communicate the test result data, which may be time-stamped and GPS-location stamped, to a network. By automatically adding time and location data to the test data, an electronic audit trail is created that can be useful for validating care, avoiding insurance fraud, and ensuring standards of care are met.

[0008] A remote patient monitoring mode may be provided that may be configured to provide a single patient with a daily monitoring tool that is simple and easy enough for the patient to use on him or herself. The device may automatically collect and securely communicate test data, such as vital information, for example, to be viewed remotely by a doctor or other caregiver at their convenience without the need for manually logging, communicating, and compiling the data. In one example remote mode, patients can use a video communication feature to conduct telehealth visits directly through the device. The patient may also electronically pair various peripheral devices with the device to allow the device to passively collect and automatically communicate additional information, such as a fall detection device, wireless daily activity trackers, and a wireless smart weight scale, for example. Additionally, information can be entered manually through a touch-screen in certain example embodiments. Such pairing with such peripherals and manually entering data may optionally be used with other modes as well.

[0009] The present device is believed to be the first hand-held mobile medical device that comprises all the presently-disclosed means for collecting medical data for diagnostics, and that also acts as its own wireless telecommunications hub that automatically uploads that data, for example as it is read to a HIPAA-compliant network on the cloud via 4G cellular and WiFi connectivity, in various example embodiments.

[0010] Accordingly, provided in various example embodiments is a mobile device integrated in a body that is sized and shaped to be held in a palm of a hand of a user. The mobile device may be configured to take a plurality of physiological measurements of a patient, who might or might not be the user in any particular circumstance, including electrocardiographic measurements, blood oxygen saturation level measurements, pulse rate measurements, body temperature measurements, blood pressure measurements when connected with a removable inflatable cuff, and blood glucose measurements when connected with an elongated test strip having at a first end an electrical connection point and at a second end an electrochemical cell. The mobile device may be configured to display and wirelessly communicate data corresponding to said physiological measurements.

[0011] In various example embodiments, the mobile device may comprise a display; a processor; a wireless modem with mobile broadband and GPS functionality; and a power source, such as a battery or a power cord. The mobile device may comprise a touch-screen data input structure and is configured to manually receive, display, and wirelessly communicate data corresponding to physiological measurements of the patient that were manually taken. The mobile device may comprise a cellular telephone; a camera, microphone, and speaker, all configured to allow the user to video-conference with one or more remotely-located persons. The mobile device may comprise two or more electrocardiographic electrodes integrated with and positioned on the body of the mobile device and configured to measure electrocardiographic signals of the patient when gripped by fingers or thumbs of the patient. The mobile device may comprise a fingertip pulse oximeter formed into the body of the mobile device and configured to measure pulse rate and blood oxygen saturation levels of the patient when a tip of a finger of the patient is inserted therein. The mobile device may comprise a temperature sensor integrated with and positioned on the body of the mobile device and configured to measure body temperature of the patient when the temperature sensor is placed against the patient's skin. The mobile device may comprise a blood pressure measuring structure within the body of the mobile device, comprising a controller, motor, pressure sensor, and pump in air communication with a tube

interface at the body that is adapted to be removably and sealably connected with an inflatable cuff, which may be provided separately or along with the mobile device as part of a kit. The mobile device may comprise a blood glucose measuring structure within the body of the mobile device, comprising an electrical connector at the body, wherein the electrical connector disposed to form an electrical connection with the electrical connection point on the first end of the elongated test strip, when the elongated strip is inserted in the electrical connector. Such test strips may be provided separately and/or along with the mobile device as part of a kit.

[0012] In various example embodiments the mobile device may be configured to automatically wirelessly communicate to a network said data corresponding to said physiological measurements. The mobile device may be configured to wirelessly receive, display, and wirelessly communicate data corresponding to physiological measurements taken by a peripheral device not physically connected to the mobile device. The peripheral devices may include a scale configured to measure and wirelessly communicate data corresponding to the weight of the patient; a fall detection device configured to be worn by the patient and to detect and to wirelessly communicate data indicating when the patient has fallen; and an activity tracker configured to be worn by the patient and to measure and wirelessly communicate data corresponding to an amount of physical activity engaged in by the patient over a period of time. The mobile device may be configured to communicate with and display information from the Internet. The mobile device may be configured to wirelessly communicate an alert to the user, and optionally to someone located remotely from the user, when said data corresponding to said physiological measurements exceeds a predetermined threshold.

[0013] The mobile device may be configured to be selectably operable in a plurality of modes. For example, in a first mode the mobile device may be configured to display visual indications of data corresponding to said physiological measurements without communicating said data wirelessly. In a second mode the mobile device may be configured to display visual indications of data corresponding to said physiological measurements and to associate with said data a patient identifier, time stamp, and GPS location, and to automatically wirelessly

communicate said data for each patient securely to a network. In a third mode the mobile device may be configured to display visual indications of data corresponding to said physiological measurements and to automatically wirelessly communicate said data securely to a network. In such a third mode the mobile device may be further configured to automatically wirelessly communicate securely to a network data corresponding to physiological measurements taken by one or more peripheral devices not physically connected to the mobile device. In a third mode the mobile device may be configured to allow the patient to communicate with remotely located persons by audio and video.

[0014] Also provided in various example embodiments is a system comprising a plurality of mobile devices as described herein, for use with a plurality of patients, all in wireless communication with a remotely-located computer network configured to securely receive, store, compile, and selectively display in a plurality of formats the data corresponding to the physiological measurements of the patients. The formats may include a single-patient format where the data corresponding to the physiological measurements corresponds to a single one of the patients. The formats may also include a multiple-patient format where the data corresponding to the physiological measurements corresponds to a plurality of the patients.

[0015] The foregoing summary is illustrative only and is not meant to be exhaustive or limiting. Other aspects, objects, and advantages of various example embodiments will be apparent to those of skill in the art upon reviewing the accompanying drawings, disclosure, and appended claims. These together with other objects of the invention, along with various features of novelty, which characterize the invention, are pointed out with particularity in the claims annexed hereto and forming a part of this disclosure. For a better understanding of the invention, its operating advantages and the specific objects attained by its uses, reference should be had to the accompanying and incorporated drawings, claims, and descriptive matter in which there is illustrated one or more non-limiting preferred embodiments.

Brief Description of the Drawings

[0016] FIGS. 1A-1F illustrate certain aspects of an example mobile device integrated in a body that is sized and shaped to be held in a palm of a hand of a user, according to certain example embodiments, wherein:

[0017] FIG. 1A is a top plan view thereof;

[0018] FIG. 1B is a front side elevation view thereof;

[0019] FIG. 1C is a bottom plan view thereof;

[0020] FIG. 1D is a left side elevation view thereof;

[0021] FIG. 1E is a right side elevation view thereof; and

[0022] FIG. 1F is a back side elevation view thereof.

[0023] FIG. 1G is a top plan view of another example mobile device integrated in a body that is sized and shaped to be held in a palm of a hand of a user, illustrating a patient taking an ECG measurement by placing their thumbs on ECG sensors on the device, according to certain example embodiments.

[0024] FIG. 1H is a top perspective view of the example mobile device of FIG. 1G, illustrating a test strip being inserted into a glucometer portion of the device, according to certain example embodiments.

[0025] FIG. 1i illustrates the example mobile device of FIG. 1G being removably attached with an example inflatable blood pressure cuff according to various example embodiments.

[0026] FIG. 1J illustrates the example mobile device of FIG. 1G removably attached with the example inflatable blood pressure cuff of FIG. 1i, and further illustrates the example blood pressure cuff being pulled through a buckle according to various example embodiments.

[0027] FIG. 1K illustrates the example mobile device of FIG. 1G removably attached with the example inflatable blood pressure cuff of FIG. 1i, and further illustrates the example blood pressure cuff being fastened around the buckle according to various example embodiments.

[0028] FIGS. 2A-2F illustrate certain aspects of the example mobile device of FIG 1A, showing an example fingertip pulse oximeter in an open position so that a tip of a finger of a patient may be inserted therein, according to certain example embodiments, wherein:

[0029] FIG. 2A is a top plan view thereof;

[0030] FIG. 2B is a front side elevation view thereof;

[0031] FIG. 2C is a bottom plan view thereof;

[0032] FIG. 2D is a left side elevation view thereof;

[0033] FIG. 2E is a right side elevation view thereof; and

[0034] FIG. 2F is a back side elevation view thereof.

[0035] FIG. 2G is a bottom perspective view of another example mobile device integrated in a body that is sized and shaped to be held in a palm of a hand of a user, according to certain example embodiments, with an arrow indicating the direction to open an example fingertip pulse oximeter.

[0036] FIG. 2H is a bottom perspective view of the example mobile device of FIG. 2G, showing the example fingertip pulse oximeter in an open position and illustrating a patient beginning to insert their fingertip therein, according to certain example embodiments.

[0037] FIG. 3 is a diagram of an example system according to various example embodiments, depicting the example system operating in a first non-limiting example modality.

[0038] FIG. 4 is a diagram of an example system according to various example embodiments, depicting the example system operating in a second non-limiting example modality.

[0039] FIG. 5 is a diagram of an example system according to various example embodiments, depicting the example system operating in a third non-limiting example modality.

[0040] FIG. 6 is a diagram of an example system according to various example embodiments, depicting an example device communicating directly with a system of a healthcare provider.

[0041] FIG. 7 is non-limiting diagram of various example components of a computer processing structure according to various example embodiments.

[0042] In the following description, like reference numbers from the figures may be used to refer to like elements and features in connection with various different embodiments.

Detailed Description of Example Embodiments

[0043] Reference will now be made in detail to some specific example embodiments, including any best mode contemplated by the inventor. Examples of these specific embodiments are illustrated in the accompanying drawings. While the invention is described in conjunction with these specific embodiments, it will be understood that it is not intended to limit the invention to the described or illustrated embodiments. On the contrary, it is intended to cover alternatives, modifications, and equivalents as may be included within the spirit and scope of the invention as defined by the appended claims.

[0044] In the following description, numerous specific details are set forth in order to provide a thorough understanding of the present invention. Particular example embodiments may be implemented without some or all of these features or specific details. In other instances, components and procedures well known to persons of skill in the art have not been described in detail in order not to obscure inventive aspects.

[0045] Various techniques and mechanisms will sometimes be described in singular form for clarity. However, it should be noted that some embodiments may include multiple iterations of a technique or multiple components, mechanisms, and the like, unless noted otherwise. Similarly, various steps of the methods shown and described herein are not necessarily performed in the order indicated, or performed at all in certain embodiments. Accordingly, some implementations of the methods discussed herein may include more or fewer steps than those shown or described.

[0046] Further, the example techniques and mechanisms described herein will sometimes describe a connection, relationship or communication between two or more items or entities. It should be noted that a connection or relationship between entities does not necessarily mean a

direct, unimpeded connection, as a variety of other entities or processes may reside or occur between any two entities. Consequently, an indicated connection does not necessarily mean a direct, unimpeded connection unless otherwise noted.

[0047] Referring now to the drawings in detail wherein like elements are indicated by like numerals, FIGS. 1A through 1F depict an example embodiment of a mobile device 100 integrated in a body 102 that is sized and shaped to be held in a palm of a hand of a user, for instance as depicted in the photographs in the '543 Application. The mobile device 100 may be configured to take a plurality of physiological measurements of a patient (depicted in the photographs in the '543 Application), who might or might not be the user in any particular circumstance. For example, a nurse or other healthcare provider may in some cases use the device 100 on one or more patients. In other cases the patient may use the device 100 on him or herself.

[0048] The body 102 of the mobile device 100 may comprise a top portion 104, a bottom portion 106, a front portion 108, a back portion 110, a right portion 112 and a left portion 114. In various example embodiments, the mobile device 100 may comprise a display 118, such as a touch-screen display used on a smartphone. Inside the body 102 of the device 100 may be a processor, wireless modem with mobile broadband and GPS functionality, and a power source, such as a battery or a power cord. For example, regarding the built-in wireless hub and GPS aspects of the device 100, these may in certain example embodiments be provided by incorporating within the body of the device 100 a LTE/EV-DO/HSPA+ Qualcomm® GobiTM 4G Module, for example. Such a module may be provided with the following specifications and capabilities, for example:

LTE: 1900 (Band 2) , 1700/2100 (Band 4), 850 (Band 5), 700 (Band 13), 700 (Band 17), 1900 (Band 25) MHz;

HSPA+: 2100 (Band 1), 1900 (Band 2) , AWS 1700/2100 (Band 4), 850 (Band 5), 800 (Band 8) MHz E-GPRS: 1900 (Band 2), 1800 (Band 3) , 850 (Band 5) , 900 (Band 8) MHz;

EV-DO: 800 (BC0), 1900 (BC1) MHz;

3GPP Release 8 LTE Specification;

WCDMA R99, 3GPP Release 5, 6 and 7 UMTS Specification EVDO Release 0 and Release A;

Standalone GPS, A-GPS, GPS XTRA;

1575.42 MHz (± 1.023 MHz), GLONASS 1596-1607MHz;

LTE (Category 3): 100 Mbps (Download), 50Mbps (Upload) DC-HSPA+: 42 Mbps (Download), 5.76 Mbps (Upload) HSPA+: 21.6 Mbps (Download), 5.76 Mbps (Upload);

EDGE: 236.8 kbps (Download), 236.8 kbps (Upload) GPRS: 85.6 kbps(Download), 85.6 kbps (Upload);

LTE: +23 dBm;

WCDMA: +23 dBm;

GSM 850/900, GMSK: +32dBm;

GSM 850/900, 8PSK: +27dBm DCS1800 / PCS 1900, GMSK: +29dBm DCS1800 / PCS 1900, 8PSK: +26dBm CDMA: +24dBm;

LTE: 1,200 mA (peak); 900 mA (average) WCDMA: 1,100 mA (peak); 800 mA (average) EGPRS: 2,500 mA (peak); 700 mA (average);

Bluetooth 4.2;

IEEE 802.15.1; and

WiFi 802.11ac.

[0049] The latest version of Wi-Fi, Wi-Fi CERTIFIED ac, offers healthcare facilities a significant performance leap, without sacrificing core competencies like interoperability, security and ease of use. Wi-Fi CERTIFIED devices are backward compatible, so newer devices will seamlessly interoperate with current devices. Wi-Fi CERTIFIED ac devices are also expected to include Wi-Fi CERTIFIED n, and dual-band networks will enable more capacity, higher throughput, better coverage and lower latency in healthcare environments.

[0050] The mobile device 100 may comprise a touch-screen data input structure 118 and is configured to manually receive, display, and wirelessly communicate data corresponding to

physiological measurements of the patient that were manually taken. The mobile device 100 may comprise a cellular telephone within the body 102, comprising a camera and microphone, for instance on surface 122 of the upper portion 104 of the body 102, and a speaker, for instance in area 126 of the front portion 108 of the body 102, all configured to allow the user to video-conference with one or more remotely-located persons. Area 126 may also be used for plugs of various types, for instance to charge the device 100. A power on-off button may be provided, for instance at location 124. In these respects the mobile device 100 may comprise any or all of the features of a typical smartphone.

[0051] With reference to FIGS. 1A through 1H, The mobile device 100 may comprise two or more electrocardiographic electrodes 120 integrated with and positioned on the body 102 of the mobile device 100 and configured to measure electrocardiographic signals of the patient 300 when gripped by fingers 310 or thumbs 320 of the patient. The electrocardiographic electrodes or ECG sensors 120 may be placed on the upper surface 104 as shown in FIG. 1A, or may be placed on a different surface in other embodiments. The electrocardiographic electrodes or ECG sensors 120 may be thumb ECG signal recorders and make use of standard ECG measurement principles. That is, the electrical changes which are caused by heart muscle activity are measured via the skin. Instead of using electrodes connected to chest and extremities, a user connects to the electrode by placing the thumbs on two electrode patch areas integrated on the device 100. Referring to standard ECG terminology, a single lead measurement setup may be achieved. Incorporated herein by reference is United States published patent application US 20140073979 A1 to Inciardi et al., entitled eCard ECG Monitor and published on March 13, 2014. The ECG system may be adapted for home, office, and travel use by the general public with or without a physician prescription. It can also be used by physicians and other health-related personnel conducting recordings on their patients while with them. The ECG system records for periods of time chosen by the user, with the record then available for review or subsequent analysis, printing, saving, and sending. For example, this ECG data may be displayed on the display 118 and may be tracked by the device 100 and transmitted wirelessly by the

device 100 remotely to a network, or directly to a physician or other caregiver directly from the device 100, for instance by email, text, or other means, either automatically or by operation of the user. Besides showing the ECG waveform on the screen 118, the screen or ECG monitor 118 may be configured to display various measurements, such as heart rate, and an interpretation of the reading, such as normal, irregular heart rhythm, occasionally double heartbeat period, bradycardia, and the like.

[0052] The mobile device 100 may comprise a temperature sensor 134 integrated with and positioned on the body 102 of the mobile device 100 and configured to measure body temperature of the patient when the temperature sensor 134 is placed against the patient's skin (or in other embodiments, sufficiently near the patient's skin). The temperature sensor 134 may be placed on the bottom surface 106 as shown in FIG. 1C, or may be placed on a different surface in other embodiments. Regarding the thermometer of the device 100, it may be a conventional forehead thermometer that has an infrared detecting unit 134. When placed against or sufficiently near the forehead of the patient (depicted in the photographs in the '543 Application), the infrared detecting unit 134 may be configured to receive the infrared energy radiated from the forehead of a patient and transmits the detecting result to a computing unit of the device 100 to compute and convert the infrared energy into temperature to estimate a forehead temperature or a core temperature of a human body. This temperature data may then be displayed on the display 118 and may be tracked by the device 100 and transmitted wirelessly by the device 100 remotely to a network, or directly to a physician or other caregiver directly from the device 100, for instance by email, text, or other means, either automatically or by operation of the user. In certain example embodiments the thermometer has a measuring range from 32 °C (89.6 °F) to 43 °C (109.4 °F), with an accuracy of ±1 °F. Incorporated herein by reference is United States published patent application US 2015/0168233 A1 to Ho, entitled Forehead Thermometer and published June 18, 2015; United States published patent application US 20150043613 A1 to Tanaka, entitled Infrared Thermometer and published February 12, 2015;

and U.S. Pat. No. 6,292,685 to Pompei, entitled Temporal Artery Temperature Detector and issued September 18, 2001.

[0053] With reference to FIGS. 1A through 1K, the mobile device 100 may comprise a blood pressure measuring structure within the body 102 of the mobile device, comprising a controller, motor, pressure sensor, and pump in air communication with a tube interface 136, 138, 140, 142 at the body 102 that is adapted to be removably and sealably connected with an inflatable cuff 150 (depicted in FIGS. 1i-1K and in the photographs in the '543 Application), which may be provided separately or along with the mobile device 100 as part of a kit. In various example embodiments blood pressure measurements may be taken with the oscillometric method with automatic inflation and controlled pressure release valve. Incorporated herein by reference are United States published patent application US 2014/0371607 A1 to Fitzsimmons et al., entitled Devices And Methods For Measuring Blood Pressure and published December 18, 2014 ("the '607 Publication"); and United States published patent application US 2007/0093718 A1 to Lane et al., entitled Modular Blood Pressure Measurement Apparatus and published April 26, 2007 ("the '718 Publication").

[0054] The tube interface 136, 138, 140, 142 may be placed on the bottom surface 106 as shown in FIG. 1C, or may be placed on a different surface in other embodiments. In this particular example embodiment, the tube interface comprises a recessed annular area 138 defined by a sidewall 136 extending inward from the bottom 106 of the body 102. A hose coupling 140 extends outward from the recessed annular area 138 but without extending beyond the bottom 106 of the body 102. The hose coupling 140 may be a nipple or other structure configured to removably and sealably attach with a hose or other coupling 170 on an inflatable blood pressure cuff 150, such that the cuff 150 can be in air communication from its coupling 170 through an opening 142 in the coupling 140 in the device 100.

