



(51) International Patent Classification:

A61B 1/00 (2006.01) *A61B 50/13* (2016.01)
A61B 50/10 (2016.01) *A61G 12/00* (2006.01)
A61B 1/12 (2006.01) *A61B 50/30* (2016.01)

(21) International Application Number:

PCT/US2021/061910

(22) International Filing Date:

25 January 2022 (25.01.2022)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

63/120,800 03 December 2020 (03.12.2020) US
63/121,302 04 December 2020 (04.12.2020) US
17/542,317 03 December 2021 (03.12.2021) US

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(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, IT, JO, 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, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, WS, 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))

(54) Title: MEDICAL DIAGNOSTIC KIT

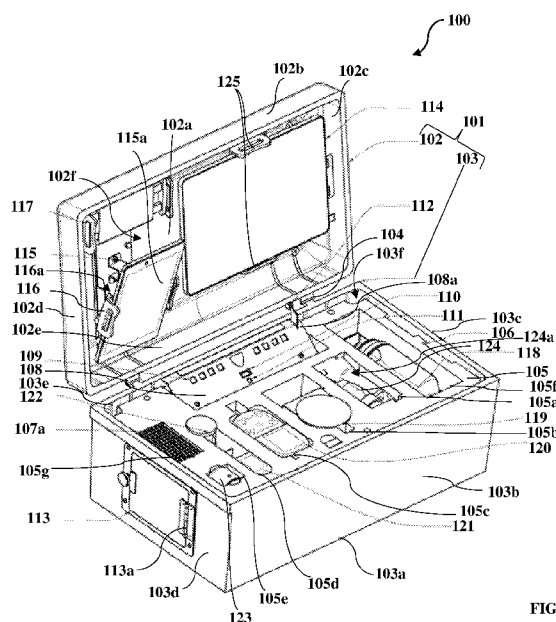


FIG. 1

(57) Abstract: A medical diagnostic kit (MDK) includes a universal cable storage compartment (UCSC), a deck, and switchable multi-port hubs (SMPHs). Configurable cable compartments in the UCSC accommodate cables of clinical examination devices (CEDs) without mutual entanglement. The deck positioned on the UCSC supports the CEDs and includes cutouts into the UCSC for cable management. The SMPHs permanently connect CED cable connectors and selectively power and communicate data with the CED(s). An internal energy storage device (ESD) receives power from a multi-port charger (MPC) during charging, and delivers the power to the SMPHs for powering and communicating data with the CED(s) when the casing is opened. An activated, hubs disconnection switch interrupts power delivery from the ESD to the SMPHs when the casing is closed. The MDK includes a diagnostic computer with a software application for activating the CED(s), executing media conference connections, managing medical data, and facilitating remote real-time medical examinations.

Published:

- *with international search report (Art. 21(3))*
- *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))*
- *the filing date of the international application is within two months from the date of expiration of the priority period (Rule 26bis.3)*

MEDICAL DIAGNOSTIC KIT

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This international application claims priority to and the benefit of the non-provisional patent application titled “Medical Diagnostic Kit”, application number 17/542,317, filed in the United States Patent and Trademark Office on December 03, 2021, which claims priority to and the benefit of the provisional patent application titled “Medical Diagnostic Kit”, application number 63/121,302, filed in the United States Patent and Trademark Office (USPTO) on December 4, 2020, and the provisional patent application titled “Industrial Camera Unit (ICU) for Performing Ear, Nose, Throat (ENT) And Skin Imaging”, application number 63/120,800, filed in the USPTO on December 3, 2020. The specifications of the above referenced patent applications are incorporated herein by reference in their entirety.

BACKGROUND

[0002] Recent advancements in deployment and development of digital and telecommunication technologies have led to an emerging use of telemedicine. Telemedicine utilizes a combination of digital and telecommunication technologies and devices, for example, medical instruments, computers, wireless devices such as mobile phones, smartphones, satellite communication devices, audio/video devices, online management systems, smartphone applications, secure communication and storage protocols, etc., for analysing a patient’s clinical health status and assisting in diagnosing and treating the patient. The purpose of telemedicine is to improve a patient’s health by enabling a secure, interactive, two-way, real-time communication between the patient or a health care professional, for example, an onsite care coordinator (OCC) attending to the patient at the patient’s location and a health care practitioner, for example, a physician, at a remote site. Telemedicine allows health care practitioners such as physicians to use telehealth appointments to pre-screen patients for possible infectious disease, and reduces exposure of patients, especially those who are chronically ill, pregnant, elderly, or

immunocompromised, to other people's germs by avoiding physical visits of the patient to a physician's office. Telemedicine allows patients with infectious diseases such as the coronavirus disease (COVID)-19 to be diagnosed at their home locations, thereby reducing the spread of germs and viruses into a community. Additional benefits that have fed the need for telemedicine include, for example, better availability and access to health care providers and health care services, lower health care costs, increased efficiency and revenue, time savings, etc.

[0003] Telemedicine is increasingly being used to close health care gaps over a large geographic area, address underutilized physician availability at any location, and attend to underserved patient populations due to scarcity of geographically local physicians. For example, during the COVID-19 pandemic, mandatory social distancing has made telemedicine the safest interactive system between patients, both infected and uninfected, and health care practitioners. There is also a need for continued examination and treatment of non-COVID-19-related illnesses, particularly among vulnerable patient populations such as the elderly or immunocompromised, who would otherwise avoid or defer care as a result of self-isolation during the COVID-19 pandemic. Telemedicine allows physicians who are temporarily barred from delivering in-person care due to the need to self-quarantine following COVID-19 exposure or infection, to provide continuous services.

[0004] While telemedicine is expected to grow rapidly over the next decade due to its multiple benefits, telemedicine still poses several technical and practical problems for health care practitioners. Health care continuity typically suffers in cases where patients use on-demand telemedicine services that connect them to a health care practitioner. A patient's primary care practitioner may not have access to records generated from multiple virtual visits to different health care practitioners and therefore, have to perform a diagnosis with an incomplete medical history of the patient. Another challenge is the unreliable and interruptive access to a wireless communication network at the patient's location, causing delays and inaccuracies in performing a comprehensive medical examination of the patient. In addition to obtaining reliable and continuous access to a wireless communication network for communicating with a remote health care practitioner, the effectiveness of

telemedicine depends on the effective use and management of medical instruments and digital technologies at the patient's location. There is a need for deploying appropriate tools, devices, equipment, and digital applications at a patient's location to aid a remote health care practitioner in performing a medical examination of the patient.

[0005] Some conventional solutions used in the practice of telemedicine include kits comprising medical instruments used for examining a patient at the patient's location by a health care professional, for example, an onsite care coordinator (OCC). Conventional kits generally do not provide adequate placement and arrangement of medical instruments, which results in disorderly management of the medical instruments and their cables during the medical examination, entanglement of the cables, confusion, and loss of productivity to a health care professional, for example, a nurse practitioner or another OCC, attending to the patient at the patient's location along with a physician at a remote site. The inadequate arrangement also makes the medical instruments difficult to access during a medical examination. Moreover, multiple connected medical instruments with universal serial bus (USB) interfaces consume power during a medical examination, which is not a problem when the medical instruments are connected to a powerful personal computer (PC) running from an alternating current (AC) outlet in the physician's office, but is a problem for a portable autonomous device running on a battery in the field. Accordingly, there is a need for a kit that facilitates secure and fast charging of the connected medical instruments. Furthermore, conventional kits do not have provisions for accommodating medical instruments of different types and configurations, their cables, and future variants therewithin. Furthermore, conventional kits require each medical instrument to be charged separately, mostly external to the kit, which takes a significant amount of time and management effort when there are multiple medical instruments in the kit.

[0006] Some conventional kits comprise a multi-layer stowage area for the medical instruments, where the medical instrument must be manually and sequentially plugged into an external universal serial bus (USB) hub using a specific USB cable for powering the medical instrument, and detached each time. Moreover, there is a need for saving battery power of a USB hub in the kit when the medical instruments are not in use. Another

challenge during a remote medical examination is the inability of a remote health care practitioner to view a patient lying on a bed at the patient's location. The remote health care practitioner may not be able to view the patient lying on the bed as the patient may not be in the field of view of a camera being used for videoconferencing during the remote medical examination, as the camera is commonly, permanently attached to a top lid of the kit. Furthermore, conventional kits do not include complementary broadband communication devices and handheld computing devices, for example, tablet computing devices, organized therewithin that adequately facilitate remote real-time medical examinations, provide access to a reliable communication network, operate with the medical instruments for enhanced visualization of organs of the patient, and receive, generate, process, store, and securely transmit medical data during the medical examination for future use, diagnosis, and continuous follow-up.

[0007] Hence, there is a long-felt need for a medical diagnostic kit for facilitating telemedicine, that is, a remote medical examination of a patient by approximating a physician-present exam more closely, by allowing health care practitioners not only to see and hear the patient remotely, but also to conduct in-depth screenings and medical exams using hospital-grade, diagnostic equipment deployed by trained health care professionals, for example, onsite care coordinators, acting as the "physician's hands" at the patient's location, while addressing the above-recited problems associated with the related art.

SUMMARY

[0008] This summary is provided to introduce a selection of concepts in a simplified form that are further disclosed in the detailed description. This summary is not intended to determine the scope of the claimed subject matter.

[0009] The apparatus disclosed herein addresses the above-recited need for a medical diagnostic kit for facilitating telemedicine, that is, a remote medical examination of a patient by approximating a physician-present exam more closely, by allowing health care practitioners not only to see and hear the patient remotely, but also to conduct in-depth

screenings and medical exams using hospital-grade, diagnostic equipment deployed by trained health care professionals, for example, onsite care coordinators (OCCs) acting as the “physician’s hands” at the patient’s location, when a communication network, for example, a broadband communication network, is available. If a communication link to the physician’s remote computing device is not available, the medical diagnostic kit is configured to store medical data, for example, the patient’s vital signs, sonograms, electrocardiograms (ECGs), auscultation sounds, camera images, etc., securely in an internal storage device for a later upload or an artificial intelligence (AI)-enabled batch upload to the physician’s remote computing device, when the communication network is available. The medical diagnostic kit comprises hospital-grade, United States Food and Drug Administration (FDA) approved diagnostic equipment.

[0010] The medical diagnostic kit disclosed herein comprises a casing, a universal cable storage compartment, a deck, multi-port hubs, one or more energy storage devices, a hubs disconnection switch, and one or more computing devices. The casing comprises an upper shell, that is, a top lid, and a lower shell connected to each other via a hinged connection. The upper shell is in movable relation to the lower shell via the hinged connection between an open position and a closed position of the casing. The upper shell of the casing comprises an upper support wall adjoined by side walls oriented substantially perpendicular to the upper support wall to define an upper cavity. The lower shell of the casing comprises a lower support wall adjoined by side walls oriented substantially perpendicular to the lower support wall to define a lower cavity.

[0011] The universal cable storage compartment is accommodated in the casing. In an embodiment, the universal cable storage compartment is accommodated in the lower cavity of the lower shell of the casing. The universal cable storage compartment comprises movable dividers and subdividers configured to create configurable cable compartments for accommodating cables of multiple clinical examination devices without mutual entanglement. The cables are, for example, power supply and data communication or exchange cables such as universal serial bus (USB) cables. The clinical examination devices are medical instruments comprising, for example, an auscultation device such as a

stethoscope, an electrocardiograph (ECG), an otoscope, an ultrasound device, a thermometer, a blood pressure monitor, an oximeter, a throat exam camera, a skin exam camera, a secondary camera, etc. The deck is positioned on the universal cable storage compartment. In an embodiment, the deck is accommodated in the lower cavity of the lower shell of the casing. The deck supports the clinical examination devices and accessories in the casing. The deck comprises multiple cutouts, that is, openings positioned in a one-to-one correspondence to the configurable cable compartments of the universal cable storage compartment. The cutouts of the deck are configured to support the clinical examination devices and accessories in multiple configurations. The cutouts of the deck extend or open into the universal cable storage compartment for cable management. The accessories comprise, for example, one or more input devices and one or more output devices configured to interface with one or more of the computing devices; ECG electrodes; etc. The input devices comprise, for example, a headset with a microphone, a wireless keyboard, etc. The output device(s) comprises, for example, a wireless speaker.

[0012] In an embodiment, the medical diagnostic kit further comprises air circulation holes configured proximal to an edge of the deck. The air circulation holes are configured to assist in movement of forced air provided by an air-cooling fan system, during charging of the computing devices, the clinical examination devices, the accessories, and other devices accommodated in the upper cavity of the upper shell of the casing, powered by the multi-port charger. The air circulation holes allow movement of forced air from the lower cavity defined by the lower shell of the casing to the upper cavity defined by the upper shell of the casing. In an embodiment, the medical diagnostic kit further comprises a cushioning member, for example, a foam block, comprising slots positioned on the deck in correspondence to the configurable cable compartments of the universal cable storage compartment. The slots of the cushioning member are configured according to shapes of the clinical examination devices and the accessories to protectively accommodate the clinical examination devices and the accessories in multiple configurations during transportation and deployment of the medical diagnostic kit. The shapes of the slots of the cushioning member protectively accommodate clinical examination devices and accessories of different shapes and sizes.

[0013] The multi-port hubs are positioned, for example, in a console positioned inside the casing. In an embodiment, the multi-port hubs are accommodated in the lower cavity of the lower shell of the casing. In an embodiment, the console is attached to a side wall inside the casing. For example, the console is attached to one of the side walls of the lower shell of the casing. In another embodiment, the console is attached to the deck. The multi-port hubs, for example, universal serial bus (USB) hubs, are configured to permanently and securely connect individual cable connectors of the clinical examination devices and the accessories and selectively power up and communicate data with one or more of the clinical examination devices and the accessories, while the cables of the clinical examination devices and the accessories are accommodated in the cable compartments or holders of the universal cable storage compartment. In an embodiment, each of the multi-port hubs comprises multiple USB switchable ports configured to permanently and securely connect the individual cable connectors of the clinical examination devices and the accessories and selectively power and communicate data with one or more of the clinical examination devices and the accessories engaged in a particular medical examination. The energy storage device(s) feeds or powers the multi-port hubs comprising switchable ports to which the individual cable connectors of the clinical examination devices and the accessories are connected. The multi-port hubs receive the power from the energy storage device(s) and deliver the power to the clinical examination devices and the accessories that are activated via the switchable ports of the multi-port hubs to which the clinical examination devices and the accessories are connected. The individual cable connectors of the clinical examination devices and the accessories extend from their respective cables accommodated in the universal cable storage compartment below the deck. The individual cable connectors of the clinical examination devices and the accessories are permanently and securely connected to the switchable ports of the multi-port hubs, while the respective cables are tied down to the cable compartments or holders proximal to the switchable ports.

[0014] In an embodiment, the medical diagnostic kit further comprises a headset jack positioned at a predetermined mounting location in the casing. For example, the headset jack is operably coupled in the console or on another mounting device in the casing. The

headset jack is configured to connect a headset for use during auscultation. In another embodiment, the medical diagnostic kit further comprises an auxiliary port positioned at a predetermined mounting location in the casing. The auxiliary port is configured to facilitate external connections to one of the multi-port hubs. For example, in an embodiment, the auxiliary port is operably coupled in the console for facilitating external connections to one of the multi-port hubs. In another embodiment, the auxiliary port is operably coupled to the deck proximal to the patient undergoing a remote medical examination. The auxiliary port is operably coupled to a switchable port of one of the multi-port hubs for delivering power to the external connections and executing data exchange with the external connections. In an embodiment, the medical diagnostic kit further comprises illuminating control elements operably coupled to the switchable ports of the multi-port hubs. The illuminating control elements are positioned, for example, on the console. The illuminating control elements, for example, illuminating switches, are configured to activate or deactivate one or more of the clinical examination devices and one or more of the accessories engaged in a particular medical examination to save battery power and provide visual information to a health care professional, for example, an onsite care coordinator (OCC) about the switchable ports being energized.

[0015] One or more energy storage devices are operably coupled to a multi-port charger inside the casing. In an embodiment, the energy storage device(s) and the multi-port charger are accommodated in the lower cavity of the lower shell of the casing. A power distribution board operably coupled to the multi-port charger is also accommodated in the lower cavity of the lower shell of the casing. The multi-port charger is electrically connected to and configured to charge the energy storage device(s), the computing devices, the clinical examination devices, and the accessories during a charging operation. In an embodiment, the energy storage device(s) is operably coupled to external power inputs of the multi-port hubs. The energy storage device(s), when connected to a power source, for example, an alternating current (AC) power source, is configured to receive power from the multi-port charger. The energy storage device(s) delivers the power to the multi-port hubs via the hubs disconnection switch for powering and communicating data with the clinical examination devices when the casing is in the open position. In an embodiment,

the medical diagnostic kit further comprises a primary hub operably coupled to the multi-port charger. The primary hub is also operably coupled to one of the computing devices, for example, the diagnostic computer, for delivering power to the diagnostic computer for charging the diagnostic computer. In addition to the diagnostic computer, the primary hub is also operably coupled to the multi-port hubs for data communication with the diagnostic computer. The primary hub is configured to receive power from the multi-port charger and deliver the power to the diagnostic computer for charging the diagnostic computer and executing data communication between the diagnostic computer and the clinical data examination devices and the accessories.