[0055] An inflatable arm cuff 150 may be provided along with the device 100 as part of a kit, the arm cuff 150 having a hose or fitting 170 that is configured to removably and sealably attach to connector 140 on the device 100 so that the pump and other blood pressure measuring

means within the device 100 is in air flow and air pressure communication with the arm cuff 150. In various example embodiments the arm cuff 150 may be configured to fit upper arm circumferences in the nine inch to seventeen inch range. Alternatively, a cuff 150 may be provided that is configured for use with a patient's wrist, for example as provided in U.S. Pat. No. 5,687,732 A to Inagaki et al., entitled Blood Pressure Monitor and issued November 18, 1997 ("the '732 patent"), which is incorporated herein by reference. Also incorporated herein by reference is U.S. Pat. No. 5,022,403 A to LaViola, entitled Automatic Blood Pressure Measuring Device And Method With Cuff Size Determination and issued June 11, 1991 ("the '403 Patent").

[0056] With reference to FIGS. 1i through 1K, arm cuff 150 may be provided with a structure 160 that is sized and shaped to removably connect the device 100 to the cuff 150. For example, a resilient plastic or metal housing clip structure 160 may be attached to cuff 150 proximate hose or fitting 170 that comprises projections extending away from the cuff 150 that are sized and shaped to snap-on to the outer surface 116 (FIG. 1A) of the device 100, similar to clips that removably hold mobile phones. Such a clip structure 160 can hold the device 100 in place on the cuff 150 while blood pressure measurements are taken, while also positioning the device 100 properly for connection of the coupling 140 of the device 100 with the corresponding hose, fitting, or coupling 170 on the cuff 150.

[0057] With continuing reference to FIGS. 1i through 1K, arm cuff 150 may be provided with a buckle 155 that facilitates quick assembly of the cuff 150 onto and off of the arm of a patient, as shown by the arrows in the figures. Portions of the cuff 150 may be provided with hook and loop fastening material (not shown) to secure the cuff 150 at the proper tightness on the arm of a patient, and to provide for easy and quick removal.

[0058] Examples of the blood pressure monitor structure in device 100 have been clinically validated to accurately measure a patient's systolic and diastolic blood pressure along with the patient's heart rate. A triple measurement average may be taken for the most precise feedback. In certain example embodiments of the device 100 the blood pressure measurement structure had a measurement range of 40~250 mmHg for blood pressure and 40~200 beats per

minute for pulse, with measurement accuracy of ±3mmHg or ±2% of readout value for blood pressure, and ±5% of readout for pulse, and measurement resolution of 1mmHg for blood pressure and 1 beat/min for pulse. This blood pressure data may be displayed on the display 118 and may be tracked by the device 100 and transmitted wirelessly by the device 100 remotely to a network, or directly to a physician or other caregiver directly from the device 100, for instance by email, text, or other means, either automatically or by operation of the user.

[0059] In alternative embodiments the device 100 may measure blood pressure using technology other than an inflatable cuff or sphygmomanometer. For example, the device 100 may comprise, within the body, surface acoustic wave (SAW) technology for measuring blood pressure. Incorporated herein by reference is United States published patent application US 20110208066 A1 to Gnadinger, entitled Noninvasive Blood Pressure Measurement and Monitoring Device and published August 25, 2011 ("the '066 Publication").

[0060] With reference to FIGS. 1A through 1F and 1H, The mobile device 100 may comprise a blood glucose measuring structure within the body 102 of the mobile device 100, comprising an electrical connector 128 at the body 102. The electrical connector 128 may be formed into a recessed area on the upper left side 114 of the body 102 as shown in FIGS. 1D and 1A, or may be located on a different surface in other embodiments. The electrical connector 128 is disposed to form an electrical connection with the electrical connection point on the first end of a typical elongated test strip 129 (depicted in the FIG. 1H and the photographs in the '543 Application), when the elongated strip 129 is inserted in the electrical connector 128. Such test strips 129 may be provided separately or along with the mobile device 100 as part of a kit. Test results from capillary blood samples taken using test strips 129 plugged into electrical connector 128 have shown excellent correlation to reference samples, meeting the ISO accuracy acceptance criteria of ±15 mg/dL for results. Incorporated herein by reference are United States published patent application US 2005/0265094 A1 to Harding et al., entitled Measuring Device And Methods For Use Therewith and published December 1, 2005 ("the '094 Publication"); United States published patent application US 2012/0302853 A1 to Chen et al., entitled System And

Method For Measuring Physiological Parameters and published November 29, 2012 ("the '853 Publication"); and United States published patent application US 2010/0249965 A1 to Rao et al., entitled Integrated Blood Glucose Measurement Device and published September 30, 2010 ("the '965 Publication"). This blood glucose data may be displayed on the display 118 and may be tracked by the device 100 and transmitted wirelessly by the device 100 remotely to a network, or directly to a physician or other caregiver directly from the device 100, for instance by email, text, or other means, either automatically or by operation of the user.

[0061] With reference to FIGS. 1A-1F as well as FIGS. 2A-2H, the mobile device 100 may comprise a fingertip pulse oximeter 130 formed into the body 102 of the mobile device 100 and configured to measure pulse rate and blood oxygen saturation levels of the patient when a tip 310 of a finger of the patient 300 is inserted into the fingertip pulse oximeter 130, for instance as depicted in the photographs in the '543 Application and in FIG. 2H. The fingertip pulse oximeter 130 may be formed into a recessed, concave-contoured area 130 extending into the lower left side 114 of the body 102 as shown in FIG. 1D, or may be located on a different surface in other embodiments. The fingertip pulse oximeter 130 may be provided with a hingeably mounted portion 132 forming part of the lower surface 106 of the body 102 as shown in FIGS. 1C, 1D, and 2G. As shown in FIGS. 2B-2H, the hingeably mounted portion 132 may pivot open to allow space for the patient to insert a tip of their finger into the fingertip pulse oximeter 130, for instance as depicted in the photographs in the '543 Application and in FIG. 2H. The sensor for the fingertip pulse oximeter 130 may be of the conductive type, for instance as disclosed in U.S. Pat. No's. 5,279,295; 5,035,243; 5,217,012; 5,249,576; 5,246,003; 5,209,230; 5,170,786; 5,080,098; 5,069,213; 5,041,187; 4,971,062; 4,964,408; 4,928,691; 4,865,038; 4,830,014; 4,825,879; 4,825,872; 4,770,179; 4,700,708; 4,653,498, and 4,621,643, all of which are incorporated herein by reference. Alternatively, the sensor for the fingertip pulse oximeter 130 may be of the transmissive type, for example as disclosed in U.S. Pat. No. 5,792,052 A to Isaacson et al., entitled Finger Clip Pulse Oximeter and issued August 11, 1998 ("the '052 Patent"), which is incorporated herein by reference. In certain example embodiments of the

device 100 the fingertip pulse oximeter measurement structure has had a range of measured saturation percentage of O_2 (SpO_2) from 50 to 100 with accuracy within 2% from 75.0-100, and 3% from 50-74.9, and measured pulse rate from 25 to 240 beats per minute (bpm). This saturation percentage and heart rate data may be displayed on the display 118 and may be tracked by the device 100 and transmitted wirelessly by the device 100 remotely to a network, or directly to a physician or other caregiver directly from the device 100, for instance by email, text, or other means, either automatically or by operation of the user.

[0062] In certain example embodiments the user may manually enter data, such as identifying information, height, weight, age, etc., through a touch-screen display 118, or via any other means, such as by voice-recognition software or by causing such information to be wirelessly communicated to the device 100.

[0063] Additional or different measuring means for different or additional physiological parameters may be provided in various example embodiments. In certain example embodiments fewer than all of the above measurement means may be incorporated into a device 100. The invention is not necessarily limited to devices 100 having all six of the physiological measurement means described herein; other devices may have five, four, three, two, or just one of the measurement means described herein. Likewise, it is contemplated that additional physiological measurement means may be incorporated into the device 100, such as a breathalyzer, for example. All such embodiments fall within the scope of the present invention as defined by any claims issued in this application or a child of this application.

[0064] Turning to FIGS. 3, 4, and 5, in various example embodiments the mobile device 100 may be configured to automatically wirelessly communicate to a network 500 the data corresponding to the various physiological measurements described herein. The mobile device 100 may be configured to communicate with and display information from the Internet, as a typical smartphone. The mobile device 100 may be configured to wirelessly communicate an alert to the user, and optionally to someone located remotely from the user, such as a medical

provider 700, when data corresponding to physiological measurements taken by the device 100 exceeds a predetermined threshold.

[0065] For example, with reference to FIG. 3, provided in various example embodiments is a system 1000 comprising a plurality of mobile devices 100 as described herein, for use with a plurality of patients 300 (each of which may or may not be the user 200 of the respective device 100), all in wireless communication with a remotely-located computer network 500 configured and managed by a manager 400 to securely receive, store, compile, and selectively display from secure data storage 600 a plurality of formats of data corresponding to the physiological measurements of the patients 300. Such displays may be accessed via the Internet via a secure web browser using a password, for example (as indicated by the three boxes marked USER 200, PATIENT 300, and MEDICAL PROVIDER 700 on the right side of the middle portion of FIG. 3). In certain example embodiments such displays can be accessed via the Internet using the device 100 (as indicated by the upper three boxes in FIG. 3 marked USER 200, PATIENT 300, and DEVICE 100). The formats may include a single-patient format where the data corresponding to the physiological measurements corresponds to a single one of the patients 300, such as a user-friendly vital sign "dashboard" graphical user interface showing status and trends for various physiological measurements of the patient 300, for instance as gauges, as depicted in the photographs in the '543 Application. The formats may also include a multiple-patient format where the data corresponding to the physiological measurements corresponds to a plurality of the patients, for instance in a chart or spreadsheet form. Multiple patient data would be accessed by a medical provider 700, for example.

[0066] FIG. 4 depicts a use of the system 1000 where a single user 200 uses a single device 100 on multiple patients, for instance in the case of a traveling nurse or a caregiver in a facility. The mobile device 100 may be configured to be selectably operable in a plurality of modes appropriate for use by either one user/patient 200/300 or by one user 200 with multiple patients 300. For example, in a first mode the mobile device 100 may be configured to display on the display 118 visual indications of data corresponding to the physiological measurements

described herein without communicating said data wirelessly to a network 500. In a second mode the mobile device 100 may be configured to display on the display 118 visual indications of data corresponding to the physiological measurements described herein and to associate with that data a patient identifier, time stamp, and GPS location, and to automatically wirelessly communicate that data for each patient securely to a network 500. In a third mode the mobile device 100 may be configured to display on the display 118 visual indications of data corresponding to the physiological measurements described herein and to automatically wirelessly communicate that data securely to a network 500. In such a third mode the mobile device 100 may be further configured to automatically wirelessly communicate securely to a network 500 data corresponding to physiological measurements taken by one or more peripheral devices 800 not physically connected to the mobile device 100. In a third mode the mobile device 100 may be configured to allow the patient 300 to communicate with remotely located persons, such a medical provider 700, by audio and video.

[0067] As depicted in FIG. 5, the mobile device 100 may be configured to wirelessly receive, display on display 118, and wirelessly communicate data corresponding to physiological measurements taken by a peripheral device 800 not physically connected to the mobile device 100, whether by a user 200 or patient 300. The peripheral devices 800 may include, for example, a scale configured to measure and wirelessly communicate data corresponding to the weight of the patient, for instance as depicted in the photographs in the '543 Application. The peripheral devices 800 may include a fall detection device configured to be worn by the patient and to detect and to wirelessly communicate data indicating when the patient has fallen, for instance as described in U.S. Pat. No. 8,116,724 B2 to Peabody, entitled System Containing Location-Based Personal Emergency Response Device, issued February 14, 2012 ("the '724 patent"), which is incorporated herein by reference. The peripheral devices 800 may include an activity tracker configured to be worn by the patient and to measure and wirelessly communicate data corresponding to an amount of physical activity engaged in by the patient over a period of time. Any other suitable peripheral device 800 may also be used. In certain example embodiments

peripheral devices 800 can be used only in a certain mode or modes, while in other example embodiments peripheral devices 800 can be used in any modes.

[0068] Turning to FIG. 6, in any of the above modes or in different modes, an alternative system 2000 may be used where the device 100 wirelessly communicates data corresponding to physiological measurements directly to the provider's system 900, so that the medical provider 700 can access the data directly from their own secure system 900, such as a medical records system, without the data residing elsewhere on the cloud or on the servers of any other party. Provided are at least three ways to synchronize the device 100 directly with a provider's system 900. In a first option, provided is a simple API layer with a standard HL7 interface utilizing a point-of-care format through a provided database. In a second option, a simple unlock code may be provided that allows the provider 700 or the provider's system 900 to change the URL on the device 100 to point the URL to the provider's own web services or system 900. In a third option, an unlock code may be provided on the device 100 that allows the provider 700 or the provider's system 900 to load their own application or app to the device 100 for maximum control over the device 100.

[0069] FIG. 7 illustrates a schematic of an example computer processing structure that may in certain example embodiments implement various aspects of the present disclosure. The computer processing structure is only one example of a suitable processing system and is not intended to suggest any limitation as to the scope of use or functionality of embodiments of the methodology described herein. The processing system shown may be operational with numerous other general purpose or special purpose computing system environments or configurations. Examples of well-known computing systems, environments, and/or configurations that may be suitable for use with the processing system shown in FIG. 7 may include, but are not limited to, personal computer processing structures, server computer processing structures, thin clients, thick clients, smart phones, tablets, handheld or laptop devices, multiprocessor systems, microprocessor-based systems, set top boxes, programmable consumer electronics, network PCs,

minicomputer processing structures, mainframe computer processing structures, and distributed cloud computing environments that include any of the above systems or devices, and the like.

[0070] The computer processing structure may be described in the general context of a computer comprising executable instructions, such as program modules, being executed by a computer processing structure. Generally, program modules may include routines, programs, objects, components, logic, data structures, and so on that perform particular tasks or implement particular abstract data types. The computer processing structure may be practiced in distributed cloud computing environments where tasks are performed by remote processing devices that are linked through a communications network. In a distributed cloud computing environment, program modules may be located in both local and remote computer processing structure storage media including memory storage devices.

[0071] The components of computer processing structure may optionally include, but are not limited to, one or more processors or processing units 12, a system memory 16, and a bus 14 that couples various system components including system memory 16 to processor 12. The processor 12 may include one or more components of one or more data processing, calculating, formatting, and communicating modules 10 that perform the methods described herein. The modules 10 may be programmed into the integrated circuits of the processor 12, or loaded from memory 16, storage device 18, or network 24 or combinations thereof.

[0072] Bus 14 may represent one or more of any of several types of bus structures, including a memory bus or memory controller, a peripheral bus, an accelerated graphics port, and a processor or local bus using any of a variety of bus architectures. By way of example, and not limitation, such architectures include Industry Standard Architecture (ISA) bus, Micro Channel Architecture (MCA) bus, Enhanced ISA (EISA) bus, Video Electronics Standards Association (VESA) local bus, and Peripheral Component Interconnects (PCI) bus.

[0073] Computer processing structure may include a variety of computer processing structure readable media. Such media may be any available media that is accessible by computer

processing structure, and it may include both volatile and non-volatile media, removable and non-removable media.

[0074] System memory 16 can include computer processing structure readable media in the form of volatile memory, such as random access memory (RAM) and/or cache memory or others. Computer processing structure may further include other removable/non-removable, volatile/non-volatile computer processing structure storage media. By way of example only, storage system 18 can be provided for reading from and writing to a non-removable, non-volatile magnetic media (e.g., a "hard drive"). Although not shown, a magnetic disk drive for reading from and writing to a removable, non-volatile magnetic disk (e.g., a "floppy disk"), and an optical disk drive for reading from or writing to a removable, non-volatile optical disk such as a CD-ROM, DVD-ROM or other optical media can be provided. In such instances, each can be connected to bus 14 by one or more data media interfaces.

[0075] Computer processing structure may also communicate with one or more external devices 26 such as a keyboard, a pointing device, a display 28, etc.; one or more devices that enable a user to interact with computer processing structure; and/or any devices (e.g., network card, modem, etc.) that enable computer processing structure to communicate with one or more other computing devices. Such communication can occur via Input/Output (I/O) interfaces 20.

[0076] Still yet, computer processing structure can communicate with one or more networks 24 such as a local area network (LAN), a general wide area network (WAN), and/or a public network (e.g., the Internet) via network adapter 22. As depicted, network adapter 22 communicates with the other components of computer processing structure via bus 14. It should be understood that although not shown, other hardware and/or software components could be used in conjunction with computer processing structure. Examples include, but are not limited to: microcode, device drivers, redundant processing units, external disk drive arrays, RAID systems, tape drives, and data archival storage systems, etc.

[0077] As will be appreciated by one skilled in the art, aspects of the present invention may be embodied as a system, method or computer program product. Accordingly, aspects of the

present invention may take the form of an entirely hardware embodiment, an entirely software embodiment (including firmware, resident software, micro-code, etc.) or an embodiment combining software and hardware aspects that may all generally be referred to herein as a "circuit," "module" or "system." Furthermore, aspects of the present invention may take the form of a computer program product embodied in one or more computer readable medium(s) having computer readable program code embodied thereon.

[0078] Any combination of one or more computer readable medium(s) may be utilized. The computer readable medium may be a computer readable signal medium or a computer readable storage medium. A computer readable storage medium may be, for example, but not limited to, an electronic, magnetic, optical, electromagnetic, infrared, or semiconductor system, apparatus, or device, or any suitable combination of the foregoing. More specific examples (a non-exhaustive list) of the computer readable storage medium would include the following: an electrical connection having one or more wires, a portable computer diskette, a hard disk, a random access memory (RAM), a read-only memory (ROM), an erasable programmable read-only memory (EPROM or Flash memory), an optical fiber, a portable compact disc read-only memory (CD-ROM), an optical storage device, a magnetic storage device, or any suitable combination of the foregoing. In the context of this document, a computer readable storage medium may be any tangible medium that can contain, or store a program for use by or in connection with an instruction execution system, apparatus, or device.

[0079] A computer readable signal medium may include a propagated data signal with computer readable program code embodied therein, for example, in baseband or as part of a carrier wave. Such a propagated signal may take any of a variety of forms, including, but not limited to, electro-magnetic, optical, or any suitable combination thereof. A computer readable signal medium may be any computer readable medium that is not a computer readable storage medium and that can communicate, propagate, or transport a program for use by or in connection with an instruction execution system, apparatus, or device.

[0080] Program code embodied on a computer readable medium may be transmitted using any appropriate medium, including but not limited to wireless, wireline, optical fiber cable, RF, etc., or any suitable combination of the foregoing.

[0081] Computer program code for carrying out operations for aspects of the present invention may be written in any combination of one or more programming languages, including an object oriented programming language such as Java, Smalltalk, C++ or the like and conventional procedural programming languages, such as the "C" programming language or similar programming languages, a scripting language such as Perl, VBS or similar languages, and/or functional languages such as Lisp and ML and logic-oriented languages such as Prolog. The program code may execute entirely on the user's computer, partly on the user's computer, as a stand-alone software package, partly on the user's computer and partly on a remote computer or entirely on the remote computer or server. In the latter scenario, the remote computer may be connected to the user's computer through any type of network, including a local area network (LAN) or a wide area network (WAN), or the connection may be made to an external computer (for example, through the Internet using an Internet Service Provider).

[0082] Aspects of the present invention are described with reference to flowchart illustrations and/or block diagrams of methods, apparatus (systems) and computer program products according to embodiments of the invention. It will be understood that each block of the flowchart illustrations and/or block diagrams, and combinations of blocks in the flowchart illustrations and/or block diagrams, can be implemented by computer program instructions. These computer program instructions may be provided to a processor of a general purpose computer, special purpose computer, or other programmable data processing apparatus to produce a machine, such that the instructions, which execute via the processor of the computer or other programmable data processing apparatus, create means for implementing the functions/acts specified in the flowchart and/or block diagram block or blocks.

[0083] These computer program instructions may also be stored in a computer readable medium that can direct a computer, other programmable data processing apparatus, or other

devices to function in a particular manner, such that the instructions stored in the computer readable medium produce an article of manufacture including instructions which implement the function/act specified in the flowchart and/or block diagram block or blocks.

[0084] The computer program instructions may also be loaded onto a computer, other programmable data processing apparatus, or other devices to cause a series of operational steps to be performed on the computer, other programmable apparatus or other devices to produce a computer implemented process such that the instructions which execute on the computer or other programmable apparatus provide processes for implementing the functions/acts specified in the flowchart and/or block diagram block or blocks.

[0085] The flowchart and block diagrams in the figures illustrate the architecture, functionality, and operation of possible implementations of systems, methods and computer program products according to various example embodiments of the present invention. In this regard, each block in the flowchart or block diagrams may represent a module, segment, or portion of code, which comprises one or more executable instructions for implementing the specified logical function(s). It should also be noted that, in some alternative implementations, the functions noted in the block may occur out of the order noted in the figures. For example, two blocks shown in succession may, in fact, be executed substantially concurrently, or the blocks may sometimes be executed in the reverse order, depending upon the functionality involved. It will also be noted that each block of the block diagrams and/or flowchart illustration, and combinations of blocks in the block diagrams and/or flowchart illustration, can be implemented by special purpose hardware-based systems that perform the specified functions or acts, or combinations of special purpose hardware and computer instructions.

[0086] The computer program product may comprise all the respective features enabling the implementation of the methodology described herein, and which—when loaded in a computer processing structure—is able to carry out the methods. Computer program, software program, program, or software, in the present context means any expression, in any language, code or notation, of a set of instructions intended to cause a system having an information

processing capability to perform a particular function either directly or after either or both of the following: (a) conversion to another language, code or notation; and/or (b) reproduction in a different material form.

[0087] The terminology used herein is for the purpose of describing particular embodiments only and is not intended to be limiting of the invention. As used herein, the singular forms "a", "an" and "the" are intended to include the plural forms as well, unless the context clearly indicates otherwise. It will be further understood that the terms "comprises" and/or "comprising," when used in this specification, specify the presence of stated features, integers, steps, operations, elements, and/or components, but do not preclude the presence or addition of one or more other features, integers, steps, operations, elements, components, and/or groups thereof.

[0088] The corresponding structures, materials, acts, and equivalents of all means or step plus function elements, if any, in the claims below are intended to include any structure, material, or act for performing the function in combination with other claimed elements as specifically claimed. The description of the present invention has been presented for purposes of illustration and description, but is not intended to be exhaustive or limited to the invention in the form disclosed. Many modifications and variations will be apparent to those of ordinary skill in the art without departing from the scope and spirit of the invention. The embodiment was chosen and described in order to best explain the principles of the invention and the practical application, and to enable others of ordinary skill in the art to understand the invention for various embodiments with various modifications as are suited to the particular use contemplated.

[0089] Various aspects of the present disclosure may be embodied as a program, software, or computer instructions embodied in a computer or machine usable or readable medium, which causes the computer or machine to perform the steps of the method when executed on the computer, processor, and/or machine. A program storage device readable by a machine, tangibly embodying a program of instructions executable by the machine to perform various functionalities and methods described in the present disclosure is also provided.

[0090] The system and method of the present disclosure may be implemented and run on a general-purpose computer or special-purpose computer processing structure. The terms "computer processing structure" and "computer network" as may be used in the present application may include a variety of combinations of fixed and/or portable computer hardware, software, peripherals, and storage devices. The computer processing structure may include a plurality of individual components that are networked or otherwise linked to perform collaboratively, or may include one or more stand-alone components. The hardware and software components of the computer processing structure of the present application may include and may be included within fixed and portable devices such as desktop, laptop, and/or server. A module may be a component of a device, software, program, or system that implements some "functionality", which can be embodied as software, hardware, firmware, electronic circuitry, or the like.

[0091] Any of the suitable technologies set forth and incorporated herein may be used to implement various example aspects of the invention as would be apparent to one of skill in the art.

[0092] Although exemplary embodiments and applications of the invention have been described herein including as described above and shown in the included example Figures, there is no intention that the invention be limited to these exemplary embodiments and applications or to the manner in which the exemplary embodiments and applications operate or are described herein. Indeed, many variations and modifications to the exemplary embodiments are possible as would be apparent to a person of ordinary skill in the art. The invention may include any device, structure, method, or functionality, as long as the resulting device, system or method falls within the scope of one of the claims that are allowed by the patent office based on this or any related patent application.

Claims

What is claimed is:

1. A mobile device integrated in a body that is sized and shaped to be held in a palm of a hand of a user, the mobile device configured to take a plurality of physiological measurements of a patient, including electrocardiographic measurements, blood oxygen saturation level measurements, pulse rate measurements, body temperature measurements, blood pressure measurements when connected with a removable inflatable cuff, and blood glucose measurements when connected with an elongated test strip having at a first end an electrical connection point and at a second end an electrochemical cell, and to display and wirelessly communicate data corresponding to said physiological measurements, the mobile device comprising:

a display;

a processor;

a wireless modem with mobile broadband and GPS functionality;

a power source;

two or more electrocardiographic electrodes integrated with and positioned on the body of the mobile device and configured to measure electrocardiographic signals of the patient when gripped by fingers or thumbs of the patient;

a fingertip pulse oximeter formed into the body of the mobile device and configured to measure pulse rate and blood oxygen saturation levels of the patient when a tip of a finger of the patient is inserted therein;

a temperature sensor integrated with and positioned on the body of the mobile device and configured to measure body temperature of the patient when the temperature sensor is placed against the patient's skin;

a blood pressure measuring structure within the body of the mobile device, comprising a controller, motor, pressure sensor, and pump in air communication with a tube interface at the body that is adapted to be removably and sealably connected with an inflatable cuff; and

a blood glucose measuring structure within the body of the mobile device, comprising an electrical connector at the body, the electrical connector disposed to form an electrical connection with the electrical connection point on the first end of the elongated test strip, when the elongated strip is inserted in the electrical connector.

2. The mobile device of claim 1, wherein the user is the patient.

3. The mobile device of claim 1, wherein the user is not the patient.

4. The mobile device of claim 1, wherein the mobile device is configured to automatically wirelessly communicate to a network said data corresponding to said physiological measurements.

5. The mobile device of claim 1, wherein the mobile device comprises a touch-screen data input structure and is configured to manually receive, display, and wirelessly communicate data corresponding to physiological measurements of the patient that were manually taken.

6. The mobile device of claim 1, wherein the mobile device is configured to wirelessly receive, display, and wirelessly communicate data corresponding to physiological measurements taken by a peripheral device not physically connected to the mobile device.

7. The mobile device of claim 6, wherein the peripheral device is selected from the group consisting of:

a scale configured to measure and wirelessly communicate data corresponding to the weight of the patient;

a fall detection device configured to be worn by the patient and to detect and to wirelessly communicate data indicating when the patient has fallen; and

an activity tracker configured to be worn by the patient and to measure and wirelessly communicate data corresponding to an amount of physical activity engaged in by the patient over a period of time.

8. The mobile device of claim 1, wherein the mobile device further comprises a cellular telephone.

9. The mobile device of claim 8, wherein the mobile device is configured to communicate with and display information from the Internet.

10. The mobile device of claim 9, wherein the mobile device comprises a camera, microphone, and speaker, and is configured to allow the user to video-conference with one or more remotely-located persons.

11. The mobile device of claim 1, wherein the mobile device is further configured to communicate an alert when said data corresponding to said physiological measurements exceeds a predetermined threshold.

12. The mobile device of claim 11, wherein the mobile device is configured to communicate an alert to the user when said data corresponding to said physiological measurements exceeds a predetermined threshold.

13. The mobile device of claim 11, wherein the mobile device is configured to wirelessly communicate an alert to someone located remotely from the user when said data corresponding to said physiological measurements exceeds a predetermined threshold.

14. The mobile device of claim 1, further configured to be selectably operable in a plurality of modes, wherein:

in a first mode the mobile device is configured to display visual indications of data corresponding to said physiological measurements without communicating said data wirelessly; and

in a second mode the mobile device is configured to display visual indications of data corresponding to said physiological measurements and to associate with said data: a patient identifier; time stamp; and GPS location; and to automatically wirelessly communicate said data for each patient securely to a network.

15. The mobile device of claim 14, wherein:

in a third mode the mobile device is configured to display visual indications of data corresponding to said physiological measurements and to automatically wirelessly communicate said data securely to a network.

16. The mobile device of claim 15, wherein the mobile device is configured to wirelessly receive, display, and wirelessly communicate data corresponding to physiological measurements taken by a peripheral device not physically connected to the mobile device, and in the third mode the mobile device is configured to automatically wirelessly communicate securely to a network the data corresponding to the physiological measurements taken by the peripheral device not physically connected to the mobile device.

17. The mobile device of claim 15, wherein the mobile device comprises a built-in camera, microphone, and speaker, and is configured to wirelessly communicate audio and video signals, to play audio, and to display video, and in the third mode the mobile device is configured to allow the patient to communicate with remotely located persons by audio and video.

18. A system comprising:

a plurality of mobile devices according to claim 1 for use with a plurality of patients, in wireless communication with a remotely-located computer network configured to securely receive, store, compile, and selectively display in a plurality of formats said data corresponding to said physiological measurements of said patients.

19. The system of claim 18, wherein the plurality of formats are selected from the group consisting of:

a single-patient format where said data corresponding to said physiological measurements corresponds to a single one of said patients; and

a multiple-patient format where said data corresponding to said physiological measurements corresponds to a plurality of said patients.

20. A mobile device integrated in a body that is sized and shaped to be held in a palm of a hand of a user, the mobile device configured to take a plurality of physiological measurements of a patient, including electrocardiographic measurements, blood oxygen saturation level measurements, pulse rate measurements, body temperature measurements, blood pressure measurements when connected with a removable inflatable cuff, and blood glucose measurements when connected with an elongated test strip having at a first end an electrical connection point and at a second end an electrochemical cell, and to display and wirelessly communicate data corresponding to said physiological measurements, the mobile device comprising:

a display;

a processor;

a wireless modem with mobile broadband and GPS functionality;

a power source;

a touch-screen data input structure and is configured to manually receive, display, and wirelessly communicate data corresponding to physiological measurements of the patient that were manually taken;

a cellular telephone;

a camera, microphone, and speaker, all configured to allow the user to video-conference with one or more remotely-located persons;

two or more electrocardiographic electrodes integrated with and positioned on the body of the mobile device and configured to measure electrocardiographic signals of the patient when gripped by fingers or thumbs of the patient;

a fingertip pulse oximeter formed into the body of the mobile device and configured to measure pulse rate and blood oxygen saturation levels of the patient when a tip of a finger of the patient is inserted therein;

a temperature sensor integrated with and positioned on the body of the mobile device and configured to measure body temperature of the patient when the temperature sensor is placed against the patient's skin;

a blood pressure measuring structure within the body of the mobile device, comprising a controller, motor, pressure sensor, and pump in air communication with a tube interface at the body that is adapted to be removably and sealably connected with an inflatable cuff; and

a blood glucose measuring structure within the body of the mobile device, comprising an electrical connector at the body, the electrical connector disposed to form an electrical connection with the electrical connection point on the first end of the elongated test strip, when the elongated strip is inserted in the electrical connector;

wherein the mobile device is configured to:

automatically wirelessly communicate to a network said data corresponding to said physiological measurements;

wirelessly receive, display, and wirelessly communicate data corresponding to physiological measurements taken by a peripheral device not physically connected to the mobile device, wherein the peripheral device is selected from the group consisting of: a scale configured to measure and wirelessly communicate data corresponding to the weight of the patient; a fall detection device configured to be worn by the patient and to detect and to wirelessly communicate data indicating when the patient has fallen; and an activity tracker configured to be worn by the patient and to measure and wirelessly communicate data corresponding to an amount of physical activity engaged in by the patient over a period of time;

communicate with and display information from the Internet;

wirelessly communicate an alert to the user and to someone located remotely from the user when said data corresponding to said physiological measurements exceeds a predetermined threshold; and

be selectably operable in a plurality of modes, wherein in at least one mode the mobile device is configured to display visual indications of data corresponding to said physiological measurements and to associate with said data: a patient identifier; time stamp; and GPS location; and to automatically wirelessly communicate said data for each patient securely to a network.

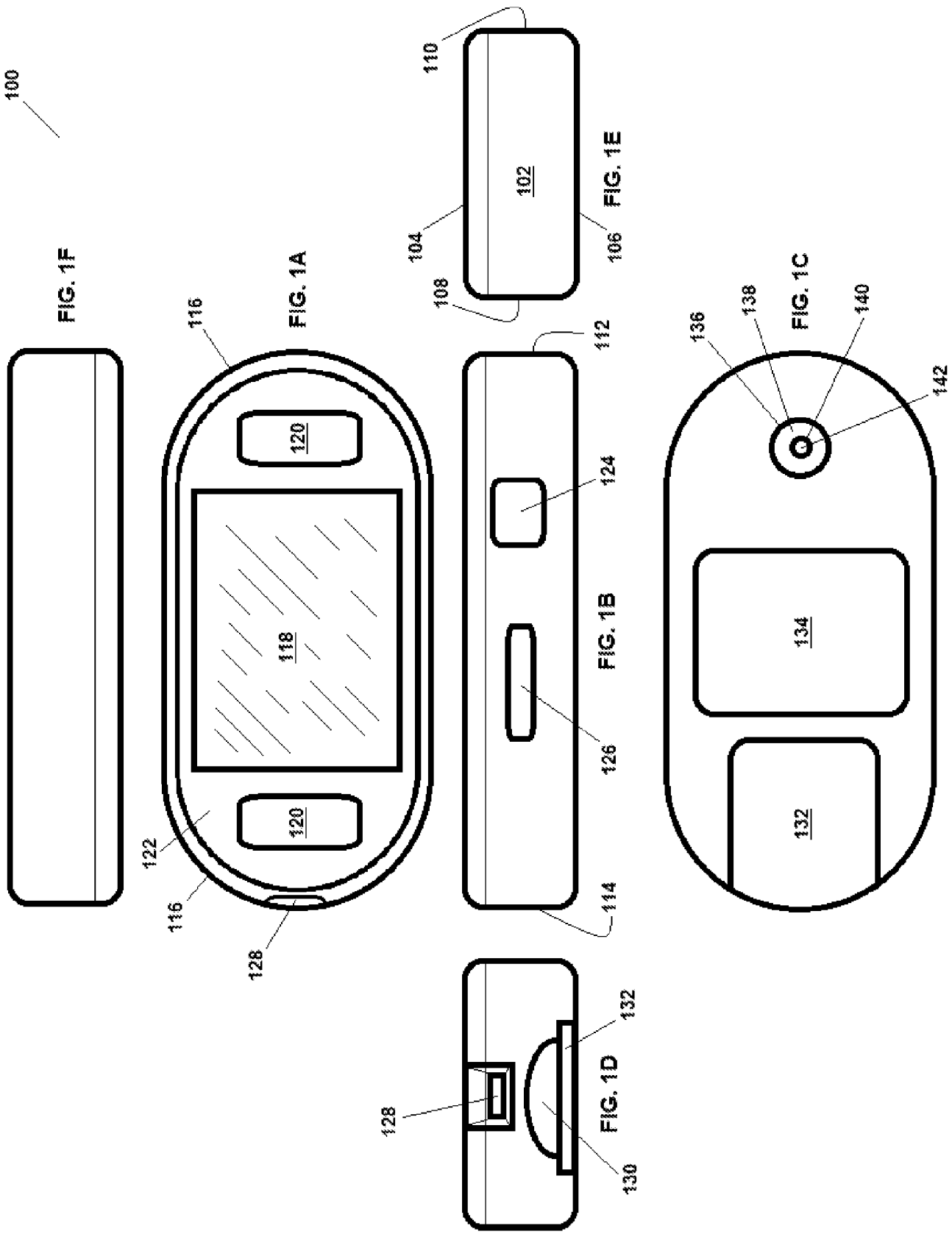

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FIG. 1F
116
FIG. 1A
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FIG. 1E
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FIG. 1B
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FIG. 1C
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132
130
FIG. 1D