[0016] The hubs disconnection switch is operably coupled to the energy storage device(s) and the multi-port hubs. In an embodiment, a hubs disconnection switch board is accommodated in the lower cavity of the lower shell of the casing. The hubs disconnection switch is in operable communication with a disconnection member operably connected between the upper shell and the lower shell of the casing. The disconnection member is, for example, a magnet or a lever, in operable communication with the hubs disconnection switch. The hubs disconnection switch, when activated by the disconnection member, is configured to interrupt the delivery of the power from the energy storage device(s) to the multi-port hubs when the casing is in the closed position.

[0017] The computing devices are supportably positioned in the casing. In an embodiment, the computing devices are supportably positioned in the upper cavity of the upper shell of the casing. At least one of the computing devices is configured with a wide bandwidth data transmission capability, for example, a broadband capability. In an embodiment, one of the computing devices is a diagnostic computer. The diagnostic computer is configured to (a) activate one or more of the clinical examination devices; (b) execute media conference connections; (c) receive, create, record, process, store, and securely transmit medical data from the clinical examination device(s) to a data store or a data storage device via a communication network, for example, a wireless communication network; and (d) facilitate remote real-time medical examinations via a software application deployed on the diagnostic computer. In an embodiment, another one of the

computing devices is a communication device in operable communication with the diagnostic computer via the communication network. The communication device is configured to display a media stream, for example, a video stream, from one or more of the clinical examination devices. In an embodiment, the communication device is configured to remotely control the software application deployed on the diagnostic computer. In an embodiment, the communication device is a tablet computing device comprising a display unit configured to assist in aiming a camera lens of one of the clinical examination devices and visualizing one or more of multiple organs, for example, eyes, nose, throat, skin, etc., of a patient. The display unit is configured to receive and display a media stream of each of the visualized organs captured by the clinical examination device(s) via the camera lens. In an embodiment, the software application is configured to display, on the diagnostic computer, a panel of the clinical examination devices and the accessories accommodated in the medical diagnostic kit and indications of one or more of the clinical examination devices and the accessories on the panel suggested by a health care practitioner at a remote site for usage during the remote real-time medical examinations.

[0018] In an embodiment, the diagnostic computer is accommodated in a device holder pivotably connected to an upper support wall of the upper shell of the casing. The device holder is configured to assist in aiming of a camera of the diagnostic computer when pivoted. In an embodiment, the communication device is accommodated in a removable device holder lockably positioned in the casing, for example, in the upper cavity of the upper shell of the casing. In an embodiment, when unlocked and removed from the casing, the removable device holder assists in attaching the communication device to one or more of the clinical examination devices, for example, a throat or skin exam camera, etc. In an embodiment, the device holder is removable during use and configured to be locked in position in the casing using an attachment member, for example, a sliding attachment member, during transportation of the medical diagnostic kit. The removable device holder is configured to be unlocked and slid out from the attachment member for attachment to other clinical examination devices, for example, a throat or skin exam camera via a mechanical coupling such as a ball coupling. In an embodiment, the medical diagnostic kit further comprises a device holder positioned in the casing, for example, in the upper cavity

of the upper shell of the casing, for accommodating another computing device, for example, a network-enabled mobile phone configured to provide access of the communication network to the diagnostic computer and the communication device. In an embodiment, the device holder that accommodates the network-enabled mobile phone is non-removable.

[0019] In an embodiment, the medical diagnostic kit further comprises a side door hinged to a door frame exteriorly positioned on a side wall of the casing. The side door is configured to close over a gasket and protect inlet ports and outlet ports of the medical diagnostic kit from dust, water, and other external elements. The inlet ports and the outlet ports are positioned on a side wall of the casing. In an embodiment, the inlet ports comprise an air intake port with a particle filter and an alternating current (AC) fused inlet. The AC fused inlet is configured to provide the power from the power source to the multi-port charger for charging the energy storage device(s), the computing devices, the clinical examination devices, and the accessories inside the casing. In an embodiment, the outlet ports comprise louvers in fluid communication with an air-cooling fan system positioned in the casing, for example, in the lower cavity of the lower shell of the casing. The louvers are configured to direct heated internal air in an upward direction into the upper cavity of the casing without mixing with incoming external air flowing in the lower cavity of the casing for cooling efficiency and optimal cooling in the medical diagnostic kit. In an embodiment, the medical diagnostic kit further comprises a fan protector affixed to the deck. The fan protector is configured to protect an exhaust fan of the air-cooling fan system interiorly positioned proximal to a side wall of the casing. The exhaust fan is supported by a fan backplate. The fan backplate is exteriorly positioned on the side wall of the casing. In an embodiment, the fan backplate is exteriorly positioned on the side wall of the lower shell of the casing.

[0020] In an embodiment, the air-cooling fan system comprises cooling fans, for example, the exhaust fan and an intake fan, positioned in the lower cavity and the upper cavity of the casing. The air-cooling fan system is configured to produce an air flow within the lower cavity and the upper cavity of the casing for cooling the multi-port charger, the energy storage device(s), the computing devices, the clinical examination devices, and the

accessories to prevent overheating thereof when the casing is in the closed position during charging. In an embodiment, the medical diagnostic kit further comprises a secondary camera extending from a flexible mount, for example, a goose neck, in the casing. The secondary camera is operably coupled to one of the multi-port hubs using an internal power supply and data communication or exchange cable, for example, a USB cable, positioned in the flexible mount. The flexible mount with its internal USB cable is configured to aim a camera lens of the secondary camera towards a patient and allow a health care practitioner at a remote site to view the patient when the patient is out of view of a camera of the diagnostic computer. In an embodiment, the secondary camera is connected to the auxiliary port or placed in a holder or on the console.

[0021] In an embodiment, the medical diagnostic kit further comprises a stethoscope interface component operably coupled to one of the multi-port hubs via an audio card for executing a remote auscultation using a stethoscope. In an embodiment, the stethoscope interface component is accommodated in the lower cavity of the lower shell of the casing. In an embodiment, the stethoscope is accommodated in one of the cutouts on the deck, or in one of the slots of the cushioning member. The audio card is, for example, a universal serial bus (USB) sound card. The stethoscope is charged by the multi-port charger within the casing via the stethoscope interface component, without having to remove the stethoscope from the casing and connect to an external charger with a particular charging cable provided by a manufacturer. In an embodiment, the stethoscope interface component comprises an audio splitter, an audio switch, and a decoder. The audio splitter is operably coupled to the stethoscope for receiving a stethoscope signal from the stethoscope during the remote auscultation and splitting the stethoscope signal into a first audio signal and a second audio signal. The audio splitter transmits the first audio signal to the headset connected to the headset jack or the auxiliary port positioned at a predetermined mounting location, for example, on the console, in the casing. The audio splitter transmits the second audio signal to the audio card via the audio switch. The audio card is configured to transmit the second audio signal to the remote computing device of the remote health care practitioner via the diagnostic computer. The audio switch is configured to select between the second audio signal and a microphone signal from the headset for transmission to the

audio card. The decoder is operably coupled to an audio control element or button of the headset. The decoder is configured to decode a control signal received from the audio control element of the headset and to operate the audio switch.

[0022] In an embodiment, the medical diagnostic kit implements a quick connect-disconnect mechanism with the clinical examination devices and the accessories for quick removal thereof from the medical diagnostic kit and quick stowage thereof into the medical diagnostic kit. In an embodiment, the medical diagnostic kit implements the quick connect-disconnect mechanism, for example, using a magnetic charging connector system. The magnetic charging connector system comprises one or more magnetic connectors operably coupled to the multi-port charger, for example, via the power distribution board. The magnetic connector(s) is magnetically engageable to one or more of the clinical examination devices and the accessories positioned proximal to the magnetic connector(s) to create an electrically conductive relationship therebetween. The magnetic connector(s) comprises mating elements, for example, a first magnetic connecting element and a second magnetic connecting element. The first magnetic connecting element protrudes from each of one or more of the cutouts of the deck. The second magnetic connecting element is operably coupled to a connector section of a battery of each of one or more of the clinical examination devices and the accessories. The second magnetic connecting element, when in close proximity to the first magnetic connecting element, is configured to magnetically attract the first magnetic connecting element for receiving the power delivered by the power distribution board from the multi-port charger. In this embodiment, the clinical examination devices and the accessories are connected to the multi-port charger for charging using the magnetic connectors that allow convenient disconnection when the clinical medical devices and the accessories are removed from the storage position in the deck, and allow convenient connection when the clinical medical devices and the accessories are returned for stowage in the deck.

[0023] The medical diagnostic kit allows the clinical examination devices to be connected to the built-in multi-port hubs at all times until maintenance and has one or more clinical examination devices with similar speed active at all times; allows charging of the

internal components when the casing is in the closed position or the open position; adopts a top layer cushioning material or foam for various device configurations; allows storage of the cables of the clinical examination device below the deck separately in a coiled configuration; and provides an internal hotspot without relying on a customer's wireless communication network. The medical diagnostic kit in the closed position is configured to be transported without the internal energy storage device being discharged using the hubs disconnection switch, activated by the disconnection member, that disconnects the energy storage device when the casing is in a fully closed position. The medical diagnostic kit allows the clinical examination devices to be charged inside the casing without having to remove them from the casing and change their cables.

[0024] In one or more embodiments, related systems comprise circuitry and/or programming for executing the methods disclosed herein. The circuitry and/or programming are of any combination of hardware, software, and/or firmware configured to execute the methods disclosed herein depending upon the design choices of a system designer. In an embodiment, various structural elements are employed depending on the design choices of the system designer.

BRIEF DESCRIPTION OF THE DRAWINGS

[0025] The foregoing summary, as well as the following detailed description, is better understood when read in conjunction with the appended drawings. For illustrating the embodiments herein, exemplary constructions of the embodiments are shown in the drawings. However, the embodiments herein are not limited to the specific structures, components, and methods disclosed herein. The description of a structure, or a component, or a method step referenced by a numeral in a drawing is applicable to the description of that structure, component, or method step shown by that same numeral in any subsequent drawing herein.

[0026] FIG. 1 exemplarily illustrates a top perspective view of an embodiment of a medical diagnostic kit.

[0027] FIG. 2 exemplarily illustrates a perspective view of an embodiment of a universal cable storage compartment of the medical diagnostic kit.

[0028] FIG. 3 exemplarily illustrates a perspective view of an embodiment of a deck of the medical diagnostic kit.

[0029] FIG. 4 exemplarily illustrates a bottom perspective view of a lower shell of a casing of an embodiment of the medical diagnostic kit.

[0030] FIG. 5 exemplarily illustrates a left side view of an embodiment of the medical diagnostic kit.

[0031] FIG. 6A exemplarily illustrates a cross-sectional view of an embodiment of the medical diagnostic kit taken along a section A-A shown in FIG. 5.

[0032] FIG. 6B exemplarily illustrates an enlarged view of a door and exhaust fan assembly section marked B in FIG. 6A.

[0033] FIG. 7A exemplarily illustrates a top perspective view of an embodiment of the medical diagnostic kit comprising a secondary camera.

[0034] FIG. 7B exemplarily illustrates a front perspective view of the medical diagnostic kit shown in FIG. 7A.

[0035] FIG. 8 illustrates a block diagram showing an exemplary implementation of internal components of an embodiment of the medical diagnostic kit.

[0036] FIG. 9 exemplarily illustrates a block diagram showing an implementation of a stethoscope interface component in an embodiment of the medical diagnostic kit.

[0037] FIGS. **10A-10D** exemplarily illustrate different views of a magnetic charging connector system implemented with an accessory of a clinical examination device for quick removal of the accessory from the medical diagnostic kit.

[0038] FIGS. **11A-11D** exemplarily illustrate different views of the magnetic charging connector system implemented with an accessory of a clinical examination device for quick stowage of the accessory in the medical diagnostic kit.

[0039] FIG. **12** exemplarily illustrates a flowchart of an embodiment of a method for charging clinical examination devices accommodated in the medical diagnostic kit.

[0040] FIG. **13** exemplarily illustrates a flowchart of an embodiment of a method for operating the medical diagnostic kit for performing a medical examination.

[0041] FIG. **14** illustrates a telemedicine system for practicing telemedicine.

[0042] FIGS. **15** and **16** illustrate screenshots of a graphical user interface (GUI) rendered by a software application showing lists of clinical examination devices connected to the medical diagnostic kit.

[0043] FIG. **17** illustrates an appointment log created by the software application.

[0044] FIGS. **18A-18G** illustrate configuration screens of the various clinical examination devices.

[0045] FIG. **19** illustrates a screenshot of the graphical user interface (GUI) rendered by the software application on a display screen of the diagnostic computer showing a button to place the medical diagnostic kit in the maintenance mode.

[0046] FIG. **20** illustrates a user profile displayed on the display screen of the diagnostic computer after the medical diagnostic kit authenticates the user.

[0047] FIG. **21** illustrates a screenshot of the graphical user interface (GUI) rendered by the software application on the diagnostic computer for accessing messages stored in the medical diagnostic kit.

[0048] FIG. **22** illustrates a method for practicing telemedicine.

[0049] FIG. **23** illustrates a Graphical User Interface (GUI) rendered by the software application on a display screen of the diagnostic computer showing specific medical examinations and procedures suggested by a health care practitioner.

[0050] FIG. **24** illustrates a Graphical User Interface (GUI) rendered by the software application showing instructions issued remotely to an operator by the remote health care practitioner for a selected procedure.

[0051] FIG. **25** illustrates a Graphical User Interface (GUI) rendered by the software application showing an order of the clinical examination devices that should be used for the selected procedure.

[0052] FIG. **26** illustrates a Graphical User Interface (GUI) rendered by the software application on the display screen of the diagnostic computer showing the procedures requested by the remote health care practitioner.

[0053] FIG. **27** illustrates a GUI rendered on the display screen of the Remote Computing Device of the remote health care practitioner.

[0054] FIG. **28** illustrates a command window displayed by the software application showing textual and video instructions on how to perform a procedure requested by the remote health care practitioner.

DETAILED DESCRIPTION

[0055] FIG. 1 exemplarily illustrates a top perspective view of an embodiment of a medical diagnostic kit **100**. The medical diagnostic kit **100** is configured for use as a clinical aid to provide vital signs and telemetered data to health care practitioners, health care professionals, and medical professionals. The medical diagnostic kit **100** provides tools for medical examinations comprising, for example, electrocardiograms, blood pressure, temperature, and visual examinations to be relayed by telemetry. In an embodiment, the medical diagnostic kit **100** provides a user-friendly, web-based platform with an integrated video/audio conference connection enabling remote, real-time medical examinations. Medical data recorded during the remote, real-time medical examinations is securely stored electronically for future diagnostic and/or therapeutic use. The tools provided by the medical diagnostic kit **100** comprise, for example, clinical examination devices and accessories for remote and in-home use. The clinical examination devices are medical instruments comprising, for example, an auscultation device or a stethoscope **122** such as a digital stethoscope of Thinklabs Medical LLC, an electrocardiograph (ECG) **119** such as the Universal ECG[®] of QRS Diagnostic, LLC, an otoscope **124** such as the Welch Allyn[®] otoscope of Welch Allyn, Inc., an ultrasound device (not shown), a thermometer (not shown), a blood pressure monitor **120** such as the ABPM50 ambulatory blood pressure monitor of Contec Medical Systems USA, Inc., an oximeter **121** such as the CMS50DL pulse oximeter of Contec Medical Systems USA, Inc., a secondary camera **147** exemplarily illustrated in FIGS. 7A-7B, a multi-organ imaging system **118** configured, for example, as a throat exam camera, a skin exam camera, etc.

[0056] In an embodiment, the medical diagnostic kit **100** is configured for use by trained health care professionals for remote and in-home medical examination of patients. The medical diagnostic kit **100** is configured to be set up in a clean environment and on a firm flat surface. The medical diagnostic kit **100** allows a secure, interactive, two-way, real-time communication between a patient or an operator of the medical diagnostic kit **100** attending to the patient at the patient's location and a health care practitioner, for example, a physician, at a remote site. The operator of the medical diagnostic kit **100** is, for example,

a trained, onsite care coordinator (OCC), a nurse, or a technician who acts as the “physician’s hands” at the patient’s location to conduct in-depth screenings and medical examinations using hospital-grade, United States Food and Drug Administration (FDA) approved diagnostic equipment deployed in the medical diagnostic kit **100**. The OCCs are, for example, medical assistants or nurses who act as exam facilitators and the “physician’s hands” at the patient site, employing the clinical examination devices from the medical diagnostic kit **100** under continual, real-time audio/video observation and direction by a remotely-connected physician. The medical diagnostic kit **100** facilitates a two-way continuous conversation between a patient or the OCC and a physician, where the physician sees the patient, the physician sees the OCC, and the physician sees the telemetry of the clinical examination devices and can remotely conduct the medical examination, if needed.

[0057] The medical diagnostic kit **100** disclosed herein comprises a casing **101**, a universal cable storage compartment **126** exemplarily illustrated in FIG. 2, a deck **130** exemplarily illustrated in FIG. 3, a cushioning member **105**, a console **108**, one or more energy storage devices, for example, a power bank **154** with a charging gauge exemplarily illustrated in FIG. 8, a hubs disconnection switch **144** exemplarily illustrated in FIG. 6A and FIG. 8, a disconnection member **112**, and one or more computing devices **114**, **115**, and **149** exemplarily illustrated in FIG. 8. At least one of the computing devices **114**, **115**, and **149** is configured with a wide bandwidth data transmission capability, for example, a broadband capability. The casing **101** comprises an upper shell **102**, that is, a top lid, and a lower shell **103** connected to each other via a hinged connection constituted by one or more hinges **104**. In an embodiment as exemplarily illustrated in FIG. 1, two, spaced apart hinges **104** are connected between the upper shell **102** and the lower shell **103** of the casing **101** for configuring the casing **101** in an open position and a closed position. As used herein, the “open position” of the casing **101** refers to a condition of the casing **101** where the upper shell **102** is detached from the lower shell **103** and opened to expose the contents of the medical diagnostic kit **100**. Also, as used herein, the “closed position” of the casing **101** refers to a condition of the casing **101** where the upper shell **102** is folded over the lower shell **103** and detachably attached to the lower shell **103** to enclose and cover the

contents of the medical diagnostic kit **100**. The upper shell **102** is in movable relation to the lower shell **103** via the hinges **104** between the open position and the closed position of the casing **101**. As exemplarily illustrated in FIG. **1**, the upper shell **102** is a lid configured to open and close the casing **101**.

[0058] In an embodiment, the medical diagnostic kit **100** comprises a latch (not shown) for securing the upper shell **102** to the lower shell **103** of the casing **101**. In an embodiment, the medical diagnostic kit **100** comprises a padlock with a key (not shown) for locking the upper shell **102** to the lower shell **103** of the casing **101**. In another embodiment, the padlock is a numeric padlock requiring a numerical combination to open the padlock, and in turn, the casing **101**. The upper shell **102** of the casing **101** comprises an upper support wall **102a** adjoined by side walls **102b**, **102c**, **102d**, and **102e** oriented substantially perpendicular to the upper support wall **102a** to define an upper cavity **102f**. The lower shell **103** of the casing **101** comprises a lower support wall **103a** adjoined by side walls **103b**, **103c**, **103d**, and **103e** oriented substantially perpendicular to the lower support wall **103a** to define a lower cavity **103f**. In an embodiment as exemplarily illustrated in FIG. **1**, the upper shell **102** and the lower shell **103** are shaped similar to an open rectangular cuboid. The upper shell **102** and the lower shell **103** define an inner volume in the upper cavity **102f** and the lower cavity **103f** respectively, for accommodating the contents of the medical diagnostic kit **100**. The upper shell **102** and the lower shell **103** are made, for example, of impact-resistant, light plastic materials.

[0059] The universal cable storage compartment **126** exemplarily illustrated in FIG. **2** and the deck **130** exemplarily illustrated in FIG. **3** are accommodated in the casing **101**. In an embodiment, the deck **130** is accommodated over the universal cable storage compartment **126** in the lower cavity **103f** of the lower shell **103** of the casing **101** as exemplarily illustrated in FIG. **6A**. The structure and the function of the universal cable storage compartment **126** and the deck **130** are disclosed in the detailed descriptions of FIG. **2** and FIG. **3** respectively. The cushioning member **105** is made, for example, from closed cell foam sheets of polyethylene (PE) #2 and #4 glued together. The cushioning member **105**, for example, a foam block, comprises slots **105a**, **105b**, **105c**, **105d**, and **105f**

positioned on the deck **130** in correspondence to cutouts, that is, openings **131a**, **131b**, **131c**, **131d**, **131e**, and **131f** of the deck **130** and cable compartments **129a**, **129b**, **129c**, **129d**, **129e**, and **129f** of the universal cable storage compartment **126** exemplarily illustrated in FIGS. 2-3. For example, the slots **105a**, **105b**, and **105c** of the cushioning member **105** correspond to the cutouts **131a**, **131b**, and **131c** of the deck **130** and the cable compartments **129a**, **129b**, and **129c** of the universal cable storage compartment **126** respectively, while the slot **105d** of the cushioning member **105** corresponds to the cutouts **131d** and **131e** of the deck **130** and the cable compartments **129d** and **129e** of the universal cable storage compartment **126**. The slot **105e** of the cushioning member **105** corresponds to the cutout **131g** of the deck **130** exemplarily illustrated in FIG. 3. The slot **105f** of the cushioning member **105** corresponds to the cutout **131f** of the deck **130** and the cable compartment **129f** of the universal cable storage compartment **126** exemplarily illustrated in FIG. 3. The slots **105a**, **105b**, **105c**, **105d**, **105e**, and **105f** of the cushioning member **105** are configured according to shapes of the clinical examination devices and the accessories to protectively accommodate the clinical examination devices and the accessories in multiple configurations during transportation and deployment of the medical diagnostic kit **100**.

[0060] The accessories comprise, for example, one or more input devices and one or more output devices configured to interface with one or more of the computing devices **114** and **115**; ECG electrodes **119a** exemplarily illustrated in FIG. 8; etc. One or more input devices comprise, for example, a headset **803** with a microphone exemplarily illustrated in FIGS. 8-9, a secondary camera **147** exemplarily illustrated in FIGS. 7A-7B, and a wireless keyboard. The wireless keyboard is, for example, a Bluetooth[®]-enabled keyboard (not shown) with a touchpad mouse configured to interface with the computing devices **114**, **115**, and **149** exemplarily illustrated in FIG. 8. The output device(s) comprises, for example, a wireless speaker **123**. In an embodiment, the slot **105e** of the cushioning member **105** protectively accommodates the wireless speaker **123**, for example, a Bluetooth[®] speaker of Bluetooth Sig, Inc. The wireless speaker **123** is paired with one of the computing devices, for example, a diagnostic computer **114** to output voice from the diagnostic computer **114**. The removable, wireless speaker **123** is provided, for example,

for hearing-impaired patients. The wireless speaker **123** receives digital audio streams wirelessly from the diagnostic computer **114**, for example, via a Bluetooth® communication protocol, and decompresses, decodes, and amplifies the audio for facilitating communication between a remote health care practitioner and a hearing-impaired patient who cannot hear regular speakers provided in the diagnostic computer **114**. The wireless speaker **123** is positioned near the patient's ears to allow the patient to hear the remote health care practitioner's voice better. The wireless speaker **123** and the headset **803** allow two-way communication between an operator of the medical diagnostic kit **100**, the patient, and the remote health care practitioner. In an embodiment, the accessories further comprise batteries of one or more of the clinical examination devices, for example, an illuminator battery **124a** of the otoscope **124** herein referred to as an otoscope illuminator battery **124a**.

[0061] In an embodiment, the clinical examination devices and the accessories are accommodated on an upper surface **130c** of the deck **130** in the cutouts **131a**, **131b**, **131c**, **131d**, **131e**, and **131f** of the deck **130** exemplarily illustrated in FIG. 3, with the cushioning member **105** having a specific thickness to level the clinical examination devices and the accessories on the upper surface **130c** of the deck **130**. In another embodiment, the clinical examination devices and the accessories are accommodated directly on the upper surface **130c** of the deck **130** in the cutouts **131a**, **131b**, **131c**, **131d**, **131e**, and **131f** of the deck **130** as disclosed in the detailed description of FIG. 3. In an embodiment, the cushioning member **105** comprises airflow channels **106** configured to connect and provide fluid communication between the lower cavity **103f** of the lower shell **103** of the casing **101** and the upper cavity **102f** of the upper shell **102** of the casing **101**. The airflow channels **106** in the cushioning member **105** are in fluid communication with the lower cavity **103f** and the upper cavity **102f** for circulating air between the lower cavity **103f** and the upper cavity **102f** of the casing **101**. In an embodiment, the airflow channels **106** are in fluid communication with air circulation holes **133** configured proximal to an edge **130a** of the deck **130** as exemplarily illustrated in FIG. 3. The air circulation holes **133** are configured to assist in movement of forced air provided by an air-cooling fan system **153** exemplarily illustrated in FIG. 6A and FIG. 8, during charging of the computing devices **114**, **115**, and

149, the clinical examination devices, the accessories, and other devices accommodated in the upper cavity **102f** of the upper shell **102** of the casing **101**, powered by a multi-port charger **150** exemplarily illustrated in FIG. **8**. The air circulation holes **133** allow transfer and movement of the forced air from the lower cavity **103f** to the upper cavity **102f** of the casing **101**.

[0062] The console **108** is positioned inside the casing **101**. In an embodiment, the console **108** is attached to one of the side walls **103b**, **103c**, **103d**, and **103e** inside the casing **101**. For example, the console **108** is attached to the side wall **103e** of the lower shell **103** of the casing **101** as exemplarily illustrated in FIG. **1**. In another embodiment, the console **108** is attached to the deck **130**. The console **108** comprises multi-port hubs **156** and **157**, for example, universal serial bus (USB) hubs exemplarily illustrated in FIG. **8**, configured to permanently and securely connect individual cable connectors, for example, USB connectors, of the clinical examination devices and the accessories, and selectively power and communicate data with one or more of the clinical examination devices and the accessories. The clinical examination devices and one or more of the accessories are securely and permanently connected to switchable ports **156a** and **157a** of the multi-port hubs **156** and **157** respectively, exemplarily illustrated in FIG. **8**, via the individual cable connectors and respective cable ties. Each of the switchable ports **156a** and **157a** of the multi-port hubs **156** and **157** respectively, are configured to be switched on and off, for example, using illuminating control elements **109**.

[0063] In an embodiment, the medical diagnostic kit **100** further comprises a headset jack **111** positioned at a predetermined mounting location in the casing **101**. The headset jack **111** is configured to connect a headset **803** exemplarily illustrated in FIGS. **8-9**, for use during auscultation. For example, the headset jack **111** is operably coupled in the console **108** as exemplarily illustrated in FIG. **1**, or on another mounting device in the casing **101**, for use with the headset **803** during auscultation. In another embodiment, the medical diagnostic kit **100** further comprises an auxiliary port **110**, for example, a USB connector, positioned at a predetermined mounting location in the casing **101**. The auxiliary port **110** is configured to facilitate external connections to one of the multi-port

hubs **156** and **157**. For example, in an embodiment as exemplarily illustrated in FIG. **1**, the auxiliary port **110** is operably coupled, for example, in the console **108**, for facilitating external connections to one of the multi-port hubs **156** and **157**. In another embodiment, the auxiliary port **110** is operably coupled to the deck **130** proximal to the patient undergoing a remote medical examination. In another embodiment, the auxiliary port **110** is configured on the upper shell **102** and/or the lower shell **103** of the casing **101** for facilitating external connections to one of the multi-port hubs **156** and **157**, when the casing **101** is in an open position. The auxiliary port **110** is operably coupled to a switching port **157a** of the multi-port hub **157** exemplarily illustrated in FIG. **8**, for delivering power to the external connections and executing data exchange with the external connections, for example, with an external USB device.

[0064] In another embodiment, the medical diagnostic kit **100** further comprises illuminating control elements **109** positioned on the console **108**. The illuminating control elements **109** are operably coupled to switchable ports **156a** and **157a** of the multi-port hubs **156** and **157** respectively. The illuminating control elements **109**, for example, illuminating switches or buttons, are configured to activate or deactivate one or more of the clinical examination devices and one or more of the accessories engaged in a particular medical examination to save battery power and facilitate data bus sharing such as USB bus sharing. The illuminating control elements **109** are configured to switch on or off a particular clinical examination device according to a diagnostic scenario to save battery power. An operator of the medical diagnostic kit **100** may activate one of the illuminating control elements **109** corresponding to a particular clinical examination device used for examining a patient according to a diagnostic scenario and deactivate the other illuminating control elements **109** corresponding to the other clinical examination devices and accessories. By deactivating the other illuminating control elements **109**, the power from the energy storage device(s) **154** to the switchable ports **156a** and **157a**, for example, the USB ports, of the multi-port hubs **156** and **157** respectively, exemplarily illustrated in FIG. **8**, to which the individual cable connectors of the clinical examination devices and the accessories are connected, is interrupted, thereby saving power. The illuminating control elements **109** provide visual information to the operator about a switchable port **156a** or

157a being energized. The cables of the clinical examination devices and the accessories terminate at their respective connectors which are connected to the switchable ports **156a** and **157a** of the multi-port hubs **156** and **157** respectively. These cables are, for example, power supply and data communication or exchange cables such as USB cables.

[0065] The disconnection member **112** is operably connected between the upper shell **102** and the lower shell **103** of the casing **101**. In an embodiment, the disconnection member **112** is a switch lever operably coupled to an edge **108a** of the console **108** as exemplarily illustrated in FIG. 1. In another embodiment, the disconnection member **112** is a sensor operably connected between the upper shell **102** and the lower shell **103** of the casing **101** and configured to detect the closed position of the casing **101**. The disconnection member **112** is in operable communication with the hubs disconnection switch **144** exemplarily illustrated in FIG. 6A and FIG. 8. The hubs disconnection switch **144** is operably coupled to the energy storage device(s) **154** and external power jacks **156b** and **157b** of the multi-port hubs **156** and **157** as exemplarily illustrated in FIG. 8. The hubs disconnection switch **144**, when activated by the disconnection member **112**, is configured to interrupt delivery of power from the energy storage device(s) **154** to the multi-port hubs **156** and **157**, when the casing **101** is in the closed position to save battery power, and in compliance with air transportation safety rules. When the upper shell **102** of the casing **101** is closed, the disconnection member **112** turns and activates the hubs disconnection switch **144**. In another embodiment (not shown), the disconnection member comprises a magnet (not shown) attached to the upper shell **102** and a reed relay (not shown) housed underneath the console **108**. In this embodiment, when the upper shell **102** of the casing **101** is closed, the magnet, in operable communication with the reed relay, activates the hubs disconnection switch **144** to interrupt the delivery of the power from the energy storage device(s) **154** to the multi-port hubs **156** and **157**. The disconnection member **112** activates the hubs disconnection switch **144** to disconnect the energy storage device(s) **154** when the casing **101** is in a fully closed position for transporting the medical diagnostic kit **100** and preserving the internal energy of the energy storage device(s) **154**.

[0066] When the casing **101** is connected to a power source, for example, an alternating current (AC) power source, during an AC charging operation, the energy storage device(s) **154** is configured to receive power from the multi-port charger **150**. When the casing **101** is in the open position and disconnected from the power source, the power stored in the energy storage device(s) **154** is used to power the clinical examination devices and the accessories via the multi-port hubs **156** and **157**. When the casing **101** is in the closed position and disconnected from the power source, the disconnection member **112** activates the hubs disconnection switch **144** to disconnect the energy storage device(s) **154** from the multi-port hubs **156** and **157**, thereby interrupting power from being delivered to power up the clinical examination devices and the accessories and precluding discharging of the energy storage device(s) **154**.

[0067] The computing devices **114** and **115** are supportably positioned in the casing **101**. In an embodiment, the computing devices **114** and **115** are supportably positioned in the upper cavity **102f** of the upper shell **102** of the casing **101**. In an embodiment, one of the computing devices is a diagnostic computer **114**, for example, a Microsoft Surface[®] Pro 7 computing device of Microsoft Corporation with a 10th Gen Intel[®] Core[™] i5 processor. In an embodiment, the diagnostic computer **114** is accommodated in a device holder **125** positioned in the casing **101**, for example, in the upper cavity **102f** of the upper shell **102** of the casing **101**. In an embodiment, the device holder **125** is attached to the casing **101** via an attachment member (not shown), for example, a spherical holder, to provide training of a video camera (not shown) of the diagnostic computer **114** on the patient. The diagnostic computer **114** is configured to (a) activate one or more of the clinical examination devices; (b) execute media conference connections, for example, audio/videoconference connections; (c) receive, create, record, process, store, and securely transmit medical data from one or more of the clinical examination devices to a data store or a data storage device via a communication network, for example, a wireless communication network; and (d) facilitate remote real-time medical examinations via a software application deployed on the diagnostic computer **114**. The software application in the diagnostic computer **114** is configured to activate and operate the clinical examination devices selected by the illuminating control elements **109**. In an embodiment,

the software application is a web-based application with audio/videoconference connections for conducting remote real-time medical examinations. In an embodiment, the software application is implemented on a Health Insurance Portability and Accountability Act (HIPAA)-compliant data streaming and store-and-forward platform.

[0068] The software application creates medical data that is temporarily stored in the diagnostic computer **114**. The software application transfers the medical data over a secure wideband, stable, wireless connection to the data storage device. If a communication link to the physician's remote computing device is not available, the medical diagnostic kit **100** is configured to store medical data, for example, the patient's vital signs, sonograms, electrocardiograms (ECGs), auscultation sounds, camera images, etc., securely in an internal storage device for a later upload or an artificial intelligence (AI)-enabled batch upload to the physician's remote computing device, when the communication network is available. In an embodiment, the software application transfers the medical data over a secure wideband, stable, wireless connection to a cloud data store in a cloud computing environment. As used herein, "cloud computing environment" refers to a processing environment comprising configurable, computing, physical and logical resources, for example, networks, servers, storage media, virtual machines, applications, services, etc., and data distributed over a communication network, for example, the internet. The cloud computing environment provides an on-demand network access to a shared pool of the configurable computing physical and logical resources. The medical data is stored in the cloud data store in a digital format for future diagnostic or therapeutic use. In an embodiment, upon successful transfer of the medical data, the software application removes the medical data from the diagnostic computer **114**. The diagnostic computer **114** allows a user, for example, an operator of the medical diagnostic kit **100**, to sign in to the software application through a restricted user account and rotated password. After a period of inactivity, the software application displays a screen saver on the diagnostic computer **114**. After an additional period of inactivity, the software application locks the diagnostic computer **114** and requests the user to sign in again to regain access.