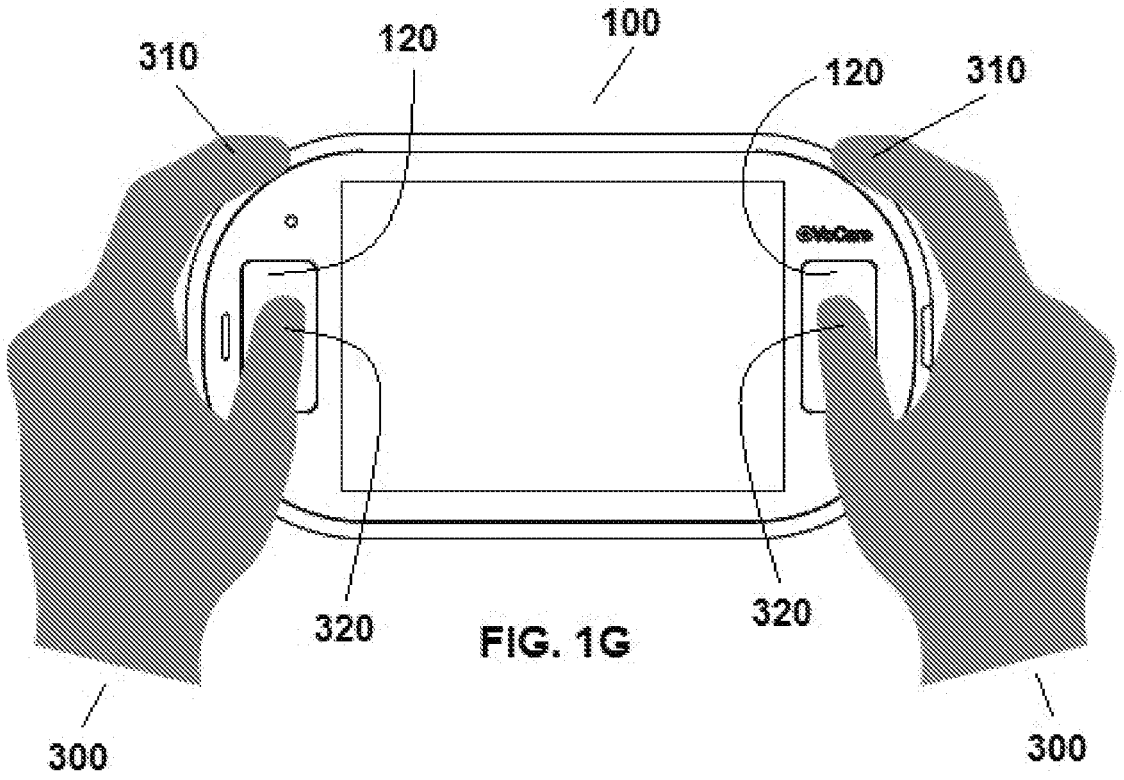

FIG. 1G

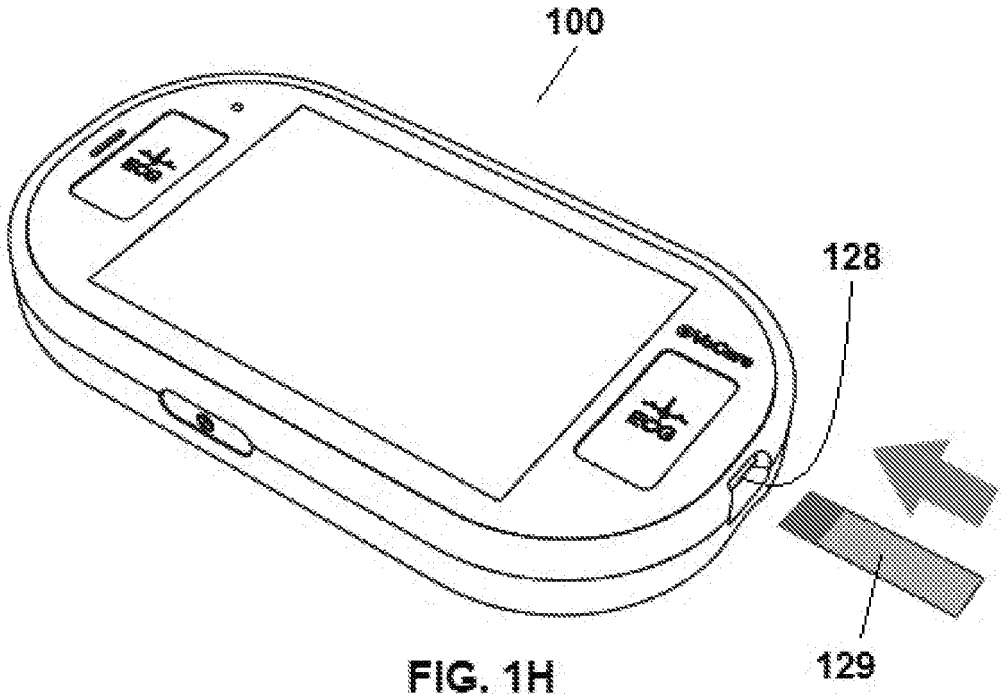

FIG. 1H

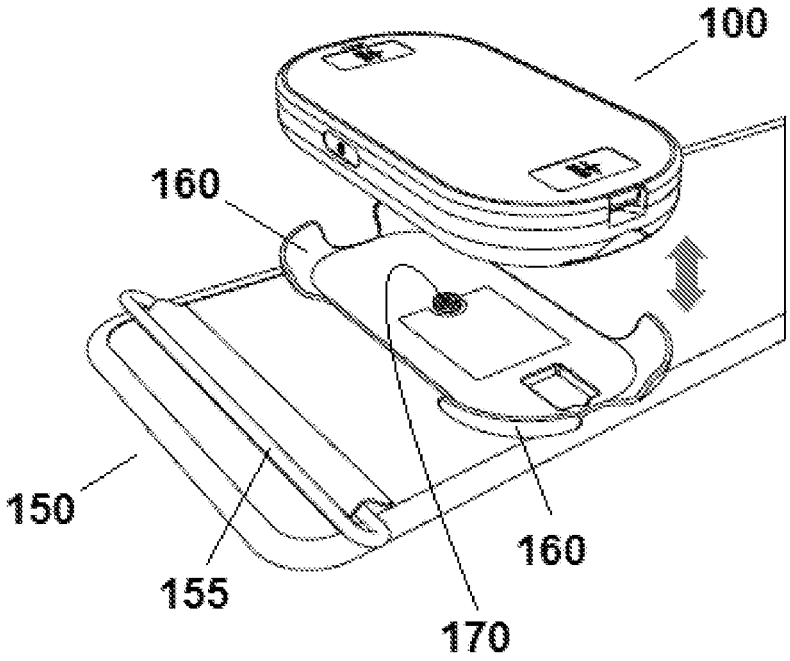

FIG. 1i

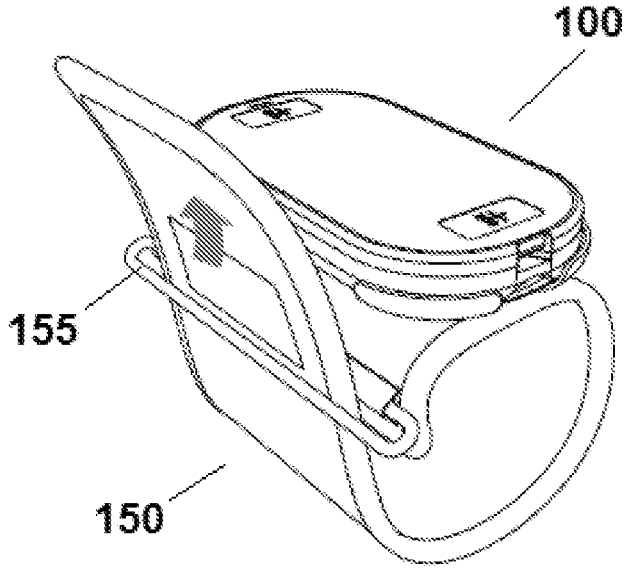

FIG. 1J

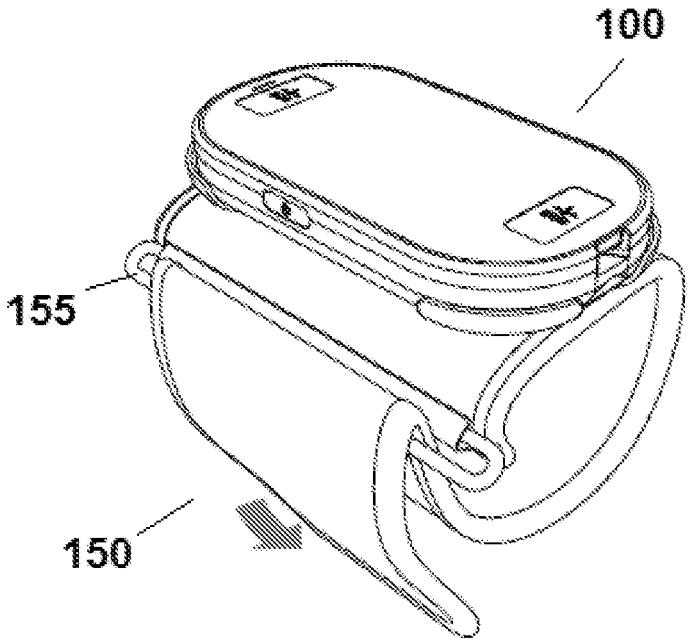

FIG. 1K

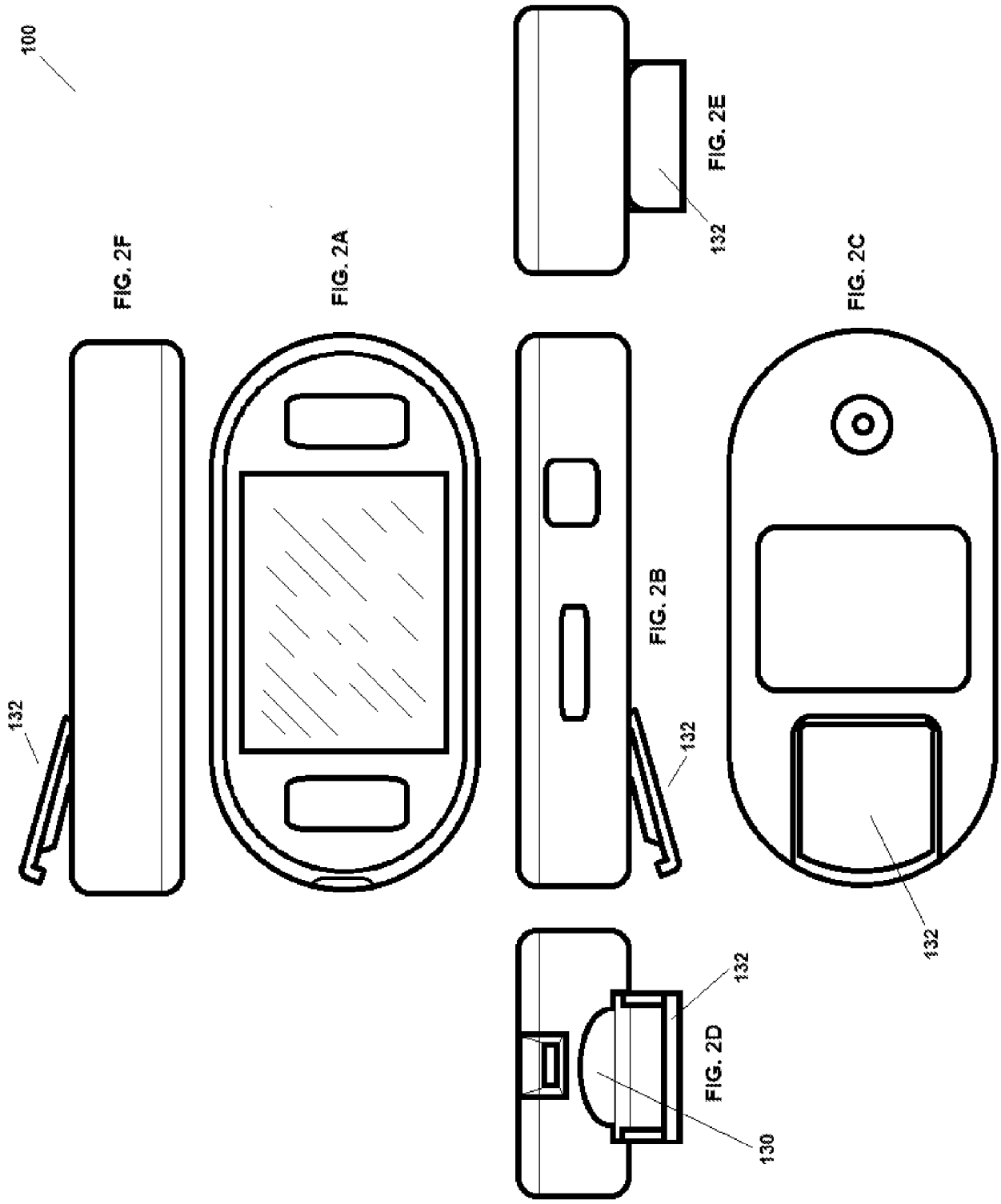
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FIG. 2A
FIG. 2E
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FIG. 2C
FIG. 2B
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FIG. 2D
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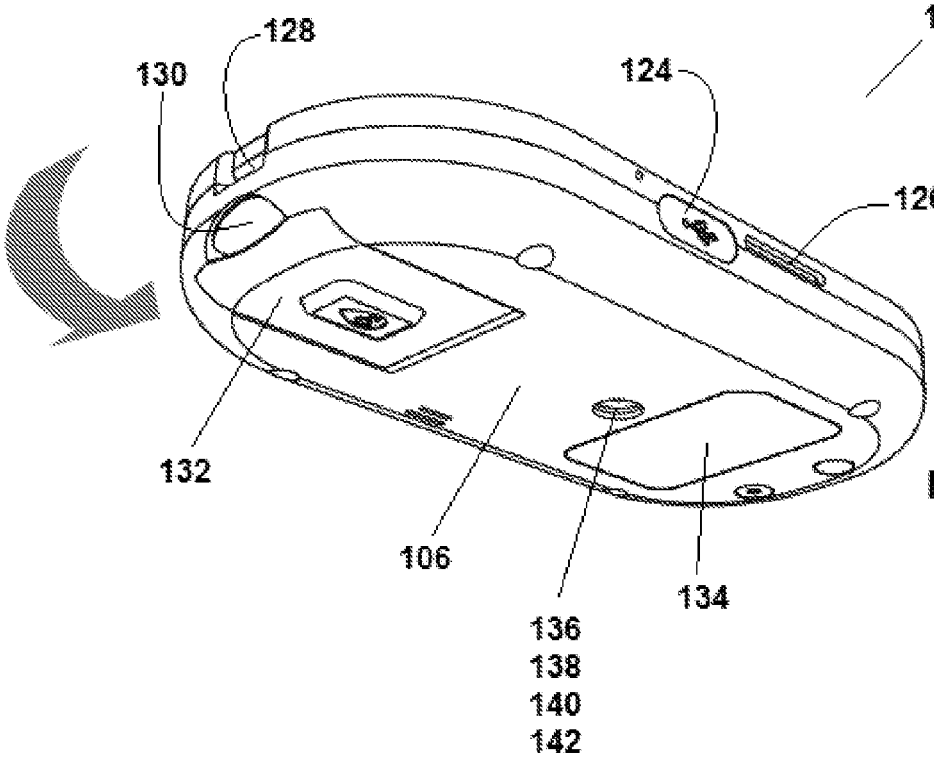
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FIG. 2G

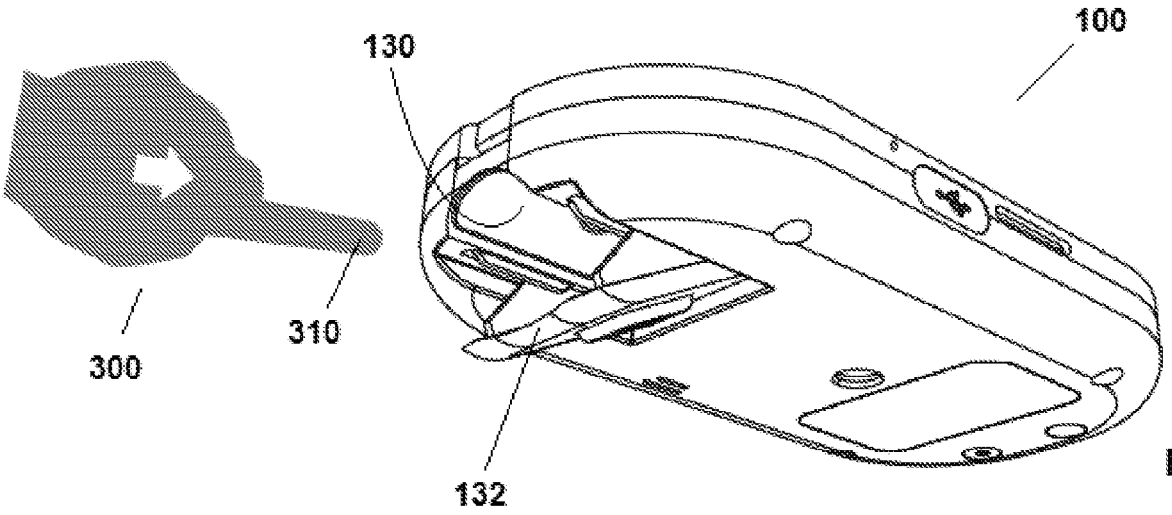
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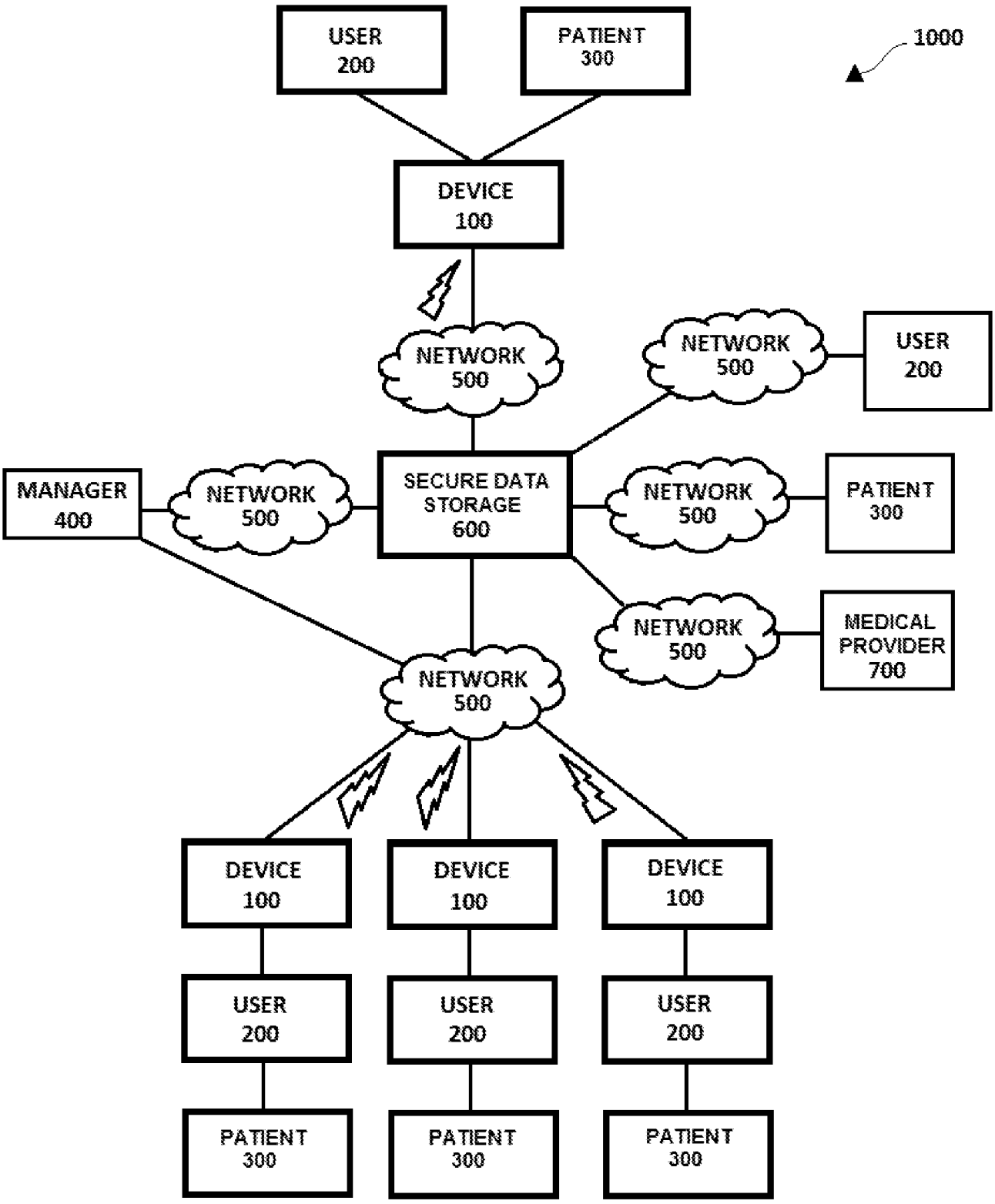
FIG. 2H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MEDICAL
PROVIDER
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NETWORK
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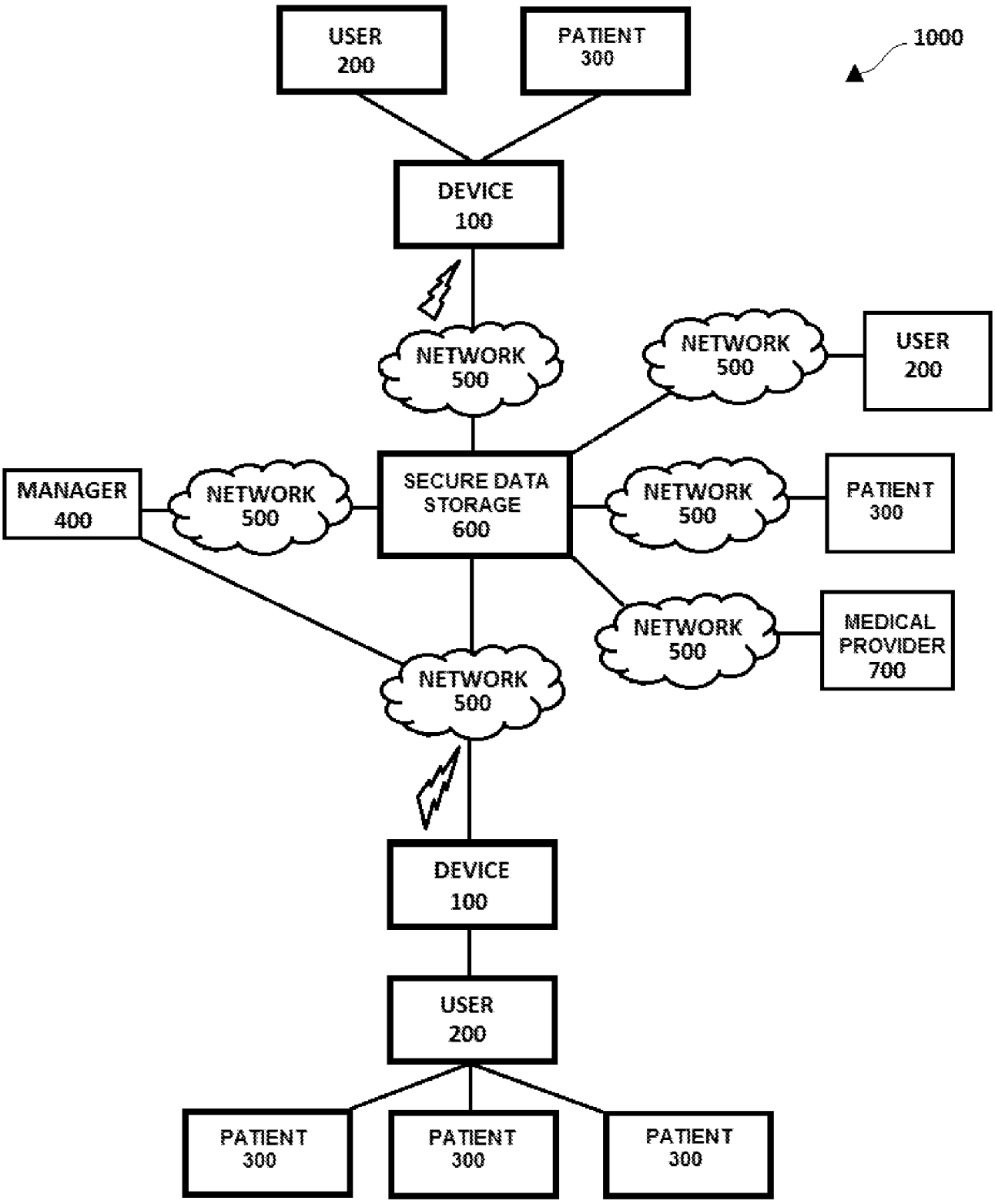
FIG. 3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PATIENT
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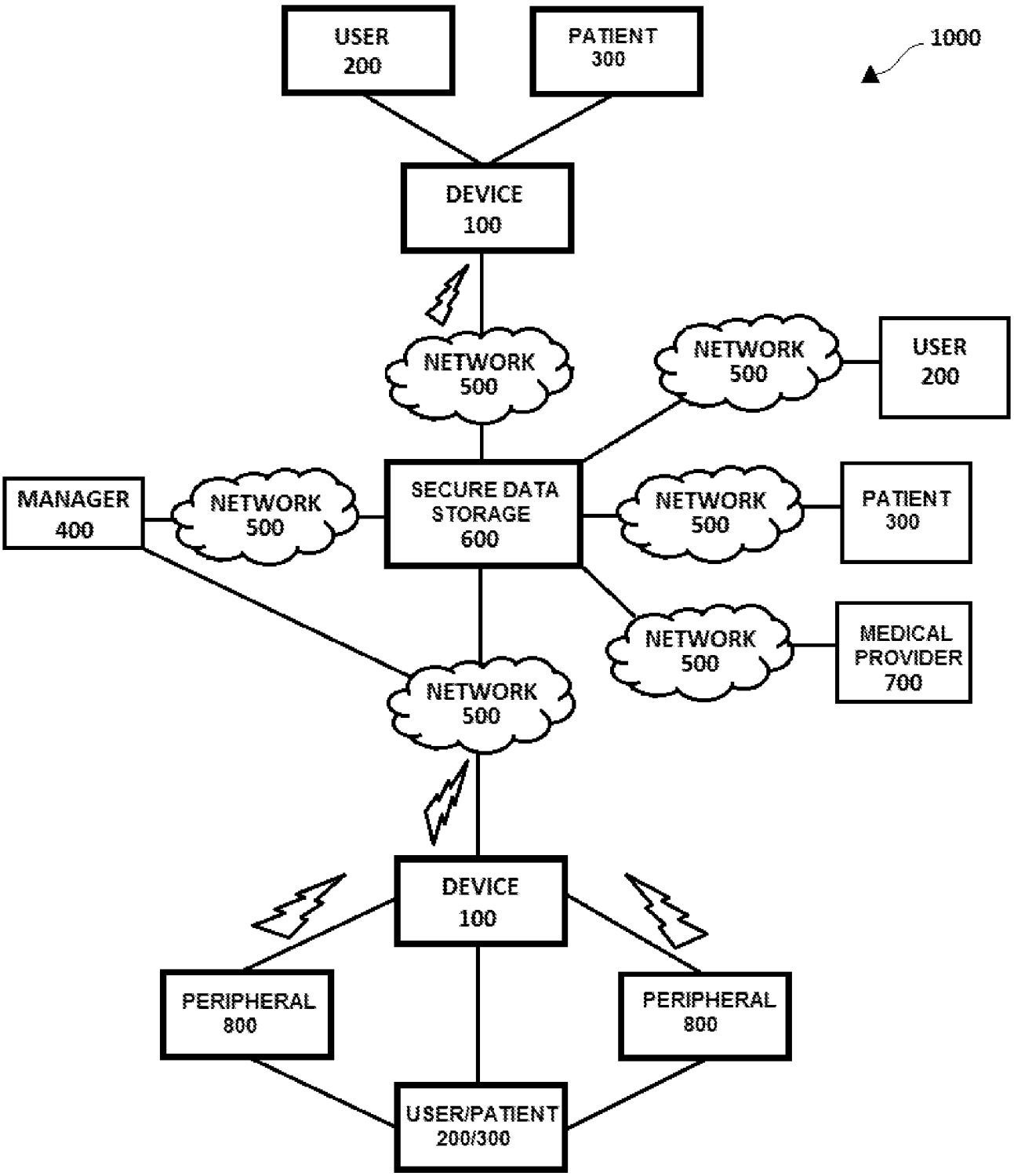
FIG. 4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PATIENT
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NETWORK
500
MEDICAL
PROVIDER
700
NETWORK
500
DEVICE
100
PERIPHERAL
800
PERIPHERAL
800
USER/PATIENT
200/300