[0069] In an embodiment, the software application allows health care practitioners at a remote site to suggest the use of the clinical examination devices and the accessories in the medical diagnostic kit **100**. In this embodiment, the software application is configured to display, on the diagnostic computer **114**, a panel of the clinical examination devices and the accessories accommodated in the medical diagnostic kit **100** and indications of one or more of the clinical examination devices and the accessories on the panel suggested by a health care practitioner at a remote site for usage during the remote real-time medical examinations. The health care practitioner will have a copy of the panel in their remote application and by activating a clinical examination device or accessory remotely, the onsite operators of the medical diagnostic kit **100** at the patient's location receive the indication that visually suggests to them to apply the activated clinical examination device or accessory to the patient.

[0070] In an embodiment, another one of the computing devices is a communication device **115** in operable communication with the diagnostic computer **114** via the communication network. The communication device **115** is configured to display a media stream, for example, a video stream, from one or more of the clinical examination devices. In an embodiment, the communication device **115** is configured to remotely control the software application deployed on the diagnostic computer **114**. In an embodiment, the communication device **115** is a tablet computing device comprising a display unit **115a** configured to assist in aiming a camera lens of one of the clinical examination devices, for example, the multi-organ imaging system **118**, and visualizing one or more of multiple organs, for example, eyes, nose, throat, skin, etc., of a patient. The display unit **115a** is configured to receive and display a media stream, for example, a video stream, of each of the visualized organs captured by the clinical examination device(s), for example, **118**, via the camera lens. In an embodiment, the communication device **115** is accommodated in a removable device holder **116** lockably positioned in the casing **101**, for example, in the upper cavity **102f** of the upper shell **102** of the casing **101**. When unlocked and removed from the casing **101**, the device holder **116** is configured to assist in attaching the communication device **115** to one or more of the clinical examination devices, for example, a camera device such as a throat or skin exam camera. In an embodiment, the device holder

116 is removable during use and configured to be locked in position in the casing **101** using an attachment member (not shown). The removable device holder **116** is configured to be unlocked and slid out from the attachment member for attachment to other clinical examination devices, for example, a throat or skin exam camera, via a mechanical coupling such as a ball coupling. FIG. 1 exemplarily illustrates the removable device holder **116** in an unlocked position ready to be taken out of the casing **101**. In the unlocked position, the communication device **115** is ready to be pulled out along with the removable device holder **116**. In an embodiment, the removable device holder **116** with the communication device **115** is configured to be detachably attached to a spherical mounting member (not shown) extending from one of the clinical examination devices, for example, the multi-organ imaging system **118**, for conducting an ear, nose, and throat (ENT) and skin examination using the display unit **115a** of the communication device **115**.

[0071] In an embodiment, the medical diagnostic kit **100** further comprises a device holder **117** positioned in the casing **101**, for example, in the upper cavity **102f** of the upper shell **102** of the casing **101**, for accommodating another computing device, for example, a network-enabled mobile phone **149** exemplarily illustrated in FIG. 8. In an embodiment, the device holder **117** that accommodates the network-enabled mobile phone **149** is non-removable. The network-enabled mobile phone **149** is configured, for example, as a mobile hotspot, to provide access of a wireless communication network, for example, a fourth generation (4G) wireless network, a fifth generation (5G) wireless network, the Wi-Fi[®] communication network of Wi-Fi Alliance Corporation, a satellite communication network provided by a satellite internet constellation such as the Starlink[®] internet constellation operated by Space Exploration (SpaceX) Technologies Corporation, etc., to the diagnostic computer **114** and the communication device **115**.

[0072] The removable device holder **116** holds the communication device **115**. In an embodiment, a lockable slider (not shown) with a ball capture component (not shown), for example, a chuck, is attached to a rear surface of the removable device holder **116**. The lockable slider interacts with rails configured on a pivotable receiver **116a** attached to the upper support wall **102a** of the upper shell **102** of the casing **101**. The lockable slider moves

along the rails of the pivotable receiver **116a**. The lockable slider latches into a stow position with the device holder **116** holding the communication device **115** positioned parallel to the upper support wall **102a** of the upper shell **102** of the casing **101**. The lockable slider is unlatched by pressing down on the device holder **116** to disengage a latch of the lockable slider. The rails of the pivotable receiver **116a** then pivot out and the device holder **116** attached to the lockable slider can be pulled up and out with the communication device **115**. The device holder **116** with the communication device **115** is stowed by engaging the lockable slider back into the rails in a downward direction and pivoting the rails back till the latch of the lockable slider engages and locks the device holder **116** in position.

[0073] The lockable slider is unlocked by pushing the device holder **116** down, pivoted out as exemplarily illustrated in FIG. 1, and then slid out from the pivotable receiver **116a** with the communication device **115** as a single unit. In an embodiment, the device holder **116** with the communication device **115** is configured to be held in the hands of an operator of the medical diagnostic kit **100**, for example, a technician, to control the diagnostic computer **114** or interface with corresponding clinical examination devices, for example, an ultrasound device (not shown). An operator of the medical diagnostic kit **100** may hold the pulled-out communication device **115** in their hands to control the diagnostic computer **114** or to interface with corresponding clinical examination devices. The ball capture component behind the device holder **116** holding the communication device **115** is also attachable to a ball mount of a clinical examination device, for example, a throat or skin exam camera, to assist in aiming of the camera. After concluding a medical examination using the camera, the device holder **116** with the communication device **115** is disengaged from the ball mount of the camera and the camera is returned into a corresponding slot, for example, **105f**, of the cushioning member **105**. The device holder **116** with the communication device **115** is configured to be attached to other devices having ball mounts to which the ball capture component of the device holder **116** can attach.

[0074] The device holder **116** assists in handling the communication device **115** by providing additional elements, for example, the ball capture component, for the operator to

hold onto. When communication device operations are completed, the device holder **116** with the communication device **115** is slid back into the pivotable receiver **116a** and pivoted back for locking in place parallel to the upper support wall **102a** of the upper shell **102** of the casing **101** to save space in a stowable position. In an embodiment, the device holder **125** that holds the diagnostic computer **114** is movably positioned in the upper shell **102** of the casing **101**. The device holders **116** and **125** are configured to hold computing devices of different sizes and are configured to be attached to similar ball mounts are disclosed above. The device holder **125** is pivotably connected to the upper support wall **102a** of the upper shell **102** of the casing **101**. The device holder **125** is configured to assist in aiming a camera of the diagnostic computer **114** when pivoted. In an embodiment, the device holder **125** attaches to a ball mount (not shown) positioned on the upper support wall **102a** of the upper shell **102** of the casing **101**. The device holder **125** pivots about the ball mount, thereby allowing pivoting of the diagnostic computer **114** accommodated in the device holder **125** to aim at a patient. In an embodiment, the device holder **117** is attached to a ball mount (not shown) positioned on the upper support wall **102a** of the upper shell **102** of the casing **101**. In an embodiment, the device holders **117** and **125** are not removable during normal operations and are removed for service.

[0075] In an embodiment, the device holders **116**, **117**, and **125** are spring-loaded and are configured to securely hold computing devices of different sizes, for example, **115**, **149**, and **114** respectively. In an embodiment, lockable sliders with ball capture components (not shown) are attached to the rear surfaces of the device holders **116**, **117**, and **125** and operate as disclosed above. In an embodiment, the ball capture component of the device holder **116** is configured to connect to a ball mount of a clinical examination device, for example, a camera. In another embodiment, the ball capture components of the device holders **117** and **125** are friction locked to respective ball mounts attached to the upper support wall **102a** of the upper shell **102** of the casing **101**. The ball mount configured for the device holder **125** allows pivoting in a predefined range of a videoconferencing camera of the diagnostic computer **114** towards the patient. In an embodiment, the ball capture component of the device holder **117** is fastened firmly to its

ball mount on the upper support wall **102a** of the upper shell **102** of the casing **101** and is therefore not removable.

[0076] In an embodiment, a side door **113** is hinged to a door frame **137** attached to one of the side walls **103b**, **103c**, **103d**, and **103e** of the casing **101**. For example, the side door **113** is exteriorly positioned on the side wall **103d** of the lower shell **103** of the casing **101** via a door hinge **113a**. The side door **113** covers a gasket **136** positioned within the door frame **137** exemplarily illustrated in FIG. 4, thereby providing dust and water proofing. The medical diagnostic kit **100** further comprises inlet ports and outlet ports as disclosed in the detailed description of FIG. 4. The inlet ports and the outlet ports are positioned, for example, on the side wall **103d** of the casing **101**. The side door **113** is configured to close over the gasket **136** within the door frame **137** and protect the inlet ports and the outlet ports from dust, water, and other external elements. As exemplarily illustrated in FIG. 1, another slot **105g** of the cushioning member **105** exposes an air intake grill **107a** of a fan protector **107** affixed to the deck **130** as exemplarily illustrated in FIG. 3. The air intake grill **107a** receives air flow from the upper cavity **102f** of the upper shell **102** of the casing **101** and passes the air towards an outlet port, for example, a louver **139**, on the side wall **103d** of the casing **101** exemplarily illustrated in FIG. 4, to cool down the energy storage device(s) **154**, the multi-port charger **150**, the computing devices **114**, **115**, and **149**, the clinical examination devices, and the accessories during charging thereof.

[0077] The medical diagnostic kit **100** is provided to users or operators, for example, onsite care coordinators (OCCs), nurses, technicians, etc., with instructions, guidance, out-of-range warnings, hazardous situation warnings, battery capacity gauges, electrical shock protection, device operation instructions, cleaning and sterilization instructions, connector and cable support instructions, customer support instructions, etc. Users, for example, telepresenters, OCCs, etc., are dispatched with the medical diagnostic kits **100** to patient locations while remote health care practitioners, for example, physicians, are waiting online to conduct remote physical data-unreached medical examinations. In an embodiment, the medical diagnostic kit **100** is lightweight and portable.

[0078] FIG. 2 exemplarily illustrates a perspective view of an embodiment of the universal cable storage compartment **126** of the medical diagnostic kit **100** shown in FIG. 1. The universal cable storage compartment **126** is accommodated in the casing **101**. In an embodiment, the universal cable storage compartment **126** is accommodated in the lower cavity **103f** of the lower shell **103** of the casing **101** exemplarily illustrated in FIG. 1. In an embodiment, the universal cable storage compartment **126** is of a generally rectangular shape as exemplarily illustrated in FIG. 2. The universal cable storage compartment **126** is made, for example, from a lightweight plastic or a metal alloy such as a magnesium silicide type of wrought aluminum or aluminum 6062. The universal cable storage compartment **126** comprises movable dividers **127** and subdividers **128** configured to create configurable cable compartments **129a**, **129b**, **129c**, **129d**, and **129e** or holders for accommodating cables (not shown) used to connect multiple clinical examination devices to the multi-port hubs **156** and **157** exemplarily illustrated in FIG. 8, without mutual entanglement. For example, the cable compartments **129a**, **129b**, **129c**, **129d**, **129e**, and **129f** accommodate cables of the otoscope **124**, the electrocardiograph **119**, the blood pressure monitor **120**, the oximeter **121**, the stethoscope **122**, and the multi-organ imaging system **118** respectively, as exemplarily illustrated in FIG. 1. The individual cables are coiled in separate cable compartments **129a**, **129b**, **129c**, **129d**, **129e**, and **129f** divided by the dividers **127** and the subdividers **128**. The dividers **127** are configured to create large cable compartments **129a**, **129b**, **129c**, and **129f** for accommodating large cables of large clinical examination devices, while the subdividers **128** are configured to create small cable compartments **129d** and **129e** for accommodating small cables of small clinical examination devices. The dividers **127** and the subdividers **128** are movable to accommodate cables of future variants of the clinical examination devices.

[0079] In an embodiment, the universal cable storage compartment **126** further comprises flanges **126a** protruding from the edges **126b** of the universal cable storage compartment **126**. The flanges **126a** provide an attachment surface for attaching the deck **130** to the universal cable storage compartment **126** in the lower cavity **103f** of the lower shell **103** of the casing **101** exemplarily illustrated in FIG. 1 and FIG. 6A. The universal cable storage compartment **126** further comprises openings **126c** through which connectors

of the cables of the clinical examination devices are inserted, extended, and affixed to the switchable ports **156a** and **157a** of the multi-port hubs **156** and **157** respectively, exemplarily illustrated in FIG. 8. In an embodiment, the universal cable storage compartment **126** further comprises a supplementary port **126d** positioned on a side wall **126e** of the universal cable storage compartment **126** for connecting a connector of a cable of one of the clinical examination devices or one of the accessories.

[0080] The universal cable storage compartment **126** is a dedicated storage compartment in the medical diagnostic kit **100** for accommodating the cables of the clinical examination devices in an orderly manner to prevent entanglement of the cables. The cable compartments **129a**, **129b**, **129c**, **129d**, **129e**, and **129f** formed by the movable dividers **127** and subdividers **128** allow accommodation of cables of clinical examination devices of different types, configurations, and future variants therewithin. The universal cable storage compartment **126** allows permanent cabling of the clinical examination devices to the multi-port hubs **156** and **157**. The universal cable storage compartment **126** provides integrated individual cable stowage under the clinical examination devices supported by the cutouts **131a**, **131b**, **131c**, **131d**, **131e**, and **131f** of the deck **130** exemplarily illustrated in FIG. 3.

[0081] FIG. 3 exemplarily illustrates a perspective view of an embodiment of the deck **130** of the medical diagnostic kit **100** shown in FIG. 1. The deck **130** is positioned on the universal cable storage compartment **126** exemplarily illustrated in FIG. 2. In an embodiment, the deck **130** is positioned over the universal cable storage compartment **126** in the lower cavity **103f** of the lower shell **103** of the casing **101** exemplarily illustrated in FIG. 1. The deck **130** positioned on the universal cable storage compartment **126** supports the clinical examination devices and the accessories. The deck **130** is made, for example, from a lightweight plastic or thin metal sheets such as thin aluminum sheets. The deck **130** comprises multiple cutouts **131a**, **131b**, **131c**, **131d**, **131e**, and **131f** positioned in a one-to-one correspondence to the configurable cable compartments **129a**, **129b**, **129c**, **129d**, **129e**, and **129f** of the universal cable storage compartment **126** respectively, exemplarily illustrated in FIG. 2. In an embodiment, the cutouts **131a**, **131b**, **131c**, **131d**, **131e**, and

131f of the deck **130** are configured to support the clinical examination devices and the accessories in multiple configurations and provide openings to the cable compartments **129a**, **129b**, **129c**, **129d**, **129e**, and **129f** respectively, for extension and stowage of the cables of the clinical examination devices and the accessories. The cutouts **131a**, **131b**, **131c**, **131d**, **131e**, and **131f** of the deck **130** correspond to individual divisions inside of the universal cable storage compartment **126** which accommodate individual cables of the clinical examination devices and the accessories.

[0082] The deck **130** provides a layout for accommodating the clinical examination devices on a surface layer. In an embodiment, the deck **130** further comprises a cutout **131g** used for accommodating an accessory, for example, a wireless speaker **123**, via the slot **105e** in the cushioning member **105** exemplarily illustrated in FIG. 1. In an embodiment, the medical diagnostic kit **100** further comprises air circulation holes **133** configured proximal to the edge **130a** of the deck **130**. In an embodiment, the air circulation holes **133** are positioned on a flange **130b** of the deck **130**. The air circulation holes **133** are configured to assist in movement of forced air provided by an air-cooling fan system **153** exemplarily illustrated in FIG. 8, during charging of the computing devices **114**, **115**, and **149**, the clinical examination devices, the accessories, and other devices accommodated in the upper cavity **102f** of the upper shell **102** of the casing **101**, powered by the multi-port charger **150**. For example, the air circulation holes **133** circulate air, for example, from the lower cavity **103f** defined by the lower shell **103** to the upper cavity **102f** defined by the upper shell **102** of the casing **101**.

[0083] In an embodiment, the deck **130** is configured to define a space **132** indicated by dashed lines in FIG. 3, for accommodating the console **108** of the medical diagnostic kit **100** exemplarily illustrated in FIG. 1. The console **108** is positioned proximal to and attached to an edge **130e** of the deck **130**. In an embodiment, the medical diagnostic kit **100** further comprises a fan protector **107** affixed to an upper surface **130c** of the deck **130**. The fan protector **107** is configured to protect an exhaust fan **145** of the air-cooling fan system **153** interiorly positioned proximal to the side wall **103d** or to the fan backplate **138** of the casing **101** as exemplarily illustrated in FIGS. 6A-6B. The exhaust fan **145** is

supported by the fan backplate **138** of the casing **101**. The fan protector **107** comprises the air intake grill **107a** that receives air flow from the upper cavity **102f** of the upper shell **102** of the casing **101** and passes the air towards louvers **139** on the fan backplate **138** exemplarily illustrated in FIG. **4** and FIG. **6B**. The cold outside air enters through the air intake port **141**, is directed by an intake fan (not shown) of the air-cooling fan system **153** to blow around the multi-port charger **150** and the internal energy storage device(s) **154** in the lower cavity **103f** of the lower shell **103** of the casing **101**, and travels up through the air circulation holes **133** of the deck **130** into the upper cavity **102f** of the upper shell **102** of the casing **101** exemplarily illustrated in FIG. **1**, FIGS. **6A-6B**, and FIG. **8**, to cool down the computing devices **114**, **115**, and **149**, the clinical examination devices, and the accessories, during charging thereof.

[0084] To accommodate a new instrument or clinical examination device layout, the medical diagnostic kit **100** requires only two components to be replaced, that is, the deck **130** and the cushioning member **105** exemplarily illustrated in FIG. **1**. The dividers **127** exemplarily illustrated in FIG. **2**, are movable for accommodating new device boundaries. In an embodiment, the cushioning member **105** is glued to the upper surface **130c** of the deck **130**. In an embodiment, an optional secondary deck (not shown) is attached on top of the cushioning member **105** to protect the upper surface of the cushioning member **105** from scratching.

[0085] FIG. **4** exemplarily illustrates a bottom perspective view of the lower shell **103** of the casing **101** of an embodiment of the medical diagnostic kit **100** shown in FIG. **1**. As exemplarily illustrated in FIG. **4**, the side door **113** is hinged to the door frame **137** exteriorly positioned on one of the side walls **103b**, **103c**, **103d**, and **103e** of the casing **101**. In an embodiment as exemplarily illustrated in FIG. **4**, the door frame **137** is exteriorly positioned on the side wall **103d** of the lower shell **103** of the casing **101**. The door frame **137** is attached to the side wall **103d** using fasteners **135**, for example, mounting screws. The side door **113** is connected to the door frame **137** using a hinge **113a** as exemplarily illustrated in FIG. **1** and FIG. **5**. The side door **113** is configured as a ventilation door. The inlet ports and outlet ports are also positioned on the side wall **103d** of the lower shell **103**

of the casing **101**. The side door **113** provides access to the inlet ports and the outlet ports of the medical diagnostic kit **100**. In an embodiment, the fan backplate **138** is exteriorly positioned on the side wall **103d** of the lower shell **103** of the casing **101**. A gasket **136** is positioned on the fan backplate **138** as a mechanical seal that fills a space between the fan backplate **138** and the side door **113**. The side door **113** is hinged to the door frame **137** to cover the gasket **136** and the fan backplate **138** and to protect the inlet ports and the outlet ports from dust, water, and other external elements. In an example, a locking thumb screw **142** is positioned on an external surface **113b** of the side door **113** for locking into a screw nut **134** positioned on the door frame **137**, thereby locking the side door **113** in a closed position over the gasket **136**.

[0086] In an embodiment, the inlet ports of the medical diagnostic kit **100** comprise an air intake port **141** and an alternating current (AC) fused inlet **140**. The air intake port **141** allows air to flow into the casing **101**, for example, into the lower cavity **103f** of the lower shell **103** of the casing **101** exemplarily illustrated in FIG. 1 and FIGS. 6A-6B, for cooling the contents of the casing **101**, for example, the energy storage device(s) **154**, the multi-port charger **150**, the computing devices **114**, **115**, and **149**, the clinical examination devices, and the accessories. In an embodiment, the air intake port **141** comprises a particle filtering element or an air filter (not shown) for filtering the air entering the casing **101**. In an embodiment, the medical diagnostic kit **100** further comprises an air-cooling fan system **153** exemplarily illustrated in FIG. 8. The air-cooling fan system **153** comprises cooling fans, for example, an exhaust fan **145** exemplarily illustrated in FIGS. 6A-6B, for exhausting heated internal air from the upper cavity **102f** of the casing **101**, and an intake fan (not shown) positioned in the lower cavity **103f** of the casing **101**. The intake fan draws air from the filtered air intake port **141** and blows the air, for example, on the multi-port charger **150** and the energy storage device(s) **154** exemplarily illustrated in FIG. 8, in the lower cavity **103f** of the lower shell **103** of the casing **101**.

[0087] The AC fused inlet **140** is configured, for example, as an AC socket such as an International Electrotechnical Commission (IEC) standard inlet, screw mounted, C14, to provide power from the AC power source to the multi-port charger **150** for charging the

energy storage device(s), for example, **154**, the computing devices **114**, **115**, and **149**, the clinical examination devices, and the accessories exemplarily illustrated in FIG. 8, inside the casing **101** when the casing **101** is connected to an AC power source. A power cord **159** of the AC power source is connected to the AC fused inlet **140** to power the multi-port charger **150**, and in turn, the energy storage device(s) **154**, the air-cooling fan system **153**, and the clinical examination devices, and accessories inside the casing **101** as exemplarily illustrated in FIG. 8. The AC fused inlet **140** allows powering of the multi-port charger **150**, operation of the air-cooling fan system **153**, and charging of rechargeable batteries of the energy storage device(s), for example, **154**, the computing devices **114**, **115**, and **149**, the clinical examination devices, and the accessories without opening the casing **101**.

[0088] In an embodiment, the outlet ports of the medical diagnostic kit **100** comprise the louvers **139** positioned in the fan backplate **138**. The louvers **139** are in fluid communication with the exhaust fan **145** positioned in the casing **101**, for example, in the lower cavity **103f** of the lower shell **103** of the casing **101** as exemplarily illustrated in FIGS. 6A-6B. The louvers **139** are a series of vents attached to one side of the exhaust fan **145** for regulating air flow up to and from the casing **101**. The louvers **139** regulate the air flow to preclude hot exhaust air from mixing with cold intake air flow, thereby increasing efficiency of air cooling. The louvers **139** are configured to direct heated internal air in an upward direction into the upper cavity **102f** of the casing **101** without mixing with incoming external or outside air flowing in the lower cavity **103f** of the casing **101** for optimal cooling in the medical diagnostic kit **100** and increasing cooling efficiency. In an embodiment, the fan protector **107** affixed to the deck **130** as exemplarily illustrated in FIG. 4, protects the exhaust fan **145** interiorly positioned proximal to the fan backplate **138** of the casing **101**. In an embodiment, the fan backplate **138** is configured to support the exhaust fan **145** interiorly positioned proximal to the side wall **103d**. In an embodiment, the fan backplate **138** further comprises a side USB port (not shown) for external connections.

[0089] FIG. 5 exemplarily illustrates a left side view of an embodiment of the medical diagnostic kit **100**. The left side elevation view illustrates the hinges **104** and the side door

113 positioned on the casing **101**. The side door **113** is closed during transportation and during an onsite medical examination. The side door **113** is opened when an alternating current (AC) power source is to be connected to the AC fused inlet **140** of the multi-port charger **150** exemplarily illustrated in FIG. 4 and FIG. 8, for charging the internal components of the medical diagnostic kit **100**. The side door **113** is also opened to expose the air intake port **141** and the louvers **139** for ventilation of the medical diagnostic kit **100** during AC charging. The side door **113** is oriented such that when an AC power cord **159** is plugged into the AC fused inlet **140**, the side door **113** cannot swing and inadvertently block the air intake port **141** and the louvers **139**. In an embodiment, the hinge **113a** of the side door **113** is positioned on a lower end **137a** of the door frame **137** for opening the side door **113** in a downward direction. In this embodiment, opening the side door **113** in the downward direction precludes the side door **113** from closing the air intake port **141** inadvertently. In an embodiment, the medical diagnostic kit **100** further comprises wheels **143** operably coupled to and extending from the lower support wall **103a** of the lower shell **103** of the casing **101**. The wheels **143** are used for transporting the medical diagnostic kit **100**.

[0090] FIG. 6A exemplarily illustrates a cross-sectional view of an embodiment of the medical diagnostic kit **100** taken along a section A-A shown in FIG. 5. The cross-sectional view shows the internal positioning of the components of the medical diagnostic kit **100** when the casing **101** is in the closed position. When the casing **101** is in the closed position, the hubs disconnection switch **144** is activated, interrupting power from the energy storage device(s) **154** to the multi-port hubs **156** and **157** exemplarily illustrated in FIG. 8. Furthermore, when the casing **101** is in the closed position or the open position, the side door **113** is opened for connecting an alternating current (AC) power cord **159** to the AC fused inlet **140** exemplarily illustrated in FIG. 4 and FIG. 8, and charging internal batteries, for example, the energy storage device(s) **154**, batteries of the computing devices **114**, **115**, **149**, etc., batteries of the clinical examination devices, batteries of the accessories, batteries of the cooling fans of the air-cooling fan system **153**, etc., exemplarily illustrated in FIG. 8, in the casing **101**.

[0091] In an embodiment, the air-cooling fan system **153** of the medical diagnostic kit **100** is positioned in the lower cavity **103f** of the lower shell **103** of the casing **101** and operably coupled to the multi-port charger **150** as exemplarily illustrated in FIG. **8**. In an embodiment, the air-cooling fan system **153** comprises one or more USB-powered intake fans (not shown) and exhaust fans **145** exemplarily illustrated in FIGS. **6A-6B**. The air-cooling fan system **153** is configured to produce an air flow within the lower cavity **103f** and the upper cavity **102f** of the casing **101** for cooling the multi-port charger **150**, the energy storage device(s) **154**, the clinical examination devices **118**, **119**, **120**, etc., the diagnostic computer **114**, the communication device **115**, the network-enabled mobile phone **149**, and the accessories to prevent batteries overheating thereof when the casing **101** is in the closed position during charging. Arrows exemplarily illustrated in FIG. **6A** are used to indicate the path of the air flow inside the casing **101** when the casing **101** is in the closed position. The air intake port **141** with the particle filter draws cold air inside the casing **101** and the intake fan (not shown) blows the cold air on the multi-port charger **150** and the energy storage device(s) **154**. The cold air flows further towards the air circulation holes **133** in the deck **130** exemplarily illustrated in FIG. **3**. The air circulation holes **133** allow movement of the cold air from the lower cavity **103f** to the upper cavity **102f** of the casing **101** and towards the computing devices **114** and **115**. The upper air intake grill **107a** receives heated air flow from the upper cavity **102f** of the upper shell **102** of the casing **101** and passes the heated air towards the louvers **139** of the fan backplate **138** to allow the exhaust fan **145** interiorly positioned proximal to the fan backplate **138** to expel the heated air through the louvers **139**. This airflow loop cools down the clinical examination devices **118**, **119**, **120**, etc., the diagnostic computer **114**, the communication device **115**, and the network-enabled mobile phone **149** during charging thereof. The exhaust fan **145** exhausts heated internal air from the upper cavity **102f** of the casing **101** out through the louvers **139**.

[0092] As exemplarily illustrated in FIG. **6A**, the deck **130** supports the universal cable storage compartment **126**, the clinical examination devices, the accessories, and the cushioning member **105** of the casing **101**. The air circulation holes **133** in the deck **130** communicate air between the upper cavity **102f** and the lower cavity **103f** of the casing

101. The air circulation holes **133** allow circulation of air from the lower cavity **103f** of the lower shell **103** to the upper cavity **102f** of the upper shell **102** in the casing **101**. The cross-sectional view and section B exemplarily illustrated in FIGS. **6A-6B** also show the exhaust fan **145** interiorly positioned proximal to the side wall **103d** of the lower shell **103** of the casing **101**. The exhaust fan **145** protected by the fan protector **107** affixed to the deck **130** and comprising the air intake grill **107a**, draws air out from the upper cavity **102f** of the casing **101** and expels the air out through the louvers **139**. The air intake port **141** allows air pulled by the intake fan (not shown) to flow into the casing **101**, for example, into the lower cavity **103f** of the lower shell **103** of the casing **101** for cooling the contents of the casing **101**, for example, the multi-port charger **150** and the energy storage device(s) **154**.

[0093] During charging, the internal rechargeable batteries in the casing **101** generate heat. If the internal rechargeable batteries overheat, charging is interrupted until internal temperature drops down. The forced airflow generated by the air-cooling fan system **153** cools the multi-port charger **150**, the energy storage device(s) **154**, the clinical examination devices **118, 119, 120**, etc., the diagnostic computer **114**, the communication device **115**, and the network-enabled mobile phone **149** with internal rechargeable batteries, facilitating fast battery charging and shortening recharge time. The air-cooling fan system **153** executes forced ventilation to facilitate cooling of the internal rechargeable batteries during charging. Charging the battery-driven internal components of the medical diagnostic kit **100**, when the medical diagnostic kit **100** is in the closed position, protects the high-priced internal components, for example, the clinical examination devices **118, 119, 120**, etc., the computing devices **114, 115**, etc., when charging is done in public areas in the field or during transportation. Moreover, closed case charging allows several medical diagnostic kits **100** to be charged side-by-side in a narrow shelf space and reduces operational costs.

[0094] FIG. **6B** exemplarily illustrates an enlarged view of a door and exhaust fan assembly section marked B in FIG. **6A**. The door and exhaust fan assembly section marked B shows the air intake grill **107a** and parts positioned on the side wall **103d** of the lower shell **103** of the casing **101**, for example, the side door **113** with its locking thumb screw **142**, the door frame **137**, the fan backplate **138**, the gasket **136**, the louvers **139**, and the air

intake port **141** with the particle filter. The section marked B also shows the exhaust fan **145** interiorly supported against the side wall **103d** of the casing **101**.

[0095] FIG. 7A exemplarily illustrates a top perspective view of an embodiment of the medical diagnostic kit **100** comprising a secondary camera **147**. As exemplarily illustrated in FIG. 7A, the upper shell **102** of the casing **101** houses the device holders **125**, **116**, and **117** that accommodate the diagnostic computer **114**, the communication device or tablet computing device **115**, and the network-enabled mobile phone or mobile hotspot **149** respectively, as exemplarily illustrated in FIG. 8. The lower shell **103** of the casing **101** houses the console **108** containing the multi-port hubs **156** and **157** with the switchable ports **156a** and **157a** respectively, having the illuminating control elements **109** exemplarily illustrated in FIG. 8. The console **108** also houses an auxiliary universal serial bus (USB) connector **110** and a headset jack **111**. The lower shell **103** of the casing **101** also houses the deck **130** exemplarily illustrated in FIG. 3, and the cushioning member **105** or foam block with slots **105a**, **105b**, **105c**, **105d**, **105e**, and **105f** for accommodating the clinical examination devices as exemplarily illustrated in FIG. 1. Underneath the deck **130** lies the universal cable storage compartment **126** exemplarily illustrated in FIG. 2, for accommodating the cables of the clinical examination devices, the multi-port charger **150**, the energy storage device(s) **154**, and the cooling fans, that is, the intake fan (not shown) and the exhaust fan **145** of the air-cooling fan system **153** exemplarily illustrated in FIGS. 6A-6B and FIG. 8.

[0096] In an embodiment, the medical diagnostic kit **100** further comprises a secondary camera **147** extending from a flexible mount **148**, for example, a goose neck, in the casing **101**. The flexible mount **148** is configured to aim a camera lens of the secondary camera **147** towards a patient and allow a health care practitioner at a remote site to view the patient when the patient is out of view of a camera of the diagnostic computer **114**. The secondary camera **147** is operably coupled to one of the multi-port hubs **156** and **157** using an internal power supply and data communication or exchange cable (not shown), for example, a USB cable, positioned in the flexible mount **148**. For example, a USB connector of the internal USB cable of the secondary camera **147** plugs into the auxiliary port **110** in the console

108. The secondary camera **147** is then stowed away into a holder (not shown) provided in the casing **101**. In an embodiment, the secondary camera **147** and its flexible mount **148** are attached below the diagnostic computer **114** in the upper shell **102** of the casing **101** using magnets (not shown). The flexible mount **148** positions the secondary camera **147** such that the remote health care practitioner may view areas obstructed to a main videoconferencing camera on the diagnostic computer **114**. The secondary camera **147** is placed closer to the patient for local patient observation, for example, during an electrocardiograph (ECG) examination and an auscultation when the patient is in a lying down position.

[0097] In an embodiment, a lower end (not shown) of the flexible mount **148** is connected to the deck **130** via a holder (not shown) in the casing **101**, while the secondary camera **147** connected to the upper end **148a** of the flexible mount **148** is accommodated in a holder (not shown) positioned in a slot of the cushioning member **105** above the deck **130**. When the casing **101** is in the open position, an operator of the medical diagnostic kit **100** removes the secondary camera **147** from the slot or detaches the secondary camera **147** from the magnets and allows the secondary camera **147** to suspend from the upper end **148a** of the flexible mount **148**. The flexible mount **148** allows the secondary camera **147** to be positioned such that a remote health care practitioner performing a remote medical examination through the diagnostic computer **114** may view a patient lying on a bed, while the operator measures the patient's vital signs, blood pressure, etc., or performs imaging of organs of the patient using the clinical examination devices.

[0098] In an embodiment, the secondary camera **147** is a universal serial bus (USB) camera operably connected to one of the switchable ports **157a** of the multi-port hub **157** as exemplarily illustrated in FIG. 8. The secondary camera **147** is in operable communication with the diagnostic computer **114** via the hubs **155** and **157** and the hubs disconnection switch **144**. The secondary camera **147** transmits captured still images or video streams to the diagnostic computer **114**, thereby allowing the remote health care practitioner to view the patient. In another embodiment, the secondary camera **147** is a network-enabled camera that communicates with the diagnostic computer **114** via a

wireless communication network or a wireless communication protocol. For example, the secondary camera **147** is a Bluetooth® camera of Bluetooth Sig, Inc. The secondary camera **147** is paired with the diagnostic computer **114** for transmitting captured still images or video streams from the secondary camera **147** to the diagnostic computer **114**, thereby allowing the remote health care practitioner to view the patient. The diagnostic computer **114** receives image streams wirelessly from the secondary camera **147**, for example, via the Bluetooth® communication protocol, and decompresses and decodes the image streams for facilitating communication between the remote health care practitioner and the patient or the operator of the medical diagnostic kit **100**.