FIG. 5

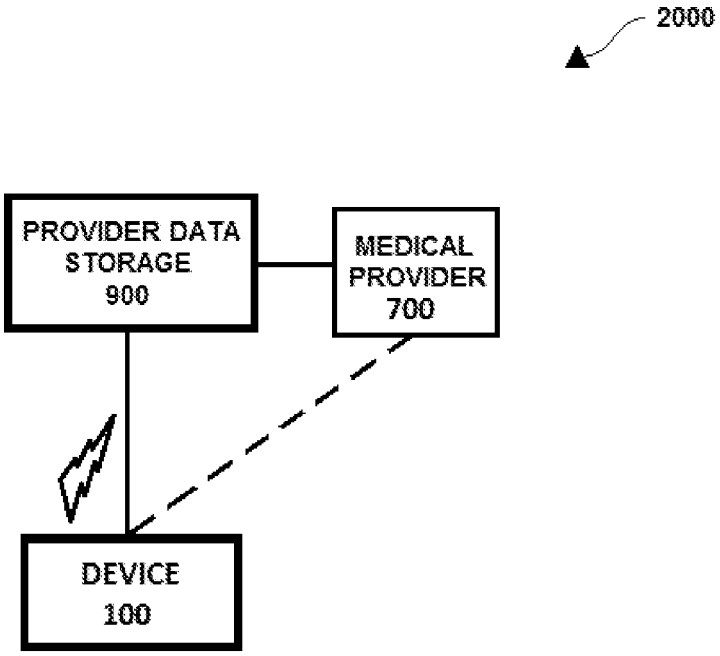
2000
PROVIDER DATA STORAGE 900
MEDICAL PROVIDER 700
DEVICE 100

FIG. 6

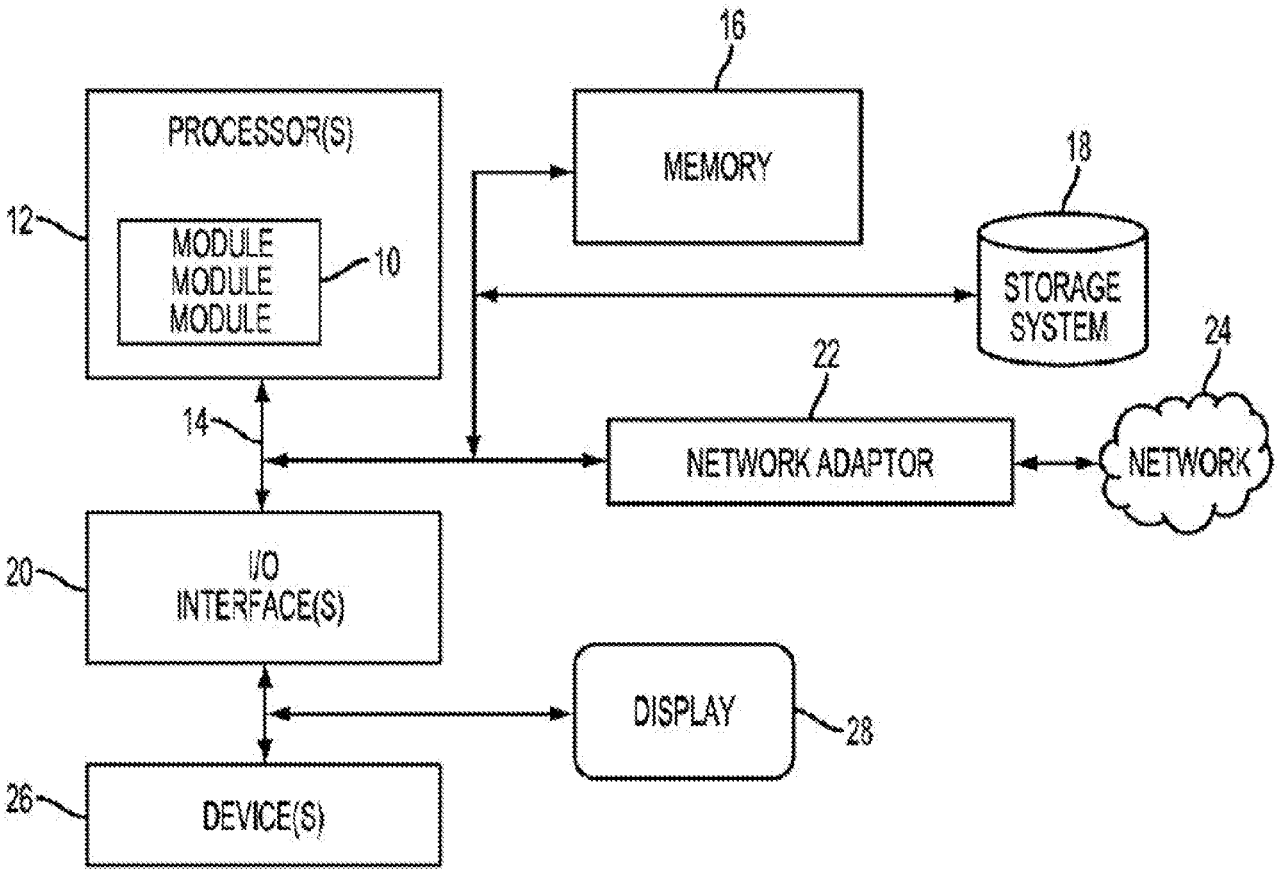
16
PROCESSOR(S)
MEMORY
18
12
MODULE
MODULE
MODULE
10
STORAGE
SYSTEM
24
22
14
NETWORK ADAPTOR
NETWORK
20
I/O
INTERFACE(S)
DISPLAY
28
26
DEVICE(S)

FIG. 7

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US 17/25689

A. CLASSIFICATION OF SUBJECT MATTER
IPC(8) - A61B 5/00, 5/02 (2017.01)
CPC - A61B 5/0002, 5/02, 5/68, 5/6801, 5/6898, 2560/0431

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
See Search History Document

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
See Search History Document

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
See Search History Document

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y --- A	US 2015/0201876 A1 (ZHOU et al.) 23 July 2015 (23.07.2015), entire document especially paras [0008], [0016]-[0017], [0066]	1-6, 8, 9, 11-13 --- 7, 10, 14-20
Y -- A	US 2014/0371607 A1 (FITZSIMMONS et al.) 18 December 2014 (18.12.2014), entire document Abstract	1-6, 8, 9, 11-13 --- 7, 10, 14-20
Y -- A	US 6,942,518 B1 (LIAMOS et al.) 13 September 2005 (13.09.2005), entire document especially Abstract; Fig 1-2; col 1, ln 15-19 and ln 64 to col 2, ln 3; col 7, ln 30-35; col 8, ln 7-12	1-6, 8, 9, 11-13 --- 7, 10, 14-20
Y -- A	US 2005/0010087 A1 (BANET et al.) 13 January 2005 (13.01.2005), entire document especially Abstract	1-6, 8, 9, 11-13 --- 7, 10, 14-20
A	GB 2,523,880 A (IMONSYS) 09 September 2015 (09.09.2015), entire document	1-20
A	US 2014/0058680 A1 (GEVA et al.) 27 February 2014 (27.02.2014), entire document	1-20
A	US 2007/0038136 A1 (GOPINATHAN et al.) 15 February 2007 (15.02.2007), entire document	1-20

☐ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

* Special categories of cited documents:
"A" document defining the general state of the art which is not considered to be of particular relevance
"E" earlier application or patent but published on or after the international filing date
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed
"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
08 June 2017	22 JUN 2017
Name and mailing address of the ISA/US Mail Stop PCT, Attn: ISA/US, Commissioner for Patents P.O. Box 1450, Alexandria, Virginia 22313-1450 Facsimile No. 571-273-8300	Authorized officer: Lee W. Young PCT Helpdesk: 571-272-4300 PCT OSP: 571-272-7774

S MAJUMDAR & CO
Patent & Trademark Attorneys
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Patents, Trademarks, Copyrights
Designs, Intellectual Property Laws
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DOMESTIC & INTERNATIONAL

1993-2018 25 YEARS OF SECURING YOUR IDEAS

The Controller of Patent
The Patent Office
Kolkata

September 29, 2018

Dear Sir,

Re: PCT National Phase Application
PCT Application No. PCT/US2017/025689 dated 03-04-2017
Indian Patent Application No.: **201837031468** dated 03-04-2017
in the name of PEABODY, Steven, R.
(Nationalization date: August 22, 2018)
TITLE: **MEDICAL DIAGNOSTIC DEVICE, SYSTEM, AND METHOD OF USE**
Priority: US62/317,543 dated: 02-04-2016
Our Ref: PCC16523

In connection with the aforesaid subject, we submit herewith:

☐ Formal Application Form-1 (via online) [1]

☒ **Power of Attorney**

☐ Notarized attested true copy of the assignment document in lieu of Form 1

☐ Certified copy of the Priority Document No. dated (via online) [1]

[1] The original said document is being submitted at the patent office along with official receipt.

The Ld. Controller is requested to kindly take the documents on record.

Yours faithfully,

Ganguli

Dr. Sanchita Ganguli
Of S. MAJUMDAR & CO.
(Applicant's Agent)

Enclosure:
1 Power of Attorney
2. Official Receipt Docket No: dated (via hard copy only

10/2

POWER OF ATTORNEY

In the matter of Patents (Amen...

And

In the matter of The Patents (Amendment) Rules, 2006,

And

In the matter of
PEABODY, Steven, R.

of
4950 Turkeyfoot Road, Zionsville, IN 46077, US

I, the above named applicant do hereby retain, constitute and appoint S. MAJUMDAR, M. MAJUMDAR, C R MITRA, DR. SANCHITA GANGULI, ABHISHEK SEN, AMIT K CHAKRABARTY, MYTHILI VENKATESH, MRIGANKI DUTTA, N R SETH, AMRITA MAJUMDAR, SULTANA SHAIKH, MD. IRFAN SHAIKH, DOMINIC ALVARES and SOUMI GANGULY all representatives of the Firm of S. MAJUMDAR & CO., 5, Harish Mukherjee Road, Kolkata – 700 025, India, all of Indian nationality, jointly and severally to be my Agents and Attorneys for the purpose of obtaining grant of letters patent entitled

MEDICAL DIAGNOSTIC DEVICE, SYSTEM, AND METHOD OF USE

in respect of International Application No. **PCT/US2017/025689** dated **03 April 2017** designating India and I authorize any of them to sign my name to such papers and writings and do such acts, as may be necessary or expedient and lastly I request that all official communications now or hereafter relating to the same may be addressed to them at their office in Kolkata and that they be recognized as my authorized Agents in all proceedings incidental thereto. I authorize them to appoint agents, advocates and attorneys. I hereby confirm all action already taken by them in this matter. I revoke all previous authorizations, if any.

Dated this 18th day of September 2018

PEABODY, Steven, R.

Name:
Status:

S. MAJUMDAR & CO.
PATENT & TRADEMARK ATTORNEYS

Undertakings: Intellectual Property Laws,
Patents, Trademarks, Designs, Copyrights,
Licencing, Investigations, Litigations
DOMESTIC AND INTERNATIONAL

5, Harish Mukherjee Road, Kolkata - 700 025, India
Tel: 91-33-2455 7484/85/86, Fax: 91-33-2455-7487/88, E-mail : cal@patentindia.com

The Controller of Patents
The Patent Office
KOLKATA

November 20, 2018

Dear Sir,

Re: Indian Patent Application No.: 201837031468 dated 03-04-2017
in the name of PEABODY, STEVEN, R.
Title : MEDICAL DIAGNOSTIC DEVICE, SYSTEM, AND METHOD OF USE
Our Ref : PCC16523

In connection with the aforesaid, we submit herewith the following documents :

1. Further Particulars

The Ld. Controller is requested to kindly take the documents on record.

Yours faithfully

Abhishek Sen
of S. Majumdar & Co.
(Applicant's Agent)

FURTHER PARTICULARS OF FOREIGN FILINGS CORRESPONDING TO THE APPLICATION NO. 201837031468

Country	Application Number	Filing Date	Status	Publication Date	Issue Date	Patent Number
USA	62/317,543	02/04/2016	Inactive			
PCT	PCT/US2017/025689	03/04/2017	Published	05/10/2017		
China	201780017463.0	03/04/2017	Pending			
USA	16/090,585	03/04/2017	Pending			

Dated this 20th day of November 2018

Abhishek Sen
Of S. MAJUMDAR & CO.
(Applicant's Agent)

S. MAJUMDAR & CO.
PATENT & TRADEMARK ATTORNEYS

Undertakings: Intellectual Property Laws,
Patents, Trademarks, Designs, Copyrights,
Licencing, Investigations, Litigations
DOMESTIC AND INTERNATIONAL

5, Harish Mukherjee Road, Kolkata - 700 025, India
Tel: 91-33-2455 7484/85/86, Fax: 91-33-2455-7487/88, E-mail : cal@patentindia.com

The Controller of Patents
The Patent Office
KOLKATA

November 20, 2018

Dear Sir,

Re: Indian Patent Application No.: 201837031468 dated 03-04-2017
in the name of PEABODY, STEVEN, R.
Title : MEDICAL DIAGNOSTIC DEVICE, SYSTEM, AND METHOD OF USE
Our Ref : PCC16523

In connection with the aforesaid, we submit herewith the following documents :

1. Further Particulars

The Ld. Controller is requested to kindly take the documents on record.