[0099] FIG. **7B** exemplarily illustrates a front perspective view of the medical diagnostic kit **100** shown in FIG. **7A**. In an embodiment, the medical diagnostic kit **100** provides testing equipment or clinical examination devices comprising, for example, a stethoscope **122**, a system for pulmonary, cardiac, and abdominal auscultation, an electrocardiograph (ECG) **119** such as a 12-lead, hospital grade ECG, a blood pressure monitor **120**, an oximeter **121**, an otoscope **124**, a multi-organ imaging system **118** with an ultra-high resolution, universal serial bus (USB) 3.0 camera, no compression, with wide color reproduction and low distortion, and an ultrasound component that, in addition to its direct purpose, is also configured for use as an alternative to palpation. The multi-organ imaging system **118** allows for general, oral, dermatological, and otoscopic exams. Through the diagnostic computer **114**, the medical diagnostic kit **100** implements a digital-format, cloud-storage mechanism for patient monitoring, thereby providing ready access of all files and medical data of a patient to a remote health care practitioner at any point in time, regardless of the size and format.

[00100] In addition to the computing devices **114** and **115**, the clinical examination devices, for example, the multi-organ imaging system **118**, the otoscope **124**, the ECG **119**, the blood pressure monitor **120**, the oximeter **121**, and the stethoscope **122**, and the accessories, for example, the wireless speaker **123**, FIG. **7B** exemplarily illustrates the secondary camera **147** extending from the flexible mount **148** in the casing **101** as disclosed in the detailed description of FIG. **7A**. The secondary camera **147** is connected to the

auxiliary port **110** on the console **108** exemplarily illustrated in FIG. **7A**, or to a switchable port **157a** of the multi-port hub **157** exemplarily illustrated in FIG. **8**, via a universal serial bus (USB) connection, and is selected by an illuminating control element **109** or switch on the console **108** exemplarily illustrated in FIG. **1**. To start video streaming to a remote health care practitioner, an operator of the medical diagnostic kit **100** switches a video source in a conferencing component of the software application deployed in the diagnostic computer **114**. The secondary camera **147** allows the remote health care practitioner to keep an eye on a patient lying on a bed, for example, during an ECG examination, when the patient is out of view of the diagnostic computer **114**. The flexible mount **148** of the secondary camera **147** allows the operator to easily aim the secondary camera **147** towards the patient. In an embodiment, the secondary camera **147** is configured as a videoconferencing camera on the flexible mount **148** to show the remote health care practitioner areas obstructed to a main videoconferencing camera of the diagnostic computer **114**. In an example, for an auscultation, the stethoscope **122** is pulled out of its cutout **131e** or its slot **105d** exemplarily illustrated in FIG. **3** and FIG. **1** respectively, and activated by a corresponding one of the illuminating control elements **109**, while an audio card channel is selected in the videoconferencing software running on the diagnostic computer **114** and the headset **803** is plugged into the headset jack **111** exemplarily illustrated in FIG. **1** and FIG. **8**. In various embodiments and alternative implementations of the medical diagnostic kit **100**, the internal components of the medical diagnostic kit **100** may be interchangeably positioned in alternative, functionally equivalent configurations and arrangements within the upper cavity **102f** and the lower cavity **103f** of the casing **101** for a smooth operation of the medical diagnostic kit **100** and a smooth facilitation of remote real-time medical examinations.

[00101] FIG. **8** illustrates a block diagram showing an exemplary implementation of internal components of an embodiment of the medical diagnostic kit **100**. The internal components of the medical diagnostic kit **100** comprise the multi-port charger **150**, one or more energy storage devices **154**, the hubs disconnection switch **144**, a primary hub **155**, and the multi-port hubs **156** and **157**. The multi-port charger **150** is, for example, a 5-port alternating current (AC)-direct current (DC) charger comprising four universal serial bus

(USB)-A ports **150a**, **150b**, **150c**, and **150d**, a power delivery (PD) port **150e**, and the AC fused inlet **140** as exemplarily illustrated in FIG. 8. The multi-port charger **150** converts AC power received from an AC power source through an AC power cord **159** to DC power for distribution to the ports **150a**, **150b**, **150c**, **150d**, and **150e**. In this embodiment, two of the USB-A ports **150a** and **150b** of the multi-port charger **150** are configured for connection to the computing devices, for example, the network-enabled mobile phone **149**, also referred to as a mobile hotspot, and the communication device **115**, that is, the tablet computing device with the camera display unit **115a** respectively, accommodated, for example, in the upper cavity **102f** of the upper shell **102** of the casing **101** in their respective device holders **117** and **116** exemplarily illustrated in FIG. 1. The USB-A port **150a** of the multi-port charger **150** is connected to a USB-C charge port **149a** of the network-enabled mobile phone **149**. The USB-A port **150b** of the multi-port charger **150** is connected to a micro-USB or USB-C port **115b** of the communication device **115**.

[00102] The network-enabled mobile phone **149** and the communication device **115** communicate with the diagnostic computer **114** via a wireless communication protocol, for example, the Wi-Fi[®] communication protocol of Wi-Fi Alliance Corporation. In an embodiment, the network-enabled mobile phone **149** is configured as an internet access point or a hotspot, for example, a fifth generation (5G) Wi-Fi[®] hotspot for providing reliable access of a wireless communication network, for example, a Wi-Fi[®] network, to the diagnostic computer **114** and the communication device **115**. In another embodiment, the communication device **115** is configured as an internet access point or a hotspot, for example, a 5G Wi-Fi[®] hotspot, for providing reliable access of a wireless communication network, for example, a Wi-Fi[®] network, to the diagnostic computer **114**. In another embodiment, the diagnostic computer **114** connects to the communication device **115** and the network-enabled mobile phone **149** via a wired connection, for example, a USB connection. In another embodiment, the diagnostic computer **114** and the communication device **115** connect to a wireless router, for example, a Wi-Fi[®] router, to access a wireless communication network.

[00103] Another USB-A port **150c** of the multi-port charger **150** is configured for connection to a power distribution board **152**. The power distribution board **152** is operably coupled to the air-cooling fan system **153** for delivering power received from the multi-port charger **150** to the air-cooling fan system **153**. The air-cooling fan system **153** is operably coupled to the multi-port charger **150** via the power distribution board **152**. The air-cooling fan system **153** produces air flow within the casing **101** to prevent overheating of the multi-port charger **150**, the energy storage device(s) **154**, the clinical examination devices, the accessories, and the diagnostic computer **114** in the closed position of the casing **101** during charging of the clinical examination devices and the diagnostic computer **114**. The power distribution board **152** is, for example, a +5 Volt (V) power distribution board that divides an electrical power feed into subsidiary circuits while providing a protective fuse or circuit breaker for each circuit in a common enclosure. In an embodiment, the power distribution board **152** comprises USB-A connectors configured to charge accessories such as the wireless speaker **123** exemplarily illustrated in FIG. 1, the rechargeable batteries of one or more of the clinical examination devices, for example, an illuminator battery **124a** of an otoscope **124** via a cable **162** extending from a universal magnetic connector **161** exemplarily illustrated in FIGS. 10A-10D and FIGS. 11A-11D, the stethoscope **122** via a stethoscope interface component **802**, etc. Another accessory, for example, a headset **803** is operably coupled to the stethoscope interface component **802** as disclosed in the detailed description of FIG. 9. In an embodiment, the multi-port hubs **156** and **157**, the energy storage device(s) **154**, the air-cooling fan system **153**, the power distribution board **152**, a hubs disconnection switch board, the stethoscope interface component **802**, and the multi-port charger **150** are accommodated in the lower cavity **103f** of the lower shell **103** of the casing **101** exemplarily illustrated in FIG. 6A.

[00104] Another USB-A port **150d** of the multi-port charger **150** is configured for connection to the energy storage device(s) **154**. In an embodiment, the energy storage device(s) **154** is configured as a power bank with a charging gauge. For example, the energy storage device(s) **154** is a 20000 milliampere-hour (mAh) USB-C power delivery power bank with a quick charge 3.0. In an embodiment, the energy storage device(s) **154** comprises an in micro-USB port **154a** and an out USB-A port **154b**. The USB-A port **150d**

of the multi-port charger **150** is connected to the in micro-USB port **154a** of the energy storage device(s) **154** via a cable. The out USB-A port **154b** of the energy storage device(s) **154** is connected to the hubs disconnection switch **144**. The power delivery port **150e** of the multi-port charger **150** is operably coupled to a power delivery port **155a** of the primary hub **155**. The power delivery port **150e** handles high power and allows charging of the diagnostic computer **114** via the USB-C port **155c** quickly over a USB connection. The USB-A ports **150a**, **150b**, **150c**, and **150d** and the power delivery port **150e** of the multi-port charger **150** are connected to their respective devices via individual cables.

[00105] The primary hub **155** is also operably coupled to the diagnostic computer **114** and to the multi-port hubs **156** and **157**. The hubs **155**, **156**, and **157** perform data communication between the diagnostic computer **114** and the clinical examination devices. The primary hub **155** is, for example, a 3-port USB-A to USB-C hub with a power delivery (PD) USB-C port **155c**. In an embodiment, the primary hub **155** is an internal hub with no switches. During charging, the primary hub **155** provides power to charge the diagnostic computer **114** via a power delivery function of the USB-C port **155c**. The primary hub **155** receives the power from the multi-port charger **150** and delivers the power to the diagnostic computer **114** for charging the diagnostic computer **114** and executing data communication between the diagnostic computer **114**, the clinical data examination devices, and the accessories during a medical examination. Moreover, the primary hub **155** is powered from the diagnostic computer **114** via the power delivery port **114a** during a medical examination. The diagnostic computer **114** receives power from the USB-C with power delivery port **114a** via the primary hub **155** from the PD port **150e** of the multi-port charger **150** when the casing **101** is connected to the AC power source via the AC power cord **159**. The primary hub **155** further comprises three USB-A ports **155b** and one USB-C port **155c**. In an embodiment, two of the USB-A ports **155b** are connected to the multi-port hubs **156** and **157**. For example, the USB-A ports **155b** of the primary hub **155** are connected to the USB-A ports **156c** and **157c** of the multi-port hubs **156** and **157** respectively, via individual cables. The multi-port hubs **156** and **157** are, for example, 4-switched port USB 3.0 hubs with individual power switches. The multi-port hubs **156** and **157** comprise switchable ports **156a** and **157a** respectively, for connection to the clinical examination devices and

one or more of the accessories. Individually switchable ports **156a** and **157a** allow the use of the clinical examination devices with different speed USB ports dynamically without permanent degradation to the slowest connection. Each clinical examination device sets an individual communication speed per specific test performed during switching time. The multi-port hubs **156** and **157** with the switchable ports **156a** and **157a** respectively, also referred to as “switched hubs”, are powered from the energy storage device **154** via the hubs disconnection switch **144** when the upper shell **102** of the casing **101** is opened. The multi-port hubs **156** and **157** receive power through the hubs disconnection switch **144** when the casing **101** is in an open position.

[00106] The multi-port hub **156** comprises USB-A ports **156a** and **156c** and a power port **156b**, for example, a 5V, 2-3 Ampere(s) (A) port. Similarly, the multi-port hub **157** comprises USB-A ports **157a** and **157c** and a power port **157b**, for example, a 5V, 2-3 Amp port. The power ports **156b** and **157b** of the multi-port hubs **156** and **157** respectively, are operably coupled to the hubs disconnection switch **144**. The multi-port hubs **156** and **157** receive regular +5V DC power into respective power ports **156b** and **157b** from the energy storage device **154** via the hubs disconnection switch **144**. The clinical examination devices are connected to the USB-A ports **156a** and **157a** of the multi-port hubs **156** and **157** respectively, via individual cable connectors of cables optimally stored in cable compartments **129a**, **129b**, **129c**, **129d**, **129e**, and **129f** of the universal cable storage compartment **126** exemplarily illustrated in FIG. 2, without mutual entanglement. For example, an audio cable of the stethoscope **122** connected to an USB audio card **801** via the stethoscope interface component **802** exemplarily illustrated in FIG. 8, the USB cables of the pulse oximeter (POX) **121**, the blood pressure monitor **120**, and the electrocardiograph (ECG) **119** are permanently connected to the USB-A ports **156a** of the multi-port hub **156** via their individual cable connectors. Accessories such as a cuff **158** of the blood pressure monitor **120** and ECG electrodes **119a** of the ECG **119** are accommodated in the deck **130** or the cushioning member **105** of the medical diagnostic kit **100** exemplarily illustrated in FIG. 1. In an embodiment, the accessories are accommodated below the deck **130** in the separated cable compartments **129a** to **129e** of the universal storage compartment **126** exemplarily illustrated in FIG. 2 and FIG. 6A.

Similarly, an auxiliary port **110** of the secondary camera **147**, the otoscope **124**, and the multi-organ imaging system **118** are permanently connected to the USB-A ports **157a** of the multi-port hub **157** via their individual cable connectors. In an embodiment, a single USB-C PD cable connected from the diagnostic computer **114** to the primary hub **155** with power delivery performs a combination of charging of the diagnostic computer **114** and USB data communication to the diagnostic computer **114**.

[00107] As exemplarily illustrated in FIG. 8, the energy storage device(s) **154** is operably coupled to the multi-port charger **150** and the multi-port hubs **156** and **157**. The multi-port charger **150** is electrically connected to and configured to charge the computing devices **115** and **149**, the energy storage device(s) **154**, the clinical examination devices, and the accessories. The energy storage device(s) **154** is configured to receive power from the multi-port charger **150**. The energy storage device(s) **154** also delivers the power to the multi-port hubs **156** and **157** via the hubs disconnection switch **144** for powering and communicating data with the clinical examination devices and the accessories when the casing **101** is in the open position. In an embodiment, the energy storage device(s) **154** is operably coupled to the multi-port hubs **156** and **157** via the hubs disconnection switch **144**. The primary hub **155** is operably coupled to the multi-port charger **150** for power delivery. The energy storage device(s) **154**, when charged by the multi-port charger **150**, powers the multi-port hubs **156** and **157**. The energy storage device(s) **154** and the clinical examination devices comprise rechargeable batteries, for example, lithium batteries having about 8 hours to about 10 hours of battery life. In an embodiment, when the casing **101** is in the open position, the hubs disconnection switch **144** is deactivated, thereby connecting the energy storage device **154** to the multi-port hubs **156** and **157**, discharging the energy storage device **154**, and delivering power from the energy storage device **154** to the multi-port hubs **156** and **157**, for powering up the clinical examination devices. When the casing **101** is in the closed position, the hubs disconnection switch **144** is activated, thereby disconnecting the energy storage device **154** from the multi-port hubs **156** and **157** and interrupting the delivery of power from the energy storage device **154** to the multi-port hubs **156** and **157**.

[00108] In an embodiment, the switchable ports **156a** and **157a** of the multi-port hubs **156** and **157** respectively, are universal serial bus (USB) switchable ports configured to permanently and securely connect the individual cable connectors of the clinical examination devices and selectively power and communicate data with one or more of the clinical examination devices and the accessories engaged in a particular medical examination. The individual cable connectors of the clinical examination devices extend from their respective cables accommodated in the universal cable storage compartment **126** below the deck **130** exemplarily illustrated in FIGS. **2-3**. The console **108** exemplarily illustrated in FIG. **1**, that houses the multi-port hubs **156** and **157**, operates, for example, as a cable connectors attachment grid. The hubs disconnection switch **144**, operably coupled to the energy storage device(s) **154** and the multi-port hubs **156** and **157**, is in operable communication with the disconnection member **112** exemplarily illustrated in FIG. **1**. The disconnection member **112** is configured to activate the hubs disconnection switch **144** and interrupt the delivery of the power from the energy storage device(s) **154** to the multi-port hubs **156** and **157** when the casing **101** is in the closed position. When the casing **101** is in the open position, the disconnection member **112** is configured to deactivate the hubs disconnection switch **144** and allow delivery of power from the energy storage device **154** to the multi-port hubs **156** and **157**, for powering up the clinical examination devices.

[00109] During the operation of the medical diagnostic kit **100** for performing a medical examination, an operator opens the upper shell **102** of the casing **101** and selects one of the clinical examination devices, for example, the multi-organ imaging system **118**, by activating one of the illuminating control elements **109** on the console **108** exemplarily illustrated in FIG. **1**. The operator then removes the multi-organ imaging system **118** from the corresponding slot **105f** of the cushioning member **105** exemplarily illustrated in FIG. **1**. When the casing **101** is in the open position, the disconnection member **112** exemplarily illustrated in FIG. **1**, deactivates the hubs disconnection switch **144**, thereby connecting the energy storage device **154**, for example, the power bank, to the multi-port hubs **156** and **157**. In the open position, the diagnostic computer **114** runs on its internal battery and invokes the software application and the functions of the software application for activating

the multi-organ imaging system **118**; executing audio/videoconference connections; receiving, creating, recording, processing, storing, and transmitting medical data to a data storage device or a data store via a communication network; and facilitating remote real-time medical examinations. The energy storage device **154** discharges and delivers power, for example, to the multi-port hub **157** for distribution to the multi-organ imaging system **118** whose cable connector is permanently connected to one of the ports **157a** of the multi-port hub **157**. The multi-organ imaging system **118**, therefore, receives power from the multi-port hub **157**, which allows continuous operation of the multi-organ imaging system **118** during the medical examination.