Yours faithfully

Abhishek Sen
of S. Majumdar & Co.
(Applicant's Agent)

FURTHER PARTICULARS OF FOREIGN FILINGS CORRESPONDING TO THE APPLICATION NO. 201837031468

Country	Application Number	Filing Date	Status	Publication Date	Issue Date	Patent Number
USA	62/317,543	02/04/2016	Inactive			
PCT	PCT/US2017/025689	03/04/2017	Published	05/10/2017		
China	201780017463.0	N/A	Pending			
USA	16/090,585	10-01-2018	Pending			

Dated this 20th day of November 2018

Abhishek Sen
Of S. MAJUMDAR & CO.
(Applicant's Agent)

FURTHER PARTICULARS OF FOREIGN FILINGS CORRESPONDING TO THE APPLICATION NO. 201837031468

Country	Application Number	Filing Date	Status	Publication Date	Issue Date	Patent Number
USA	62/317,543	02/04/2016	Inactive			
PCT	PCT/US2017/025689	03/04/2017	Gone National	05/10/2017		
China	201780017463.0	03/04/2017	An amendment and response to the office action was filed on June 17, 2021			
USA	16/090,585	03/04/2017	Granted		20/07/ 2021	11064948
USA (continuation application)	17/352,280	19/06/2021	Pending			

Dated this 8th day of July 2021

ABHISHEK SEN
Of S. Majumdar & Co.
(Applicant's Agent)
IN/PA No: 980

FINAL DATE: 01/10/2021

The Controller of Patent
The Patent Office
KOLKATA **July 08,2021**

KIND ATTN: MR. SREEKANTH K S
LD. CONTROLLER OF PATENTS

Dear Sir,

Re: **RESPONSE TO FIRST EXAMINATION REPORT DATED 01-04-2021**
Indian Patent Application No.: **201837031468** dated 03-04-2017
in the name of **PEABODY, STEVEN, R.**
(Nationalization date: 22-08-2018)
TITLE: MEDICAL DIAGNOSTIC DEVICE, SYSTEM, AND METHOD OF USE
Our Ref: PCC16523

This is with reference to the First Examination Report dated **01-04-2021** and the objections raised therein. Our submissions are as follows:

PART-I: SUMMARY OF THE REPORT:

OTHER REQUIREMENT(S):

1. Care should be taken in reply of FER, if there is any amendment it should be done U/s 59 and markup copy also submitted along with amendment. Proper reason shall be provided regarding amendment.

Contents noted and complied with.

2. Please note that this Examination is done on the basis of electronically uploaded documents in the module only. You may verify all documents as filed are uploaded electronically or not, and bring to the notice of the concerned discrepancies if any.

Contents noted.

PART-II: DETAILED TECHNICAL REPORT:

A. List of documents cited

D1: US20150254414A1
D2: US20140296669A1

B. DETAILED OBSERVATIONS ON THE REQUIREMENTS UNDER THE ACT:

(1) NOVELTY:

Claim(s) (1, 18, 20) lack(s) novelty, being anticipated in view of disclosure in the document cited above under reference D1

PRESENT INVENTION

The present invention relates to a hand-held mobile medical diagnostic device and comprehensive remote patient telehealth monitoring system for measuring and wirelessly communicating a number of physiologic parameters.

The present invention aims to consolidate into one hand-held device a multiplicity of medical measurement capabilities plus a hub for automatic wireless data transmission. The hand-held device may be configured to measure and wirelessly communicate a plurality of physiologic parameters for one or more patients, including for instance any or all of blood pressure, blood glucose, body temperature, pulse rate, blood oxygen saturation level (SpO_2), and electrocardiogram (ECG). Additional peripheral devices may also be provided, either separately or along with the device as part of a kit, that automatically interface with and wirelessly transmit data to the hand-held device, such as fall detection, activity tracking, and smart scale peripherals. A carrying case may also be provided for the device, or for the device and one or more of its peripherals, either separately or along with the device as part of a kit. Also provided is an online network and interface for securely receiving, storing, compiling, and displaying data in a variety of formats selectively to patients, physicians, or other caretakers. The device and system simplify and improve management of multiple and often co-occurring chronic conditions such as diabetes, congestive heart failure, (CHF), chronic obstructive pulmonary disease (COPD), and hypertension, for example.

The present invention particularly relates to a mobile device integrated in a body that is sized and shaped to be held in a palm of a hand of a user, the mobile device configured to take a plurality of physiological measurements of a patient, including electrocardiographic measurements, blood oxygen saturation level measurements, pulse rate measurements, body temperature measurements, blood pressure measurements when connected with a removable inflatable cuff, and blood glucose measurements when connected with an elongated test strip having at a first end an electrical connection point and at a second end an electrochemical cell, and to display and wirelessly communicate data corresponding to said physiological measurements, the mobile device comprising:

a display;
a processor;
a wireless modem with mobile broadband and GPS functionality;
a power source;
two or more electrocardiographic electrodes integrated with and positioned on the body of the mobile device and configured to measure electrocardiographic signals of the patient when gripped by fingers or thumbs of the patient;
a fingertip pulse oximeter formed into the body of the mobile device and configured to measure pulse rate and blood oxygen saturation levels of the patient when a tip of a finger of the patient is inserted therein;
a temperature sensor integrated with and positioned on the body of the mobile device and configured to measure body temperature of the patient when the temperature sensor is placed against the patient's skin;
a blood pressure measuring structure within the body of the mobile device, comprising a controller, motor, pressure sensor, and pump in air communication with a tube interface at the body that is adapted to be removably and sealably connected with an inflatable cuff; and
a blood glucose measuring structure within the body of the mobile device, comprising an electrical connector at the body, the electrical connector disposed to form an electrical connection with the electrical connection point on the first end of the elongated test strip, when the elongated strip is inserted in the electrical connector.

The mobile device is configured to: automatically wirelessly communicate to a network the data corresponding to different physiological measurements;
wirelessly receive, display, and wirelessly communicate data corresponding to physiological measurements taken by a peripheral device not physically connected to the mobile device, wherein the peripheral device is selected from the group consisting of: a scale configured to measure and wirelessly communicate data corresponding to the weight of the patient; a fall detection device configured to be worn by the patient and to detect and to wirelessly communicate data indicating when the patient has fallen; and an activity tracker configured to be worn by the patient and to measure and wirelessly communicate data corresponding to an amount of physical activity engaged in by the patient over a period of time;
communicate with and display information from the Internet;
wirelessly communicate an alert to the user and to someone located remotely from the user when said data corresponding to said physiological measurements exceeds a predetermined threshold; and be selectably operable in a plurality of modes, wherein in at least one mode the mobile device is configured to display visual indications of data corresponding to said physiological measurements and to associate with said data: a patient identifier; time stamp; and GPS location; and to automatically wirelessly communicate said data for each patient securely to a network.

The present invention also provides a system comprising:
a plurality of mobile devices for use with a plurality of patients, in wireless communication with a remotely-located computer network configured to securely receive, store, compile, and selectively display in a plurality of formats said data corresponding to said physiological measurements of said patients.

D1

D1 disclosed a casing adapted to use with a mobile device for monitoring health condition of a user, wherein said casing comprises:
(a) a memory unit;
(b) a sensor unit at a surface of said casing;
(c) a plurality of health parameter measuring sensors embedded within said sensor unit for measuring raw health parameters data of said user;
(d) a processor, which is activated from a sleep mode based on a user input comprising contacting at least one predetermined sensor surface on said casing for a predetermined period, adapted to
(i) initialize and configure said plurality of health parameter measuring sensors; and
(ii) receive said raw health parameters data from said plurality of health parameter measuring sensors, and
(e) a communication unit for communicating said raw health parameters data to said mobile device for processing; and
(f) a power unit for controllably supplying power to said plurality of health parameter measuring sensors and said processor upon detecting said user input.

D1 also discloses a system for monitoring health condition of a user, wherein said system comprises:
(a) a casing as described above; and
(b) a mobile device adapted to use with said casing, wherein said mobile device comprises:
(i) a memory unit comprising a database and a set of modules; and
(ii) a processor that executes said set of modules, wherein said set of modules comprise:
(a) a raw health parameters data receiving module, executed by said processor of said mobile device, that receives said raw health parameters data from said communication unit; and
(b) a raw data processing module comprising an ECG data processing module that
(a) filters baseline wandering from said raw health parameters data to obtain a filtered health parameter data;
(b) detects a plurality of peaks that are within a predetermined peak range from said filtered health parameter data;
(c) calculates an average interval of successive peaks of said plurality of peaks; and
(d) calculates a heart rate of said user based on said average interval of said successive peaks.

As disclosed in D1, the casing **104** includes a sensor unit in which the multiple sensors are embedded. Examples of such sensor include a pulse oxygen or blood pressure sensor **202**, a temperature sensor **204**, an ECG electrode **206**, and a microcontroller unit **208**. D1 further describes that the pulse oxygen/blood pressure sensor **202** is made of LEDs and one or more photo diodes that measures health condition of a patient (e.g., a pulse rate, an oxygen saturation level, and/or a blood pressure range). The temperature sensor **204** obtains signals related to body temperature of the user, such that the temperature sensor **204** can be a contactless infrared (IR) sensor which obtains temperature signals without need for the user to contact a sensor surface on the casing **104**.

On the contrary, the mobile device disclosed in the present invention do not contain sensors for measuring pulse oxygen or blood pressure.

The blood pressure is measured by blood pressure measuring structure within the body of the mobile device, comprising a controller, motor, pressure sensor, and pump in air communication with a tube interface at the body of the mobile device that is adapted to be removably and sealably connected with an inflatable cuff. As described in para [0056] of the PCT specification, the inflatable arm cuff is provided with a clip structure attached directly to an outer surface of the inflatable arm cuff, such that the clip structure is sized and shaped to removably connect the mobile device to the inflatable arm cuff and comprising projections extending away from the inflatable arm cuff that are sized and shaped to snap on to the outer surface of the mobile device. Such a clip structure can hold the device in place on the cuff while blood pressure measurements are taken, while also positioning the device properly for connection of the coupling of the device with the corresponding hose, fitting, or coupling on the cuff 150.

The present invention also describes a fingertip pulse oximeter formed into the body of the mobile device and configured to measure pulse rate and blood oxygen saturation levels of the patient when a tip of a finger of the patient is inserted into the fingertip pulse oximeter. The fingertip pulse oximeter may be formed into a recessed, concave-contoured area of the body as described in para [0061] of the PCT specification. The fingertip pulse oximeter may be provided with a hingeably mounted portion forming part of the lower surface of the body. The hingeably mounted portion may pivot open to allow space for the patient to insert a tip of their finger into the fingertip pulse oximeter. This is unlike the casing in D1 which does not have the provision of the tip of a finger of the patient being inserted into the fingertip pulse oximeter.

D1 also does not disclose detection of blood glucose by a blood glucose measuring structure within the body of the mobile device. D1 only mentions that a universal connector enables one or more external sensors (e.g., a spirometry or a glucose sensor) to communicate with a microcontroller of the casing. This is contrary to the present invention that discloses a blood glucose measuring structure within the body of the mobile device, the glucose measuring structure comprising an electrical connector at the body, the electrical connector disposed to form an electrical connection with the electrical connection point on the first end of the elongated test strip, when the elongated strip is inserted in the electrical connector.

It is therefore evident from the above that the mobile device of the present invention is not disclosed in D1. To destroy novelty, a prior art is required to disclose each and every feature of the presently claimed invention. However, D1 fails to disclose each and every feature and therefore the present invention is novel over D1.

The Ld. Controller is requested to reconsider and waive the objection.

(2) INVENTIVE STEP:

Claim(s) (1-20) lack(s) inventive step, being obvious in view of teaching (s) of cited document(s) above under reference D1, D2

It is respectfully submitted that as evident from the above submissions D1 does not disclose the mobile device of the present invention. D1 does not suggest the mobile device of present invention having a mechanical blood pressure measuring mechanism comprising a controller, motor, pressure sensor, and pump in air communication with a tube interface at the body of the mobile device that is adapted to be removably and sealably connected with an inflatable cuff. Moreover, there is no requirement of the any hoses or wires because the device is directly fixed to the inflatable cuff by the clip. D1 only teaches a blood pressure measuring sensor that is made of LEDs and one or more photo diodes. The sensor of D1 does not use an inflatable cuff and does not require inflation means. D1 further does not suggest a mobile device having a pulse oximeter which requires insertion of tip of a finger of the user. D1 also does not teach measuring of blood glucose by a blood glucose measuring structure that is integrated within the body of the mobile device.

It is submitted that the present mobile device cannot be arrived from the casing or the system of D1. The present invention provides a mobile device which can measure the vitals of a user while the user holds the device in the hand while the device is mechanically attached with an inflatable cuff to measure blood pressure by the same device.

To conclude from teachings of D1 that it motivates a person skilled in the art to arrive at the mobile device of the present invention is possible only on basis of impermissible hindsight. Such impermissible hindsight knowledge using the blue print of the present invention to find obviousness is not allowable.

D2

D2 discloses a headwear assembly that measures physiological changes, e.g., oxygen saturation, pulse, blood pressure, and body temperature of a user during physical exercise, to include athletic activities and other situations. The headwear assembly can provide integrated functionality with an external device such as a smart phone. The headwear assembly can be embodied in various configurations, e.g., stand-alone headband, cap, visor, or a helmet.

It is respectfully submitted that D2 is not relevant for the present invention. D2 teaches a headwear assembly whereas the present invention relates to a mobile device that to be held in a palm of a hand.

The object of D2 is to monitor blood oxygen levels with an oximetry unit that can be used to guide exercise, athletic training, and provide an alarm in critical conditions and situations. D2 addresses the technical problem that during exercise or other athletic activities, traditional locations for oximetry sensor placement such as fingertip or earlobe can be problematic. Hence, D2 provides a headwear assembly having a variety of physiological sensors, such as oxygen saturation, body temperature, pulse rate, and blood pressure.

Accordingly, the technical problem and the object of D2 is not relevant in determining the inventive step of the present invention.

The blood pressure monitor in the headwear assembly of D2 includes a pressurized bladder disposed over a blood vessel of the user. Preferably, a blood vessel is near the surface of the user's skin, such as blood vessels in the temporal region of the scalp, such as the superficial temporal artery. A proximity sensor is coupled to the bladder. In this arrangement, the volumetric change of the vessel is transferred to the bladder such that this volumetric change can be sensed by the sensor. Additionally, the bladder may be inflated and deflated using a small air pump and bleed off valve. This arrangement of the sensor for blood pressure measurement integrated within the headwear is completely different from the blood pressure measuring arrangement of the mobile device of the present invention.

Further, the arrangement of the pulse and oximeter sensor of the electronic headwear of D2 is different from the hand held mobile device of the present invention. Also, the headwear of D2 does not have the provision for electrocardiographic measurements and blood glucose measurements.

It is respectfully submitted that a person skilled in the art would not find it obvious from the teachings of D2 to arrive at the mobile device of the present invention.

It is respectfully submitted that none of the cited prior arts D1 and D2 teach or suggest combining disclosed medical functionalities such as pulse, electrocardiography, temperature, blood pressure, oxygen saturation and blood glucose into a single wireless monitoring hand-held device. D1 and D2 taken alone or in combination do not teach the structural components of the mobile device of the present invention.

The present hand-held mobile medical device comprises all the presently-disclosed means for collecting medical data for diagnostics, and that also acts as its own wireless telecommunications hub that automatically uploads that data, for example as it is read to a HIPAA-compliant network on the cloud via 4G cellular and WiFi connectivity.

As disclosed in the present specification, "*The device minimizes or eliminates human data entry errors since all readings are typically automatically uploaded after every use to a HIPAA-compliant (i.e., compliant with the Health Insurance Portability and Accountability Act of 1996) cloud network via cellular (e.g., 4G) and WiFi connectivity. Alternatively or additionally, the data can be sent directly to a provider's management solution directly through an application program interface (API). This replaces or minimizes the time-consuming and error-prone step of manually entering data, and patients no longer have to obtain and keep track of multiple devices. The device efficiently and effectively improves clinical outcomes, enhances patient engagement, and reduces total cost of care by reducing equipment costs, expanding the productivity of health care workers, and having patients self-report their medical data in an automatically accurate and timely fashion.*"

Therefore, it is submitted that the present mobile device is not suggested in the prior arts and the technical effects of the present invention are not obvious. Therefore, the present invention as claimed in claims 1-20 is not obvious and is inventive.

The Ld. Controller is requested to reconsider and waive the objection.

(4) SCOPE:

The phrase 'further' used in claims 8, 11, 14 is vague and broadening the scope of the invention. Hence these claims are not allowable under section 10(4)(c).

It is respectfully submitted that the term "further comprising" is a standard term for the recitation of non-exclusive and additional features of a claim. No lack of clarity arises from the use of this term, which allows the presence of additional and optional non-essential components. It is submitted that 'further' does not broaden the scope of the invention, on the contrary the 'further' features limit the scope of the invention.

The Ld. Controller is requested to reconsider and waive the objection.

(5) CLARITY AND CONCISENESS:

1. The various definitions of the invention given in independent Claims 1, 18, 20 are such that the claims as a whole are not clear and concise and plurality of independent claims makes it difficult to determine the matter for which protection is sought. Hence these claims are not allowable under section 10(5).

It is respectfully submitted that there is no provision in the law that does not allow multiple independent claims. Multiple independent claims refer to different embodiments of the same invention and are connected by a single inventive concept.

2. For the purpose of clarity the phrase "of claim" used in the dependent claims shall be replaced with phrase "as claimed in claim" under section 10(5).

Claims are suitably amended.

The Ld. Controller is requested to reconsider and waive the objection.

PART-III: FORMAL REQUIREMENTS:

STATEMENT & UNDER TAKING (FORM 3 DETAILS):

Updated foreign filing particulars are submitted herewith.

POWER OF ATTORNEY (WHETHER GPA, SPA, STAMPED, REQUISITE FEE ETC.):

It is respectfully submitted that the power of attorney is originally filed with a Rupees 10 stamp duty which is appropriate since the application is filed in Kolkata Jurisdiction. Further, it is submitted that as per the Schedule-1A of The Indian Stamp (Bengal Amendment) Act, 1935, the original POA with Rupees 10 stamp duty is appropriate and therefore the objection stands moot. The Ld. Controller is thus requested to kindly reconsider and waive the objection.

FORMAT OF SPECIFICATION (RULE 13):

1. Claims are suitably amended.

2. It is respectfully submitted that the Indian Patent office has published public notice CG/ Public Notice/ PO/2012/15 dated July 2, 2012, whereby the Patent office has simplified process of filing of PCT national phase Applications in India. These instructions came into force from July 6, 2012 and did away the redundant process of filing multiple documents that are invariably available on records of the IB of WIPO. According to said changes, Form 2 and the last sheet of claims bearing the signature of the Applicant's authorized patent agent along with date of filing Complete Specification has been submitted with the IPO. It is therefore submitted that the specification has been filed in prescribed manner.

However, a copy of the abstract is submitted herewith.

FORMAT OF DRAWINGS:

It is respectfully submitted that the Indian Patent office has published public notice CG/ Public Notice/ PO/2012/15 dated July 2, 2012, whereby the Patent office has simplified process of filing of PCT national phase Applications in India. These instructions came into force from July 6, 2012 and did away the redundant process of filing multiple documents that are invariably available on records

of the IB of WIPO. Accordingly, it is submitted that the drawings are available on WIPO and not required to be filed.

The Ld. Controller is requested to reconsider and waive the objection.

PART-IV: DOCUMENTS ON RECORD:

Contents are noted .

Grant of the application is requested. In the event our above submissions are not found to be persuasive a hearing may please be granted before taking any adverse decision.

Yours Sincerely,

Abhishek Sen
Of S.MAJUMDAR& CO.
(Applicant's Agent)
IN/PA No: 980

Enclosures:

Amended Claims (marked and clean copy)
Abstract
Updated Foreign Filing Particulars.

I Claim:

1. A mobile device integrated in a body that is sized and shaped to be held in a palm of a hand of a user, the mobile device configured to take a plurality of physiological measurements of a patient, including electrocardiographic measurements, blood oxygen saturation level measurements, pulse rate measurements, body temperature measurements, blood pressure measurements when connected with a removable inflatable cuff, and blood glucose measurements when connected with an elongated test strip having at a first end an electrical connection point and at a second end an electrochemical cell, and to display and wirelessly communicate data corresponding to said physiological measurements, the mobile device comprising:

a display;

a processor;

a wireless modem with mobile broadband and GPS functionality;

a power source;

two or more electrocardiographic electrodes integrated with and positioned on the body of the mobile device and configured to measure electrocardiographic signals of the patient when gripped by fingers or thumbs of the patient;

a fingertip pulse oximeter formed into the body of the mobile device and configured to measure pulse rate and blood oxygen saturation levels of the patient when a tip of a finger of the patient is inserted therein;

a temperature sensor integrated with and positioned on the body of the mobile device and configured to measure body temperature of the patient when the temperature sensor is placed against the patient's skin;

a blood pressure measuring structure within the body of the mobile device, comprising a controller, motor, pressure sensor, and pump in air communication with a tube interface at the body that is adapted to be removably and sealably connected with an inflatable cuff; and

a blood glucose measuring structure within the body of the mobile device, comprising an electrical connector at the body, the electrical connector disposed to form an electrical connection with the electrical connection point on the first end of the elongated test strip, when the elongated strip is inserted in the electrical connector.

2. The mobile device as claimed in claim 1, wherein the user is the patient.

3. The mobile device as claimed in claim 1, wherein the user is not the patient.

4. The mobile device as claimed in claim 1, wherein the mobile device is configured to automatically wirelessly communicate to a network said data corresponding to said physiological measurements.

5. The mobile device as claimed in claim 1, wherein the mobile device comprises a touch-screen data input structure and is configured to manually receive,

display, and wirelessly communicate data corresponding to physiological measurements of the patient that were manually taken.

6. The mobile device as claimed in claim 1, wherein the mobile device is configured to wirelessly receive, display, and wirelessly communicate data corresponding to physiological measurements taken by a peripheral device not physically connected to the mobile device.

7. The mobile device as claimed in claim 6, wherein the peripheral device is selected from the group consisting of:

a scale configured to measure and wirelessly communicate data corresponding to the weight of the patient;

a fall detection device configured to be worn by the patient and to detect and to wirelessly communicate data indicating when the patient has fallen; and

an activity tracker configured to be worn by the patient and to measure and wirelessly communicate data corresponding to an amount of physical activity engaged in by the patient over a period of time.

8. The mobile device as claimed in claim 1, wherein the mobile device further comprises a cellular telephone.

9. The mobile device as claimed in claim 8, wherein the mobile device is configured to communicate with and display information from the Internet.

10. The mobile device as claimed in claim 9, wherein the mobile device comprises a camera, microphone, and speaker, and is configured to allow the user to video-conference with one or more remotely-located persons.

11. The mobile device as claimed in claim 1, wherein the mobile device is further configured to communicate an alert when said data corresponding to said physiological measurements exceeds a predetermined threshold.

12. The mobile device as claimed in claim 11, wherein the mobile device is configured to communicate an alert to the user when said data corresponding to said physiological measurements exceeds a predetermined threshold.

13. The mobile device as claimed in claim 11, wherein the mobile device is configured to wirelessly communicate an alert to someone located remotely from the user when said data corresponding to said physiological measurements exceeds a predetermined threshold.

14. The mobile device as claimed in claim 1, further configured to be selectably operable in a plurality of modes, wherein:

in a first mode the mobile device is configured to display visual indications of data corresponding to said physiological measurements without communicating said data wirelessly; and

in a second mode the mobile device is configured to display visual indications of data corresponding to said physiological measurements and to associate with said data: a patient identifier; time stamp; and GPS location; and to automatically wirelessly communicate said data for each patient securely to a network.

15. The mobile device as claimed in claim 14, wherein:

in a third mode the mobile device is configured to display visual indications of data corresponding to said physiological measurements and to automatically wirelessly communicate said data securely to a network.

16. The mobile device as claimed in claim 15, wherein the mobile device is configured to wirelessly receive, display, and wirelessly communicate data corresponding to physiological measurements taken by a peripheral device not physically connected to the mobile device, and in the third mode the mobile device is configured to automatically wirelessly communicate securely to a network the data corresponding to the physiological measurements taken by the peripheral device not physically connected to the mobile device.

17. The mobile device as claimed in claim 15, wherein the mobile device comprises a built-in camera, microphone, and speaker, and is configured to wirelessly communicate audio and video signals, to play audio, and to display video, and in the third mode the mobile device is configured to allow the patient to communicate with remotely located persons by audio and video.

18. A system comprising:

a plurality of mobile devices as claimed in claim 1 for use with a plurality of patients, in wireless communication with a remotely-located computer network configured to securely receive, store, compile, and selectively display in a plurality of formats said data corresponding to said physiological measurements of said patients.

19. The system as claimed in claim 18, wherein the plurality of formats are selected from the group consisting of:

a single-patient format where said data corresponding to said physiological measurements corresponds to a single one of said patients; and

a multiple-patient format where said data corresponding to said physiological measurements corresponds to a plurality of said patients.

20. A mobile device integrated in a body that is sized and shaped to be held in a palm of a hand of a user, the mobile device configured to take a plurality of physiological measurements of a patient, including electrocardiographic measurements, blood oxygen saturation level measurements, pulse rate

measurements, body temperature measurements, blood pressure measurements when connected with a removable inflatable cuff, and blood glucose measurements when connected with an elongated test strip having at a first end an electrical connection point and at a second end an electrochemical cell, and to display and wirelessly communicate data corresponding to said physiological measurements, the mobile device comprising:

a display;

a processor;

a wireless modem with mobile broadband and GPS functionality;

a power source;

a touch-screen data input structure and is configured to manually receive, display, and wirelessly communicate data corresponding to physiological measurements of the patient that were manually taken;

a cellular telephone;

a camera, microphone, and speaker, all configured to allow the user to video-conference with one or more remotely-located persons;

two or more electrocardiographic electrodes integrated with and positioned on the body of the mobile device and configured to measure electrocardiographic signals of the patient when gripped by fingers or thumbs of the patient;

a fingertip pulse oximeter formed into the body of the mobile device and configured to measure pulse rate and blood oxygen saturation levels of the patient when a tip of a finger of the patient is inserted therein;

a temperature sensor integrated with and positioned on the body of the mobile device and configured to measure body temperature of the patient when the temperature sensor is placed against the patient's skin;

a blood pressure measuring structure within the body of the mobile device, comprising a controller, motor, pressure sensor, and pump in air communication with a tube interface at the body that is adapted to be removably and sealably connected with an inflatable cuff; and

a blood glucose measuring structure within the body of the mobile device, comprising an electrical connector at the body, the electrical connector disposed to form an electrical connection with the electrical connection point on the first end of the elongated test strip, when the elongated strip is inserted in the electrical connector;

wherein the mobile device is configured to:

automatically wirelessly communicate to a network said data corresponding to said physiological measurements;

wirelessly receive, display, and wirelessly communicate data corresponding to physiological measurements taken by a peripheral device not physically connected to the mobile device, wherein the peripheral device is selected from the group consisting of: a scale configured to measure and wirelessly communicate data corresponding to the weight of the patient; a fall detection device configured to be worn by the patient and to detect and to wirelessly communicate data indicating when the patient has fallen; and an activity tracker configured to be worn by the patient and to measure and

wirelessly communicate data corresponding to an amount of physical activity engaged in by the patient over a period of time;

communicate with and display information from the Internet;

wirelessly communicate an alert to the user and to someone located remotely from the user when said data corresponding to said physiological measurements exceeds a predetermined threshold; and

be selectably operable in a plurality of modes, wherein in at least one mode the mobile device is configured to display visual indications of data corresponding to said physiological measurements and to associate with said data: a patient identifier; time stamp; and GPS location; and to automatically wirelessly communicate said data for each patient securely to a network.

Dated this 22nd day of August 2018

Abhishek Sen
Of S.MAJUMDAR& CO.
(Applicant's Agent)
IN/PA No: 980

~~What is claimed is~~I Claim:

1. A mobile device integrated in a body that is sized and shaped to be held in a palm of a hand of a user, the mobile device configured to take a plurality of physiological measurements of a patient, including electrocardiographic measurements, blood oxygen saturation level measurements, pulse rate measurements, body temperature measurements, blood pressure measurements when connected with a removable inflatable cuff, and blood glucose measurements when connected with an elongated test strip having at a first end an electrical connection point and at a second end an electrochemical cell, and to display and wirelessly communicate data corresponding to said physiological measurements, the mobile device comprising:

a display;

a processor;

a wireless modem with mobile broadband and GPS functionality;

a power source;

two or more electrocardiographic electrodes integrated with and positioned on the body of the mobile device and configured to measure electrocardiographic signals of the patient when gripped by fingers or thumbs of the patient;

a fingertip pulse oximeter formed into the body of the mobile device and configured to measure pulse rate and blood oxygen saturation levels of the patient when a tip of a finger of the patient is inserted therein;

a temperature sensor integrated with and positioned on the body of the mobile device and configured to measure body temperature of the patient when the temperature sensor is placed against the patient's skin;

a blood pressure measuring structure within the body of the mobile device, comprising a controller, motor, pressure sensor, and pump in air communication with a tube interface at the body that is adapted to be removably and sealably connected with an inflatable cuff; and

a blood glucose measuring structure within the body of the mobile device, comprising an electrical connector at the body, the electrical connector disposed to form an electrical

connection with the electrical connection point on the first end of the elongated test strip, when the elongated strip is inserted in the electrical connector.

2. The mobile device ~~of~~ as claimed in claim 1, wherein the user is the patient.

3. The mobile device ~~of~~ as claimed in claim 1, wherein the user is not the patient.

4. The mobile device ~~of~~ as claimed in claim 1, wherein the mobile device is configured to automatically wirelessly communicate to a network said data corresponding to said physiological measurements.

5. The mobile device ~~of~~ as claimed in claim 1, wherein the mobile device comprises a touch-screen data input structure and is configured to manually receive, display, and wirelessly communicate data corresponding to physiological measurements of the patient that were manually taken.

6. The mobile device ~~of~~ as claimed in claim 1, wherein the mobile device is configured to wirelessly receive, display, and wirelessly communicate data corresponding to physiological measurements taken by a peripheral device not physically connected to the mobile device.

7. The mobile device ~~of~~ as claimed in claim 6, wherein the peripheral device is selected from the group consisting of:

a scale configured to measure and wirelessly communicate data corresponding to the weight of the patient;

a fall detection device configured to be worn by the patient and to detect and to wirelessly communicate data indicating when the patient has fallen; and

an activity tracker configured to be worn by the patient and to measure and wirelessly communicate data corresponding to an amount of physical activity engaged in by the patient over a period of time.

8. The mobile device ~~of~~ as claimed in claim 1, wherein the mobile device further comprises a cellular telephone.

9. The mobile device ~~of~~ as claimed in claim 8, wherein the mobile device is configured to communicate with and display information from the Internet.

10. The mobile device ~~of~~ as claimed in claim 9, wherein the mobile device comprises a camera, microphone, and speaker, and is configured to allow the user to video-conference with one or more remotely-located persons.

11. The mobile device ~~of~~ as claimed in claim 1, wherein the mobile device is further configured to communicate an alert when said data corresponding to said physiological measurements exceeds a predetermined threshold.

12. The mobile device ~~of~~ as claimed in claim 11, wherein the mobile device is configured to communicate an alert to the user when said data corresponding to said physiological measurements exceeds a predetermined threshold.

13. The mobile device ~~of~~ as claimed in claim 11, wherein the mobile device is configured to wirelessly communicate an alert to someone located remotely from the user when said data corresponding to said physiological measurements exceeds a predetermined threshold.

14. The mobile device ~~of~~ as claimed in claim 1, further configured to be selectably operable in a plurality of modes, wherein:

in a first mode the mobile device is configured to display visual indications of data corresponding to said physiological measurements without communicating said data wirelessly; and

in a second mode the mobile device is configured to display visual indications of data corresponding to said physiological measurements and to associate with said data: a patient identifier; time stamp; and GPS location; and to automatically wirelessly communicate said data for each patient securely to a network.

15. The mobile device ~~of~~ as claimed in claim 14, wherein:

in a third mode the mobile device is configured to display visual indications of data corresponding to said physiological measurements and to automatically wirelessly communicate said data securely to a network.

16. The mobile device ~~of~~ as claimed in claim 15, wherein the mobile device is configured to wirelessly receive, display, and wirelessly communicate data corresponding to physiological measurements taken by a peripheral device not physically connected to the mobile device, and in the third mode the mobile device is configured to automatically wirelessly communicate securely to a network the data corresponding to the physiological measurements taken by the peripheral device not physically connected to the mobile device.

17. The mobile device ~~of~~ as claimed in claim 15, wherein the mobile device comprises a built-in camera, microphone, and speaker, and is configured to wirelessly communicate audio and video signals, to play audio, and to display video, and in the third mode the mobile device is configured to allow the patient to communicate with remotely located persons by audio and video.

18. A system comprising:

a plurality of mobile devices as claimed in ~~according to~~ claim 1 for use with a plurality of patients, in wireless communication with a remotely-located computer network configured

to securely receive, store, compile, and selectively display in a plurality of formats said data corresponding to said physiological measurements of said patients.

19. The system ~~of~~ as claimed in claim 18, wherein the plurality of formats are selected from the group consisting of:

a single-patient format where said data corresponding to said physiological measurements corresponds to a single one of said patients; and

a multiple-patient format where said data corresponding to said physiological measurements corresponds to a plurality of said patients.

20. A mobile device integrated in a body that is sized and shaped to be held in a palm of a hand of a user, the mobile device configured to take a plurality of physiological measurements of a patient, including electrocardiographic measurements, blood oxygen saturation level measurements, pulse rate measurements, body temperature measurements, blood pressure measurements when connected with a removable inflatable cuff, and blood glucose measurements when connected with an elongated test strip having at a first end an electrical connection point and at a second end an electrochemical cell, and to display and wirelessly communicate data corresponding to said physiological measurements, the mobile device comprising:

a display;

a processor;

a wireless modem with mobile broadband and GPS functionality;

a power source;

a touch-screen data input structure and is configured to manually receive, display, and wirelessly communicate data corresponding to physiological measurements of the patient that were manually taken;

a cellular telephone;

a camera, microphone, and speaker, all configured to allow the user to video-conference with one or more remotely-located persons;

two or more electrocardiographic electrodes integrated with and positioned on the body of the mobile device and configured to measure electrocardiographic signals of the patient when gripped by fingers or thumbs of the patient;

a fingertip pulse oximeter formed into the body of the mobile device and configured to measure pulse rate and blood oxygen saturation levels of the patient when a tip of a finger of the patient is inserted therein;

a temperature sensor integrated with and positioned on the body of the mobile device and configured to measure body temperature of the patient when the temperature sensor is placed against the patient's skin;

a blood pressure measuring structure within the body of the mobile device, comprising a controller, motor, pressure sensor, and pump in air communication with a tube interface at the body that is adapted to be removably and sealably connected with an inflatable cuff; and

a blood glucose measuring structure within the body of the mobile device, comprising an electrical connector at the body, the electrical connector disposed to form an electrical connection with the electrical connection point on the first end of the elongated test strip, when the elongated strip is inserted in the electrical connector;

wherein the mobile device is configured to:

automatically wirelessly communicate to a network said data corresponding to said physiological measurements;

wirelessly receive, display, and wirelessly communicate data corresponding to physiological measurements taken by a peripheral device not physically connected to the mobile device, wherein the peripheral device is selected from the group consisting of: a scale configured to measure and wirelessly communicate data corresponding to the weight of the patient; a fall detection device configured to be worn by the patient and to detect and to wirelessly communicate data indicating when the patient has fallen; and an activity tracker configured to be worn by the patient and to measure and wirelessly communicate data corresponding to an amount of physical activity engaged in by the patient over a period of time;

communicate with and display information from the Internet;

wirelessly communicate an alert to the user and to someone located remotely from the user when said data corresponding to said physiological measurements exceeds a predetermined threshold; and

be selectably operable in a plurality of modes, wherein in at least one mode the mobile device is configured to display visual indications of data corresponding to said physiological measurements and to associate with said data: a patient identifier; time stamp; and GPS location; and to automatically wirelessly communicate said data for each patient securely to a network.

ABSTRACT

MEDICAL DIAGNOSTIC DEVICE, SYSTEM, AND METHOD OF USE

Provided in various example embodiments a mobile device integrated in a body that is sized and shaped to be held in a palm of a hand of a user, the mobile device configured to take a plurality of physiological measurements of a patient, including electrocardiographic measurements, blood oxygen saturation level measurements, pulse rate measurements, body temperature measurements, blood pressure measurements when connected with a removable inflatable cuff, and blood glucose measurements when connected with an elongated test strip, and to display and wirelessly communicate data corresponding to said physiological measurements. The mobile device may comprise some or all of the features of an Internet enabled smartphone. The mobile device may be provided with selectable modes of operation for use with one or more patients. Wireless peripherals may provide additional physiological data to the device. Systems are provided for secure communication and storage of data.

INTELLECTUAL PROPERTY INDIA
एकस्व/PATENTS|अभिकल्प/DESIGNS|
व्यापार चिह्न/TRADE MARKS|भौगोलिक उपदर्शन/GEOGRAPHICAL INDICATIONS

सत्यमेव जयते
भारत सरकार
GOVERNMENT OF INDIA

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बौद्धिक सम्पदा भवन/ I.P.O. BUILDING
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वेबसाइट /Website:http://ipindia.nic.in

सं.संख्या/Ref.No /आवेदन संख्या/Application No/ 201837031468 दिनांक/Date of Dispatch/Email: 01/04/2021

सेवा मे,/To
SUBHATOSH MAJUMDAR,
S. MAJUMDAR & CO., 5, HARISH MUKHERJEE ROAD, FIRST FLOOR, KOLKATA - 700 025
Email : cal@patentindia.com

विषय: एकस्व अधिनियम, 1970 की धारा 12 व 13 तथा एकस्व नियम, 2003 के अधीन परीक्षण रिपोर्ट
Subject: Examination report under sections 12 & 13 of the Patents Act, 1970 and the Patents Rules, 2003.

1. उपर्युक्त आवेदन के संदर्भ मे परीक्षण रिपोर्ट (अर्थात, एकस्व नियम, 2003 (यथा संशोधित) के नियम 24-ख(3) में विनिर्दिष्ट आपत्तियों का प्रथम कथन) इसके साथ संलग्न है। यह रिपोर्ट परीक्षण हेतु अनुरोध दिनांक 25/08/2018 के उत्तर मे जारी की गयी है। परीक्षण रिपोर्ट का उत्तर दाखिल करने की अंतिम तिथि (अर्थात, इस रिपोर्ट में लगाई गयी सभी आवश्यकताओं के अनुपालन की अवधि) आवेदक को आपत्तियों का प्रथम कथन जारी होने की तिथि से छः माह है।
   Please find enclosed herewith an Examination Report (i.e. a first statement of objections as specified in Rule 24-B(3) of The Patents Rules, 2003 (as amended)) in respect of above-mentioned application. This report is issued with reference to a request for examination dated 25/08/2018.The last date for filing a response to the Examination Report (i.e. a period to comply with all the requirements raised in this examination report) is six months from the date on which the first statement of objections is issued to the Applicant.