[00110] After completion of the medical examination using the multi-organ imaging system **118**, the operator places the multi-organ imaging system **118** back in the corresponding slot **105f** of the cushioning member **105**, deactivates the corresponding illuminating control element **109**, and closes the upper shell **102** of the casing **101**. When the casing **101** is in the closed position, the disconnection member **112** activates the hubs disconnection switch **144**, thereby disconnecting the energy storage device **154** from the multi-port hubs **156** and **157** and preventing the energy storage device **154** from discharging. The energy storage device **154** is recharged from the AC power source via the AC power cord **159** via the multi-port charger **150** when the casing **101** is in the closed position or in the open position. The AC power cord **159** is connected to an AC fused inlet **140** which in turn is connected to an AC inlet port **150f** of the multi-port charger **150**. Furthermore, in an embodiment, when the casing **101** is in the closed position or in the open position, the multi-port charger **150** delivers power to the rechargeable batteries of the clinical examination devices and the accessories, for example, via the magnetic charging connector system **160** exemplarily illustrated in FIGS. **10A-10D** and FIGS. **11A-11D**, and dedicated cables permanently connected to the power distribution board **152**. Therefore, when the casing **101** is in the closed position or the open position and connected to the AC power source, the clinical examination devices and one or more of the accessories receive power from the multi-port charger **150** via the multi-port hubs **156** and **157** and are therefore charged. The medical diagnostic kit **100**, therefore, allows closed or open case charging of the internal rechargeable batteries when the AC power source is connected to

the AC inlet port **150f** of the multi-port charger **150** via the AC fused inlet **140**. The medical diagnostic kit **100** allows charging to be performed regardless of whether the casing **101** is in the closed position or the open position. Closed case charging is compact space wise and secure. Open case charging is performed, for example, during testing operations. When the energy storage device **154** completely recharged from the AC power source via the multi-port charger **150** in the open position or the closed position, the AC power cord **159** is disconnected, for example, by a technician or other operator of the medical diagnostic kit **100**, from the AC fused inlet **140**, and the energy storage device **154** is ready for powering the clinical examination devices and the accessories when the casing **101** is in the open position.

[00111] For purposes of illustration, an exemplary implementation of the multi-port charger **150**, the power distribution board **152**, the energy storage device(s) **154**, the primary hub **155**, and the multi-port hubs **156** and **157** are shown in FIG. 8. However, the scope of the medical diagnostic kit **100** is not limited to the exemplary implementation illustrated in FIG. 8, but may be extended to include alternative implementations of the internal components of the medical diagnostic kit **100**. For example, in another exemplary implementation, the multi-port charger **150** is configured as a 60-Watt (W), 10-port AC charger. In another exemplary implementation, the multi-port charger **150** is configured as a 100-Watt, 8-port USB rapid charger. In another exemplary implementation, the hubs **155**, **156**, and **157** are configured as 4-port switchable 3.0 hubs, each comprising four USB-A ports, a power delivery port, and a USB 3.0 port. In another exemplary implementation, the hubs **155**, **156**, and **157** are split with 2.0 and 3.0 USB specifications according to the class of clinical examination devices connected thereto. Furthermore, USB ports of different types, for example, type A, type C, etc., for optimal charging and data communication are configured in the various components of the medical diagnostic kit **100**.

[00112] FIG. 9 exemplarily illustrates a block diagram showing an implementation of the stethoscope interface component **802** in an embodiment of the medical diagnostic kit **100** shown in FIG. 1. In an embodiment, the stethoscope interface component **802** in the medical diagnostic kit **100** is operably coupled to a switchable port, for example, **156a**, of

one of the multi-port hubs, for example, **156**, via an audio card **801** exemplarily illustrated in FIG. 8, for executing a remote auscultation using a stethoscope **122**. In an embodiment, the stethoscope **122** is accommodated in one of the cutouts, for example, **131e**, on the deck **130** exemplarily illustrated in FIG. 3, or in one of the slots, for example, **105d**, of the cushioning member **105** exemplarily illustrated in FIG. 1. The stethoscope **122** is, for example, a digital or electronic stethoscope such as the Thinklabs® One digital stethoscope of Thinklabs Medical LLC, configured to provide live sounds to a remote computing device (not shown) of a remote health care practitioner. The audio card **801** is, for example, a universal serial bus (USB) sound card such as the Sound Blaster PLAY! 3 USB digital-to-analog converter (DAC), amplifier (Amp), and external sound card of Creative Technology Ltd. The power distribution board **152** exemplarily illustrated in FIG. 8, distributes power received from the multi-port charger **150** to the stethoscope interface component **802** as disclosed in the detailed description of FIG. 8, for allowing implementation of the stethoscope **122** in the medical diagnostic kit **100**. During an alternating current (AC) charging operation, the internal battery of the stethoscope **122** is charged from the stethoscope interface component **802** by the multi-port charger **150** via the power distribution board **152** within the casing **101**, without having to remove the stethoscope **122** from the casing **101** and connect to an external charger with a particular charging cable provided by a manufacturer. The stethoscope interface component **802** connects to one of the USB-A ports **156a** of the multi-port hub **156** via the audio card **801** as exemplarily illustrated in FIG. 8. The stethoscope interface component **802**, therefore, facilitates charging of the stethoscope **122** when the casing **101** is connected to the AC power source via the AC power cord **159**.

[00113] In an embodiment as exemplarily illustrated in FIG. 9, the stethoscope interface component **802** comprises an audio splitter **802a**, an audio switch **802b**, and a decoder **802c**. The audio splitter **802a** is operably coupled to the stethoscope **122** for receiving a stethoscope signal from the stethoscope **122** during a remote auscultation and splitting the stethoscope signal equally into a first audio signal and a second audio signal. The audio splitter **802a** transmits the first audio signal to a headset **803**, for example, mobile phone earbuds, connected to a headset jack **111** on the console **108** or to another mounting

location or holder in the casing **101** via a cable exemplarily illustrated in FIG. **1**. An operator of the medical diagnostic kit **100**, for example, a technician or an onsite care coordinator (OCC), hears internal body sounds from the first audio signal through the headset **803**. The headset **803** comprises a microphone (not shown) and an audio control element **803a**. The audio control element **803a** is configured, for example, as an audio control button, to control transmission of a microphone signal from the headset **803** to the audio card **801** via the audio switch **802b**. The microphone signal provides voice data spoken by the onsite operator into the microphone of the headset **803**.

[00114] The audio splitter **802a** transmits the second audio signal to the audio card **801** via the audio switch **802b**. The audio splitter **802a**, therefore, routes the stethoscope signal to the audio card **801** and in parallel to the headset **803** of the onsite operator of the medical diagnostic kit **100**. The audio card **801** is configured to transmit the second audio signal to the remote computing device of the remote health care practitioner via the diagnostic computer **114** exemplarily illustrated in FIG. **1** and FIG. **8**. The audio switch **802b** is configured by default to switch an audio card input to the second audio signal provided by the audio splitter **802a**. The audio switch **802b** is further configured to select between the second audio signal and the microphone signal received from the headset **803** for transmission to the audio card **801**. The audio switch output is configured to transmit either the second audio signal or the microphone signal to the audio card **801**. Accordingly, an audio/videoconferencing software application operating in the diagnostic computer **114** receives either the second audio signal or the microphone signal from the audio card **801** for transmission to the remote computing device.

[00115] The audio switch output is connected to the audio card **801** to allow the audio/videoconferencing software application deployed on the diagnostic computer **114** to receive either the second audio signal or the microphone signal from the audio card **801** for transmission to the remote computing device. The onsite operator switches the audio/videoconferencing software application deployed in the diagnostic computer **114** to the audio card **801** to transmit the second audio signal or the microphone signal to the remote computing device. The diagnostic computer **114** runs the audio/videoconferencing

software application and passes the second audio signal or the microphone signal to the remote computing device of the remote health care practitioner.

[00116] The decoder **802c** is operably coupled to the audio control element **803a** of the headset **803**. The decoder **802c** is configured to decode a control signal received from the audio control element **803a** and operate the audio switch **802b**. In an embodiment, the audio control element **803a** is a push-to-talk (PTT) switch on the headset **803** configured to allow the onsite operator to select to transmit either the stethoscope signal or a voice signal of the onsite operator performing the auscultation to the remote computing device of the remote health care practitioner to establish a rapport with the remote health care practitioner. The voice signal is herein referred to as the “microphone signal”. In an example, a pressing action on the audio control element **803a** by the onsite operator indicates selection of the microphone signal for transmission to the audio card **801**. When the onsite operator presses the audio control element **803a**, the decoder **802c** decodes the control signal received from the audio control element **803a** and transmits the microphone signal from the headset **803** to the audio card **801** via the audio switch **802b**.

[00117] In an embodiment, the audio card **801** that is connected to the multi-port hub **156** interfaces with the diagnostic computer **114**, which communicates with the remote computing device of the remote health care practitioner via a communication network, for example, the internet. The stethoscope **122** is configured to communicate with one or more of the computing devices, for example, the diagnostic computer **114** exemplarily illustrated in FIG. 1 and FIG. 8, via the stethoscope interface component **802**. The stethoscope interface component **802** receives power from the multi-port hub **156** when the port **156a** is energized with the respective illuminating control element **109** exemplarily illustrated in FIG. 8, thereby energizing internal circuits and the audio card **801**. The decoder **802c** monitors microphone bias voltage on the headset **803** to detect a pressing action on the audio control element **803a**. In an exemplary implementation, the microphone bias voltage drops to zero when the pressing action on the audio control element **803a** is produced. The onsite operator selects an audio card channel on the diagnostic computer **114** during auscultation using the audio/videoconferencing software application. The onsite operator

operates two switches, one which is operated by the audio control element **803a** of the headset **803** during auscultation, and another positioned in the diagnostic computer **114** to switch the audio/videoconferencing input from a conference microphone of the diagnostic computer **114** to the audio card **801** for the auscultation session. After auscultation, the onsite operator switches the audio/videoconferencing input back to the conference microphone of the diagnostic computer **114**.

[00118] When the casing **101** of the medical diagnostic kit **100** is connected to the AC power source via the AC power cord **159** exemplarily illustrated in FIG. **8**, the multi-port charger **150** generates, for example, about +5 Volts (V) of direct current to charge the stowed stethoscope **122**, for example, using a standard audio 3.5 mm, tip-ring-ring-sleeve (TRRS) audio cable, via the power distribution board **152** and the stethoscope interface component **802**. To execute an auscultation during a remote medical examination with a remote health care practitioner, for example, a physician, an onsite operator of the medical diagnostic kit **100** such as an onsite care coordinator (OCC) opens the casing **101**, starts the diagnostic computer **114**, connects the headset **803** having the audio control element **803a** to the headset jack **111** on the console **108** or another mounting location, via a cable, and removes the stethoscope **122** from the slot **105d** of the cushioning member **105** in the casing **101** exemplarily illustrated in FIG. **1**. The headset jack **111** is a single audio port in the console **108** or other mounting location for connecting the headset **803** having the audio control element **803a**. The audio control element **803a** allows selection of the second audio signal, that is, the stethoscope signal, or the microphone signal to be transmitted to the audio card **801**. The audio/videoconferencing software application running on the diagnostic computer **114** comprises an internal conferencing microphone and audio card input. For the auscultation procedure, the OCC selects the audio card input on the diagnostic computer **114** and after the auscultation, the OCC selects the internal conferencing microphone to communicate with the patient.

[00119] The OCC then places a chest piece with a diaphragm of the stethoscope **122** against a patient's skin to listen to internal body sounds through the headset **803**. The chest piece of the stethoscope **122** transmits a stethoscope signal comprising the internal body

sounds, to the stethoscope interface component **802**. The OCC switches the main audio card input of the audio/videoconferencing software application on the diagnostic computer **114** to the secondary USB audio card **801** to send the stethoscope signal to the remote computing device of the physician. During auscultation, the stethoscope signal splits to the headset **803** and the audio card **801**. The OCC hears the quality of the internal body sounds, for example, a heartbeat and lung sounds, and adjusts the position and settings of the stethoscope **122** to achieve an optimal signal-to-noise ratio. When the physician's audio channel is switched to receive the stethoscope signal by the OCC, the physician will not be able to hear the voice of the OCC or the patient, but if needed, the OCC may press the audio control element **803a** and talk to the physician. The physician's voice will be heard by the OCC and the patient during the entire auscultation procedure.

[00120] To achieve optimal manual switching without performing cumbersome audio channel selection operations on the diagnostic computer **114**, the operator uses the audio control element **803a** of the headset **803**. The operator uses the audio control element **803a** to switch between the stethoscope output and a microphone output of the headset **803**. The decoder **802c** decodes the operator's pressing action on the audio control element **803a** and operates the audio switch **802b** connecting either the second audio signal of the stethoscope signal or the microphone signal from the operator's headset **803** to the audio card **801**. The operator performs the pressing action, for example, as a "hold-to-talk", or a "push-talk-push", or a "push-talk" action until timeout to switch between inputs. The decoder **802c** allows the operator to select for the physician input, either the stethoscope signal or the microphone signal, via the audio switch **802b** to provide a verbal communication channel to the physician at the remote site during auscultation. The stethoscope **122** provides an audio signal, for example, a heartbeat signal, binaural to the headset **803** via the audio splitter **802a** and to the remote computing device of the physician. Binaural sound improves the perception of the internal body sounds, for example, the heartbeat sound, at the operator's location and the physician's remote site. In an embodiment, the decoder **802c** operates on a voltage bias of the headset **803** and operates on power received from the energy storage device(s) **154** via the deactivated, hubs disconnection switch **144** exemplarily illustrated in FIG. 8, through the corresponding switchable port **156a** of the

multi-port hub **156**, when the upper shell **102** of the casing **101** exemplarily illustrated in FIG. **1** is opened and the switchable port **156a** is activated by the corresponding illuminating control element **109**. In an embodiment, the medical diagnostic kit **100** implements a direct charging circuit from the multi-port charger **150** and the power distribution board **152** for directly charging the stethoscope **122** and the stethoscope interface component **802**.

[00121] FIGS. **10A-10D** exemplarily illustrate different views of a magnetic charging connector system **160** implemented with an accessory, for example, an otoscope illuminator battery **124a**, of a clinical examination device, for example, an otoscope **124**, for quick removal of the accessory from the medical diagnostic kit **100** shown in FIG. **1**. In an embodiment, the medical diagnostic kit **100** implements a quick connect-disconnect mechanism with the clinical examination devices and the accessories for quick removal thereof from the medical diagnostic kit **100** and quick stowage thereof into the medical diagnostic kit **100**. In this embodiment, the medical diagnostic kit **100** implements the quick connect-disconnect mechanism using the magnetic charging connector system **160** as exemplarily illustrated in FIGS. **10A-10D** and FIGS. **11A-11D**. The magnetic charging connector system **160** comprises one or more universal magnetic connectors **161** operably coupled to the multi-port charger **150** via the power distribution board **152** exemplarily illustrated in FIG. **8**. The universal magnetic connector(s) **161** is magnetically engageable to one or more of the clinical examination devices and the accessories positioned proximal to the universal magnetic connector(s) **161** to create an electrically conductive relationship therebetween.

[00122] Magnetic connecting elements, for example, **164**, are operably positioned on battery components, for example, **124a**, of one or more of the clinical examination devices and the accessories. The magnetic connecting elements **164** are configured specific to battery charging ports. The magnetic connecting elements **164** on the battery components are configured to magnetically attract and mate with corresponding magnetic connecting elements, for example, **163**, of the universal magnetic connectors **161**. The battery components of the clinical examination devices and accessories, therefore, receive power

from the power distribution board **152** via the universal magnetic connectors **161**. In an embodiment, the clinical examination devices and the accessories are connected to the power distribution board **152** for charging using the magnetic charging connector system **160** that allows convenient disconnection when the clinical medical devices and the accessories are removed from their storage positions in the deck **130** exemplarily illustrated in FIG. 3, and allows convenient connection for receiving power from the power distribution board **152** when the clinical medical devices and the accessories are returned for stowage in the deck **130**.

[00123] Consider an example where an accessory of a clinical examination device that operates with the magnetic charging connector system **160** is an otoscope illuminator battery **124a** as exemplarily illustrated in FIGS. 10A-10D and FIGS. 11A-11D. For purposes of illustration, the detailed description refers to the accessory of the clinical examination device that operates with the magnetic charging connector system **160** as being an otoscope illuminator battery **124a**; however the scope of the medical diagnostic kit **100** disclosed herein is not limited to the magnetic charging connector system **160** being implemented with only an otoscope illuminator battery **124a**, but may be extended to include implementation of the magnetic charging connector system **160** with all clinical examination devices and accessories accommodated in the medical diagnostic kit **100**. In an example, the magnetic charging connector system **160** is also implemented with the wireless speaker **123** exemplarily illustrated in FIG. 1, accommodated in the medical diagnostic kit **100**. A storage position of the otoscope illuminator battery **124a** in the medical diagnostic kit **100** is, for example, in a corresponding cutout, for example, **131a**, of the deck **130** exemplarily illustrated in FIG. 3, or in a corresponding slot, for example, **105a**, of the cushioning member **105** exemplarily illustrated in FIG. 1.