2. यदि रिपोर्ट के अंतर्गत लगाई गयी आवश्यकताओं का अनुपालन एकस्व नियम, 2003 (यथा संशोधित) के नियम 24 ख(5) में विनिर्दिष्ट अवधि के भीतर अंदर अनुपालन नहीं किया गया तो एकस्व अधिनियम 1970 की धारा 21(1) के अधीन वर्तमान आवेदन को परित्यक्त माना जाएगा।
   The instant application shall be deemed to have been abandoned under Section 21(1) of The Patents Act, 1970, unless all the requirements raised in this report are complied with in the period as specified in Rule 24-B (5) of The Patents Rules, 2003 (as amended).

3. आपका ध्यान एकस्व नियम, 2003 के नियम 24 ख(6) के प्रावधानों की ओर भी आमंत्रित किया जाता है।
   Your attention is also invited to the provisions of Rule 24-B (6) of the Patents Rules 2003.

4. आपको सलाह दी जाती है कि शीघ्र निपटान हेतु अपना उत्तर शीघ्र प्रस्तुत करें।
   You are advised to file the reply at the earliest for early disposal.

Sreekanth K S
नियंत्रक पेटेंट/ Controller of Patents

संलग्न/Enclosed: अपरोक्त अनुसार/As above

टिप्पणी: यह इलेक्ट्रोनिक रूप से उत्पन्न रिपोर्ट है।
NOTE: This is an electronically generated report.

सभी पत्राचार नियंत्रक एकस्व को उपरोल्लिखित पते पर भेजा जाये।
All communications should be sent to the Controller of Patents at the above mentioned address.

THE PATENT OFFICE

परीक्षण रिपोर्ट /Examination Report

आवेदन संख्या /Application Number	201837031468
दाखिल करने की तिथि /Date of Filing	22/08/2018
पूर्विक्ता दिनांक /Date of Priority	02/04/2016
पीसीटी अंतर्राष्ट्रीय आवेदन की संख्या व दिनांक / PCT International Application No. & Date	US2017025689 -- 03/04/2017
आवेदक /Applicant	PEABODY, Steven, R.
परीक्षण हेतु अनुरोध की संख्या व दिनांक /Request for Examination No. & Date	R20183025288 25/08/2018
प्रकाशन की तिथि /Date of Publication	05/10/2018

इस परीक्षण रिपोर्ट के चार भाग हैं, अर्थात रिपोर्ट का सारांश, विस्तृत तकनीकी रिपोर्ट, औपचारिक आवश्यकताएँ तथा रिकॉर्ड मे दस्तावेज़ /
This examination report consists of four parts, namely summary of the report, detailed technical report, formal requirements and documents on record.

भाग -1: रिपोर्ट का सारांश
PART-I: SUMMARY OF THE REPORT

क्र. सं. /Sl. No.	अधिनियम के तहत आवश्यकताओं पर विस्तृत टिप्पणियां /Requirements under the Act		दावों की संख्या /Claim Numbers	टिप्पणी /Remarks
1.	धारा 2(1)(ञ) के तहत आविष्कार /Invention u/s 2(1)(j)	नवीनता /Novelty	दावे /Claims:	हाँ /Yes
			दावे /Claims: 1, 18, 20	नहीं /No
		आविष्कारी कदम / Inventive step	दावे /Claims:	हाँ /Yes
			दावे /Claims: 1-20	नहीं /No
		औद्योगिक उपयोगिता /Industrial Applicability	दावे /Claims: 1-20	हाँ /Yes
			दावे /Claims:	नहीं /No
2.	[धारा 10(5) व 10(4) (ञ)] के अधीन दावे /Claims [u/s 10(5) & 10(4) (c)]	स्पष्टता/ संक्षिप्तता /Clarity / Conciseness	दावे /Claims:	हाँ /Yes
			दावे /Claims: 1-20	नहीं /No
		क्षेत्र /Scope	दावे /Claims:	हाँ /Yes
			दावे /Claims: 8, 11, 14	नहीं /No
3.	अन्य आवश्यकता (एँ) /Other requirement(s): 1. Care should be taken in reply of FER , if there is any amendment it should be done U/s 59 and markup copy also submitted along with amendment. Proper reason shall be provided regarding amendment. 2. Please note that this Examination is done on the basis of electronically uploaded documents in the module only. You may verify all documents as filed are uploaded electronically or not, and bring to the notice of the concerned discrepancies if any.			

भाग –II विस्तृत तकनीकी रिपोर्ट
PART-II: DETAILED TECHNICAL REPORT

क. उद्धरित दस्तावेजों की सूची /A.List of documents cited:

(क) पेटेंट साहित्य / (a). Patent Literature :

क्र. सं. /	दस्तावेज़ों का विवरण	प्रकाशन तिथि(दिन/माह/वर्ष) /	उद्धरित दस्तावेज़ का प्रासंगिक विवरण (पृष्ठ व अनुच्छेद संख्या) / Relevant	उद्धरित दस्तावेज़ के प्रासंगिक दावे /	अभिकथित आविष्कार के दावे /Claims of

Sl.no	/Details of documents	Publication date	description (page and paragraph no.) of cited document	Relevant claims of cited document	alleged invention
1	D1: US20150254414A1	10/09/2015	Whole Document	all claims	1-20
2	D2: US20140296669A1	02/10/2014	Whole Document	all claims	1-20

(ख) गैर-पेटेंट साहित्य /(b).Non-patent literature

कोई दस्तावेज़ उद्धृत नहीं है /No Document Cited

ख. अधिनियम के तहत आवश्यकताओं पर विस्तृत टिप्पणियां /B. Detailed observations on the requirements under the Act:

(1).नवीनता / NOVELTY:

(I) ऊपर उद्धरित दस्तावेज़ के संदर्भ (1, 18, 20) मे दिये गए प्रकटन के पूर्वानुमान को ध्यान मे रखते हुए, निम्नलिखित कारणों से दावा(वों) (1, 18, 20) मे नवीनता की कमी है /
Claim(s) (1, 18, 20) lack(s) novelty, being anticipated in view of disclosure in the document cited above under reference D1 for the following reasons:

The subject matter of claim 1 is disclosed by document D1 as below:

- A mobile device integrated in a body that is sized and shaped to be held in a palm of a hand of a user, the mobile device configured to take a plurality of physiological measurements of a patient, including electrocardiographic measurements, blood oxygen saturation level measurements, pulse rate measurements, body temperature measurements, blood pressure measurements when connected with a removable inflatable cuff, and blood glucose measurements when connected with an elongated test strip having at a first end an electrical connection point and at a second end an electrochemical cell, and to display and wirelessly communicate data corresponding to said physiological measurements (see D1, para [0003]: The embodiments herein generally relate to a health monitoring system, and more particularly to, a casing which is adapted to use with a mobile device for monitoring health condition of a user.), the mobile device comprising:
- a display ; a processor; (see D1, para [0058]: The mobile device 106 includes a memory 1202 having a set of instructions, a bus 1204, a display 1206, a speaker 1208, a processor 1210 capable of processing a set of instructions to perform any one or more of the methodologies herein,)
- a wireless modem with mobile broadband and GPS functionality (see D1, para [0065]: Network adapters may also be coupled to the system to enable the data processing system to become coupled to other data processing systems or remote printers or storage devices through intervening private or public networks. Modems, cable modem and Ethernet cards are just a few of the currently available types of network adapters.);
- a power source (see D1, para [0007]: a power unit for controllably Supplying power to the sensors and the processor upon detecting the user input.);
- two or more electrocardiographic electrodes integrated with and positioned on the body of the mobile device and configured to measure electrocardiographic signals of the patient when gripped by fingers or thumbs of the patient (see D1, para [0040]: The ECG electrode 206 includes one or more electrode cardiogram sensors. In one embodiment, the casing 104 includes a first electrode 210 and a second electrode 212 at a surface of the casing 104. When the user 102, places his/her finger on the first electrode 210 and the second electrode 212, the ECG electrode 206 obtains signal related to cardio functionality of the user 102.);
- a fingertip pulse oximeter formed into the body of the mobile device and configured to measure pulse rate and blood oxygen saturation levels of the patient when a tip of a finger of the patient is inserted therein (see D1, para [0039]: In one embodiment, the pulse oxygen/blood pressure sensor 202 is made of LEDs and

one or more photo diodes that measures health condition of a patient (e.g., a pulse rate, an oxygen saturation level, and/or a blood pressure range).);
- a temperature sensor integrated with and positioned on the body of the mobile device and configured to measure body temperature of the patient when the temperature sensor is placed against the patient's skin (see D1, para [0010]: The set of modules further include a temperature computing module that computes skin temperature of the user from the raw health parameters data including Voltage values);
- a blood pressure measuring structure within the body of the mobile device, comprising a controller, motor, pressure sensor, and pump in air communication with a tube interface at the body that is adapted to be removably and sealably connected with an inflatable cuff (see D1, para [0036]: The casing 104 further includes a sensor unit in which the multiple sensors (e.g., pulse oxygen/blood pressure sensor, a temperature sensor, and an ECG electrode) are embedded.); and
- a blood glucose measuring structure within the body of the mobile device, comprising an electrical connector at the body, the electrical connector disposed to form an electrical connection with the electrical connection point on the first end of the elongated test strip, when the elongated strip is inserted in the electrical connector. (see D1, para [0036]: The universal connector 104A enables one or more external sensors (e.g., a spirometry or a glucose sensor) to communicate with a microcontroller of the casing 104 over certain protocol (e.g., I2C))

Similar reasoning is given for claims 18, 20 which are claiming the same subject matter as claimed in claim 1.

Since all the features of claims 1, 18, 20 are disclosed by document D1, hence in view of the disclosure by document D1 these claims are not novel under section 2(1)(j).

(2).आविष्कारी कदम / INVENTIVE STEP:

(I) ऊपर उद्धरित दस्तावेज़(जों) के संदर्भ D1, D2 मे स्पष्ट अध्यापन(नों) को ध्यान मे रखते हुए, निम्नलिखित कारणों से दावा(वों) (1-20) मे आविष्कारी कदम की कमी है
Claim(s) (1-20) lack(s) inventive step, being obvious in view of teaching (s) of cited document(s) above under reference D1, D2 for the following reasons:

1. Since claims 1, 18, 20 are not novel, as all the technical features of these claims are disclosed by document D1, hence these claims are not inventive in view of the above disclosure.

2. Other dependent claims 2-17, 19 do not contain any additional feature in combination to the feature of any claims to which they refer to meet the criteria of inventive steps.

However, some features of these claims are disclosed by document D1, D2 as below:

- mobile device is configured to automatically wirelessly communicate to a network said data corresponding to said physiological measurements. (see D1, para [0060])
- mobile device is configured to communicate with and display information from the Internet.(see D1, para [0038])
- mobile device comprises a touchscreen data input structure and is configured to manually receive, display, and wirelessly communicate data corresponding to physiological measurements of the patient that were manually taken. (see D1, para [0066])
- A mobile device integrated in a body that is sized and shaped to be held in a palm of a hand of a user, the mobile device configured to take a plurality of physiological measurements of a patient, including electrocardiographic measurements, blood oxygen saturation level measurements, pulse rate measurements, body temperature measurements, blood pressure measurements when connected with a removable inflatable cuff (see D2, abstract, fig 1, para [0006]-[0013])

Hence all features of the instant application are disclosed in documents D1 and D2. If the teaching of D1 and D2 is used, a person skilled in the art, without being inventive would readily arrive at the subject matter of all the alleged claims. Therefore these claims lack inventive steps under section 2(1) (ja) of, The Patents Act, 1970. Therefore instant application does not constitute an invention under section 2(1) (j) of, The Patents Act, 1970(as amended).

(3).प्रकटन की दक्षता /SUFFICIENCY OF DISCLOSURE:

(4).क्षेत्र /SCOPE:

(I) दावा(वे) 8, 11, 14 आविष्कार के उस क्षेत्र जिस के लिए संरक्षण का दावा किया गया है उसे निम्नलिखित कारणों से परिभाषित नहीं करता(ते) है.
Claim(s) 8, 11, 14 does/do not define the scope of invention for which the protection is claimed for the following reasons:

The phrase 'further' used in claims 8, 11, 14 is vague and broadening the scope of the invention. Hence these claims are not allowable under section 10(4)(c).

(5).स्पष्टता एवं संक्षिप्तता /CLARITY AND CONCISENESS:

(I) दावा(वे) 1-20 के संबंध मे स्पष्ट रूप से परीभाषित नहीं हैं.
Claim(s) 1-20 are not clearly worded in respect of:

1. The various definitions of the invention given in independent Claims 1, 18, 20 are such that the claims as a whole are not clear and concise and plurality of independent claims makes it difficult to determine the matter for which protection is sought. Hence these claims are not allowable under section 10(5).

2. For the purpose of clarity the phrase "of claim" used in the dependent claims shall be replaced with phrase "as claimed in claim" under section 10(5).

भाग – III: औपचारिक आवश्यकताएँ /PART-III: FORMAL REQUIREMENTS

आपत्तियां /Objections	टिप्पणी /Remarks
Statement & Under Taking (Form 3 Details)	An updated form-3 shall be filed under section 8(1).
Power of Attorney (Whether GPA, SPA, Stamped, requisite fee etc.)	PA shall be filed, with proper stamp duty as per stamp act 1899, under section 127 of the Patent Act, 1970(as amended).
Format of Specification (rule 13)	1. Claims shall be started with a preface "i/ we claim" as per rule 13(1). 2. Abstract shall be filed in proper manner under rule 13(7).
Format of Drawings	Drawings shall be filed in accordance with rule 15.

भाग-IV: रिकॉर्ड मे दस्तावेज़ /PART-IV: DOCUMENTS ON RECORD

निम्नलिखित दस्तावेज़ों के आधार पर यह परीक्षण रिपोर्ट तैयार की गयी है
The examination report has been prepared based on the following documents:

कार्यसूची तिथि / Docket Date	कार्यसूची संख्या /Docket Number	प्रविष्टि संख्या विवरण /Entry Number Description

22 Aug 2018	27910	1-New Application For Patent With Provisional /Complete Specification
25 Aug 2018	28324	28(i)-Request For Examination After 18 months Publication - Form 18
01 Oct 2018	32263	45-Form Of Authorisation Of Patent Agent - Form 26
22 Nov 2018	37500	3-Statement & Undertaking - Form 3
29 Nov 2018	38218	3-Statement & Undertaking - Form 3

नियंत्रक का नाम /Name of the Controller: Sreekanth K S

नियंत्रक स्थान /Controller Location: Mumbai

टिप्पणी: परीक्षण रिपोर्ट का उत्तर दाखिल करने की अंतिम तिथि / Note: Last date for filing response to the Examination Report: 01/10/2021

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GEOGRAPHICAL INDICATIONS

संदर्भ सं. / Ref. No:
POM/Application No /201837031468

प्रेषण दिनांक / Date of Dispatch:
11-09-2023

सेवा मे, / To

आवेदक /Applicant:
PEABODY, Steven, R.

Registerd Address For Service :SUBHATOSH MAJUMDAR, S. MAJUMDAR & CO., 5, HARISH MUKHERJEE ROAD, FIRST FLOOR, KOLKATA - 700 025. Email: cal@patentindia.com

विपक्षी /Opponent:
NA

ई-मेल प्रेषित /Email Sent to:
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विषय: आवेदन संख्या 201837031468 के संदर्भ मे सुनवाई नोटिस
Sub: Hearing Notice in Reference of Application No. 201837031468

सुनवाई स्थल / Hearing Location: Through Video Conferencing
सुनवाई दिनांक व समय / Hearing Date & Time: 09/01/2024 / 14:30 HRS(IST) for (30 Mins)
नियंत्रक ईमेल /Controller's EmailId: sreekanthks.ipo@nic.in

आपके द्वारा प्रथम परीक्षण रिपोर्ट/ अनुवर्ती परीक्षण रिपोर्ट के उत्तर के संदर्भ मे, दिनांक 09/01/2024 को 14:30 HRS(IST) for (30 Mins) बजे विडियो कॉन्फ्रेंसिंग मामले मे Hearing U/S (14) सुनवाई तय की गयी है। अतः, आपको उपरोक्त दिनांक व समय पर नियंत्रक के समक्ष सुनवाई हेतु उपस्थित होना है।

With reference to your reply to the First examination Report/Subsequent Examination Report, a Hearing U/S (14) hearing has been scheduled in the matter through Video Conferencing on 09/01/2024 at 14:30 HRS(IST) for (30 Mins) . You are therefore, required to appear before the Controller for the hearing on said date and time.

इस आवेदन को पेटेंट अनुदान हेतु क्रम मे लाने की अंतिम तिथि से पूर्व / अंतिम तिथि के उपरांत, निम्नलिखित आपत्तियां अभी भी शेष हैं।
The following objection(s) are still outstanding before / after the expiry of last date for putting this application in order for grant of patent.

SREEKANTH K S
Assistant Controller of Patents & Designs

*दिनांक/समय, स्थल, स्थिति व सुनवाई के बारे में अन्य विवरण के लिए: कृपया निम्नलिखित यूआरएल देखें http://ipindiaservices.gov.in/PatentCauseList
Please refer to the following URL for: Date/Time, Venue, Status and other details about the Hearing
http://ipindiaservices.gov.in/PatentCauseList

टिप्पणी:- विडियो कॉन्फ्रेंसिंग के माध्यम से सुनवाई के समय के संबंध मे मेल अलग से भेजी जाएगी।
Note:- Separate mail will be sent regarding the time of the Hearing through Video Conference.

* Hearing Objections are attached.

Objections

Clarity and Conciseness

1. The various definitions of the invention given in independent Claims 1, 18, 20 are such that the claims as a whole are not clear and concise and plurality of independent claims makes it difficult to determine the matter for which protection is sought. Hence these claims are not allowable under section 10(5).

2. In absence of reference numerals the subject matter of claims 1-20 are not clear. Applicant/agent shall comply with the requirement under section 10(5).

Formal Requirement(s)

1. Form-3 filed on 08.07.2021 can not be taken on recoed. It should be filed in prescribed manner as given in format of form-3 of second schedule.

2. PA shall be filed, with proper stamp duty as per stamp act 1899, under section 127 of the Patent Act, 1970(as amended).

3. Drawings shall be filed in accordance with rule 15.

Invention u/s 2(1)(j)

1. Claims lack novelty and inventive step based on the documents cited in the FER.

Other Requirement(s)

1. 1. "The applicant is required to notify the Controller at the earliest (3 days prior to hearing date) whether or not the applicant will attend the hearing (Sub-rule 4 of Rule 28 of the Patents Rules and rule 129-A). If an authorized person with substitute PA is attending the hearing, the PA must be submitted before the date of hearing. If any case law needs to be discussed to substantiate technical arguments, the same shall be provided to the Controller at least 3 days prior to the hearing"

   2. Applicant failed to submit mark up copy of amended claims, In case the applicant decides to amend the claims subsequent to this report, the same shall be drafted afresh to include the technical advancement over the prior art cited ,in claim 1 as required u/s 2(1)(j) of the Patent's Act. Please indicate in the response communication the support for such amendments claims in the original specification, as required u/s 10(4) of the Act .Care shall be taken that requirement section 59 (1) of the Act is also met. Please provide an additional copy of marked up amendments (highlighting the amendments) where ever applicable.