[00124] Different views of the magnetic charging connector system **160** implemented with the otoscope illuminator battery **124a** for quick removal of the otoscope illuminator battery **124a** from the medical diagnostic kit **100** are exemplarily illustrated in FIGS. 10A-10D. As exemplarily illustrated in FIGS. 10A-10D, the magnetic charging connector system **160** comprises a universal magnetic connector **161**. The universal magnetic

connector **161** is operably coupled to the power distribution board **152** exemplarily illustrated in FIG. **8**, via a cable **162**. The universal magnetic connector **161** is, for example, a stationary coaxial magnetic connector. In an embodiment, the universal magnetic connector **161** is mounted moderately loose in a corresponding cutout, for example, **131a**, of the deck **130** exemplarily illustrated in FIG. **3**, or in a corresponding slot, for example, **105a**, of the cushioning member **105** exemplarily illustrated in FIG. **1**, to have freedom of movement to cling and self-align with a connector section **124b** of the otoscope illuminator battery **124a** for future charging of the otoscope illuminator battery **124a**. The universal magnetic connector **161** comprises a first magnetic connecting element **163** configured to magnetically engage with a second magnetic connecting element **164** operably coupled to the connector section **124b** of the otoscope illuminator battery **124a**. The first magnetic connecting element **163** and the second magnetic connecting element **164** are a pair of mating elements that magnetically attract each other for implementing a quick connect-disconnect mechanism. In an embodiment, the first magnetic connecting element **163** of the universal magnetic connector **161** protrudes from its storage position. FIGS. **10A-10D** exemplarily illustrates the otoscope illuminator battery **124a** removed from its storage position, while its magnetic counterpart, that is, the universal magnetic connector **161**, remains attached to the storage position, for example, the deck **130**. The second magnetic connecting element **164** on the connector section **124b** of the otoscope illuminator battery **124a**, when in close proximity to the first magnetic connecting element **163** on the universal magnetic connector **161**, is configured to magnetically attract the first magnetic connecting element **163** for receiving the power from the power distribution board **152**. The power distribution board **152** delivers power received from the multi-port charger **150** to the otoscope illuminator battery **124a** via the magnetic charging connector system **160**.

[00125] FIGS. **11A-11D** exemplarily illustrate different views of the magnetic charging connector system **160** implemented with an accessory, for example, the otoscope illuminator battery **124a**, for quick stowage of the accessory in the medical diagnostic kit **100** shown in FIG. **1**. When the otoscope illuminator battery **124a** is brought in close proximity to the universal magnetic connector **161**, the first magnetic connecting element **163** on the universal magnetic connector **161** magnetically attracts the second magnetic

connecting element **164** on the connector section **124b** of the otoscope illuminator battery **124a**, thereby connecting the otoscope illuminator battery **124a** to the universal magnetic connector **161** as exemplarily illustrated in FIGS. **11A-11D**, and allowing quick stowage of the otoscope illuminator battery **124a** into its corresponding storage position and charging of the otoscope illuminator battery **124a**. To disconnect the otoscope illuminator battery **124a** from the universal magnetic connector **161**, the otoscope illuminator battery **124a** is pulled apart from the universal magnetic connector **161**, thereby disengaging the corresponding magnetic connecting elements **164** and **163** as exemplarily illustrated in FIGS. **10A-10D**, and allowing quick removal of the otoscope illuminator battery **124a** from its corresponding storage position. The magnetic charging connector system **160** provides optimal connect-disconnect operations with battery-driven devices and accessories that need to be taken out of the casing **101** and placed back into the casing **101** during medical examinations.

[00126] The magnetic connecting elements **163** and **164** self-align and cling to each other when the universal magnetic connector **161** and the otoscope illuminator battery **124a** respectively, are placed in close proximity to each other. When the otoscope illuminator battery **124a** is placed firmly into its storage position in the casing **101** with the magnetic connecting element **164** facing its magnetic counterpart, that is, the magnetic connecting element **163** of the universal magnetic connector **161**, the magnetic connecting element **163** of the universal magnetic connector **161** is attracted to and self-connects to the magnetic connecting element **164** on the connector section **124b** of the otoscope illuminator battery **124a**. FIGS. **11A-11D** exemplarily illustrates the otoscope illuminator battery **124a** magnetically engaged to its magnetic counterpart, that is, the universal magnetic connector **161**, while being stowed in its storage position. When the otoscope illuminator battery **124a** is pulled out of its storage position, magnetic and electrical contacts of the magnetic connecting elements **163** and **164** are mechanically disconnected. In addition to accessories, the magnetic charging connector system **160** is implemented with the clinical examination devices for quick removal and stowage of the clinical examination devices in the medical diagnostic kit **100**. The magnetic charging connector system **160** is used for charging the clinical examination devices and the accessories, while

allowing convenient disconnection when the clinical examination devices and the accessories are removed from their storage positions in the medical diagnostic kit **100** and allowing connection when the clinical examination devices and the accessories are returned for stowage in the medical diagnostic kit **100**.

[00127] FIG. **12** exemplarily illustrates a flowchart of an embodiment of a method for charging clinical examination devices accommodated in the medical diagnostic kit **100** shown in FIG. **1**. An operator of the medical diagnostic kit **100** connects an alternating current (AC) power cord **159** to the multi-port charger **150** via the AC fused inlet **140** exemplarily illustrated in FIG. **8**, to initiate charging. If the AC power source is connected **1201**, the rechargeable batteries in the medical diagnostic kit **100**, for example, the energy storage device(s) **154** and the rechargeable batteries of the clinical examination devices **118**, **147**, **119**, **120**, **121**, **124**, etc., and the accessories exemplarily illustrated in FIG. **1** and FIG. **8**, are charged **1202** via the AC power source connected to the multi-port charger **150** and the power distribution board **152**. If the AC power source is not connected **1201** to the multi-port charger **150**, and if the upper shell **102** of the casing **101** is opened **1203**, the multi-port hubs **156** and **157** are powered **1205** from the energy storage device(s) **154**, and the medical examination is conducted **1206** using one or more of the clinical examination devices whose cable connectors are permanently connected to one of the ports **156a** and **157a** of the multi-port hubs **156** and **157** respectively.

[00128] When the casing **101** is connected to the AC power source, the multi-port charger **150** feeds power to the air-cooling fan system **153** via the power distribution board **152**, charges the computing devices **114**, **115**, and **149**, and charges the energy storage device **154** exemplarily illustrated in FIG. **8**. When the casing **101** is in the open position, the energy storage device **154** delivers the power to the multi-port hubs **156** and **157** exemplarily illustrated in FIG. **8**, for powering the clinical examination devices and the accessories. The operator may visually see charging activity on the computing devices **114**, **115**, and **149**, the internal energy storage device **154**, and the batteries of the clinical examination devices and the accessories by viewing their respective gauges, charging lights, etc., and assess time needed for a full charge. The operator observes charging lights

on the clinical examination devices and the accessories. If there is no charging activity, then the operator adjusts positions of the failed-to-charge clinical examination devices, accessories, and respective cable connectors or magnetic quick-disconnect connectors till charging activity commences, thereby ensuring all components are recharged for a patient visit. The operator then closes the casing **101** to reduce space and protect the contents of the casing **101**. If there is a need, AC charging can be done at the patient's location during the visit without affecting functionality of the casing **101** using a local AC connection. The AC inlet connection is a worldwide compatible International Electrotechnical Commission (IEC) standard inlet C14 and only affects the external detachable power cord **159** exemplarily illustrated in FIG. 8, to a country-specific AC outlet.

[00129] If the upper shell **102** of the casing **101** is closed, the medical diagnostic kit **100** is in a transport state **1204** or is ready for charging and can be charged via the AC power source connected to the multi-port charger **150**. That is, when the casing **101** is in the closed position, the multi-port charger **150** feeds power to the air-cooling fan system **153**, charges the computing devices **114**, **115**, and **149**, and charges the energy storage device **154** and the batteries of the clinical examination devices and the accessories.

[00130] FIG. 13 exemplarily illustrates a flowchart of an embodiment of a method for operating the medical diagnostic kit **100** shown in FIG. 1, for performing a medical examination. Consider an example where the medical diagnostic kit **100** is used for facilitating telemedicine, that is, a remote medical examination of a patient by an onsite care coordinator (OCC) acting as a "physician's hands" at the patient's location. The OCC opens **1301** the upper shell **102** of the casing **101** of the medical diagnostic kit **100** and switches on or activates **1302** the computing devices, for example, the network-enabled mobile phone **149** operating as a mobile hotspot, the diagnostic computer **114**, and the communication device **115** or tablet computing device exemplarily illustrated in FIG. 8. The diagnostic computer **114** runs **1303** the software application. The OCC selects **1304** an exam type, for example, an ear, nose, and throat (ENT) and skin examination on a graphical user interface (GUI) rendered by the software application. The OCC activates **1305** an illuminating control element **109** or switch corresponding to the selected exam

type on the console **108** exemplarily illustrated in FIG. **1**. The OCC retrieves **1306** the clinical examination device, for example, **118**, corresponding to the selected exam type from the slot **105f** in the medical diagnostic kit **100** exemplarily illustrated in FIG. **1**, and conducts the medical examination on the patient. The OCC then stows **1307** the cable of the clinical examination device in the cable compartment **129f** of the universal cable storage compartment **126** exemplarily illustrated in FIGS. **2-3**, and places the clinical examination device **118** above in the slot **105f** of the cushioning member **105** exemplarily illustrated in FIG. **1**. The OCC then deactivates **1308** the illuminating control element **109** on the console **108**. The OCC checks **1309** whether the physician requires further medical examination or whether the medical examination is complete. If the medical examination is complete, the OCC signs out **1310** of the software application on the diagnostic computer **114**, switches off or puts to sleep the computing devices **114**, **115**, etc., and closes the upper shell **102** or lid of the casing **101**. If the medical examination is not complete, the OCC proceeds to select **1304** another exam type on the GUI of the software application and repeats the steps **1305** to **1310**.

[00131] The medical diagnostic kit **100** enables a secure, interactive, two-way, real-time communication between a patient or an onsite operator such as an OCC attending to the patient at the patient's location and a health care practitioner, for example, a physician, at a remote site. The operation of the medical diagnostic kit **100** in telemedicine closes health care gaps over a large geographic area, addresses underutilized physician availability at any location, and attends to underserved patient populations due to scarcity of geographically local physicians. The medical diagnostic kit **100** provides an advanced level of concierge health care and telehealth medicine. The medical diagnostic kit **100** allows health care practitioners reach and periodically monitor patients who have difficulties attending specialist visits, especially patients affected by chronic diseases, who require continuous follow-up. The software application deployed on the diagnostic computer **114** receives, creates, processes, stores, and transmits medical data to a data storage device or a data store via a communication network, thereby providing access of records to different health care practitioners and therefore, allowing health care practitioners to diagnose the patient with a complete medical history of the patient. Moreover, the provision for

accommodating a network-enabled mobile phone **149** configured as a mobile hotspot in the medical diagnostic kit **100** provides reliable and uninterrupted access to a wireless communication network at the patient's location, thereby aiding in performing continuous and comprehensive medical examinations of the patient.

[00132] Furthermore, the optimal and orderly arrangement for placement and attachment of the clinical examination devices, the accessories, the computing devices **114**, **115**, and **149**, and their cables without mutual entanglement in the medical diagnostic kit **100** improves accessibility and aids in the effective use, handling, and management of tools, devices, equipment, and digital applications at the patient's location, thereby aiding a remote health care practitioner and an onsite operator in performing a medical examination of the patient. The clinical examination devices are configured with enclosed spaces for maximum sanitation. The medical diagnostic kit **100** provides a dedicated storage compartment **126** for accommodating the cables of the clinical examination devices in an orderly manner to prevent entanglement of the cables. The movable dividers **127** and subdividers **128** of the universal cable storage compartment **126** create configurable cable compartments **129a**, **129b**, **129c**, etc., exemplarily illustrated in FIGS. 2-3, for accommodating cables of clinical examination devices of different types, configurations, and future variants therewithin.

[00133] The medical diagnostic kit **100** provides a flexible layout that allows accommodation of new instruments or clinical examination devices and their future variants by allowing replacement of a minimal number of layers, for example, the universal cable storage compartment **126** being reconfigurable with movable dividers **127** and subdividers **128** exemplarily illustrated in FIG. 2, the deck **130** exemplarily illustrated in FIG. 3, and the cushioning member **105** exemplarily illustrated in FIG. 1. Furthermore, the medical diagnostic kit **100** comprises complementary computing and communication devices **114**, **115**, and **149** organized therewithin that adequately facilitate remote real-time medical examinations, provide access to a reliable communication network, operate with the clinical examination devices for enhanced visualization of organs of the patient, and generate, process, and store medical data during the medical examination for future use,

diagnosis, and continuous follow-up. The computing devices **114**, **115**, and **149** and other accessories, for example, the headset **803** exemplarily illustrated in FIG. **9**, a wireless speaker **123** exemplarily illustrated in FIG. **1**, etc., accommodated in the medical diagnostic kit **100** improve the two-way communication with a remote health care practitioner, for example, during auscultation, and improve verbal communication with a patient. The medical diagnostic kit **100** provides for convenient assembly and testing as the console **108** and the air-cooling fan system **153** comprising the exhaust and intake fans are all accommodated in the universal cable compartment **126**. The whole assembly comprising the console **108**, the universal cable storage compartment **126**, the deck **130**, and the air-cooling fan system **153** is mounted in the lower shell **103** of the casing **101** using few fasteners, for example, screws. The medical diagnostic kit **100** implements forced air cooling through the air-cooling fan system **153** to optimize charging time of the energy storage device(s) **154** when the casing **101** is in the closed position.

[00134] Furthermore, the hubs disconnection switch **144** that interrupts delivery of power from the energy storage device(s) **154** exemplarily illustrated in FIG. **8**, allows the medical diagnostic kit **100** to be transported in a closed position without the energy storage device(s) **154** being discharged, thereby saving battery power when the clinical examination devices are not in use. The medical diagnostic kit **100** also saves battery power by allowing selectively activation of only the required clinical examination device according to a diagnostic scenario and by disconnecting the energy storage device(s) **154** when the medical diagnostic kit **100** is in a closed position and is being transported. Furthermore, the medical diagnostic kit **100** further comprises built-in multi-port hubs **156** and **157** configured to permanently connect to the clinical examination devices and accessories by individual cable connectors for selectively powering and communicating data with the rechargeable battery-containing clinical examination devices and accessories, thereby improving maintenance operations and protecting expensive clinical examination devices. The multi-port charger **150** and the power distribution board **152** connect to the rechargeable battery-containing devices by individual cable connectors for charging when the medical diagnostic kit **100** is connected to an external AC power source. The cable connectors, for example, the USB cable connectors, of the clinical examination devices are

permanently attached to the built-in multi-port hubs **156** and **157** at all times until maintenance. Furthermore, the magnetic charging connector system **160** exemplarily illustrated in FIGS. **10A-10D** and FIGS. **11A-11D**, provides for in-casing charging and easy reconnect when the clinical examination device or accessory is returned to its storage position in the casing **101**, thereby improving field operations. The medical diagnostic kit **100** allows the clinical examination devices and the accessories to be charged inside the casing **101** using the magnetic charging connector system **160** without having to remove the clinical examination devices and the accessories from the casing **101** and change their cables.

[00135] The medical diagnostic kit **100** allows charging of the energy storage device(s) **154** with a closed or open casing **101**. The in-casing charging of the medical diagnostic kit **100** with forced air cooling of the rechargeable batteries of, for example, the computing devices **114**, **115**, and **149**, the clinical examination devices, and the accessories allows all the connected devices to securely charge in a shorter time. The ability to charge the battery-driven internal components in the closed casing **101** improves field operations and protects the expensive computing devices **114**, **115**, and **149** and clinical examination devices accommodated therein. The casing **101** of the medical diagnostic kit **100** is equipped with the air-cooling fan system **153** exemplarily illustrated in FIG. **8**, to prevent the energy storage device(s) **154** and other internal rechargeable batteries from overheating during charging when the casing **101** is in the closed position. The secondary camera **147** provided in the medical diagnostic kit **100** allows a remote health care practitioner to view a patient who may not be in the field of view of a camera of the diagnostic computer **114** being used for videoconferencing during the remote medical examination. The medical diagnostic kit **100** facilitates interactive medicine, also known as live telemedicine, thereby allowing patients and physicians to communicate in real time while also maintaining Health Insurance Portability and Accountability Act (HIPAA) compliance.

[00136] The medical diagnostic kit **100** allows onsite application of diagnostic tools, that is, the clinical examination devices, in a house call environment at a patient's home, where a health care practitioner, for example, a physician, at a remote site conducts a remote

medical examination of the patient. The medical diagnostic kit **100** allows physicians to remotely examine and prescribe to patients without the patients leaving their homes or apartments. Unlike conventional telemedicine platforms, the medical examinations conducted using the medical diagnostic kit **100** provide physicians with a data-rich experience from the onsite application of hospital-grade diagnostic tools, directed and supervised by the physicians in real time. The enhanced medical examination capability provided by the medical diagnostic kit **100** ensures the continued examination and treatment of, for example, non-COVID-19-related illnesses, particularly among vulnerable patient populations such as the elderly or immune-compromised, who would otherwise avoid or defer care as a result of self-isolation during the coronavirus pandemic. The medical diagnostic kit **100** also allows for continued services from physicians who are temporarily barred from delivering in-person care, due to the need to self-quarantine following COVID-19 exposure or infection.

[00137] In a house call scenario, the medical diagnostic kit **100** is deployed, for example, by onsite care coordinators (OCCs) who travel to patients' private homes and apartments, and facilitate patients' appointments with remotely located physicians. At all times during house calls, the OCCs are instructed to wear protective personal equipment and strictly adhere to infection-limiting behavioral protocols, pursuant, for example, to US Centers for Disease Control (CDC) and Prevention and World Health Organization (WHO) guidance. The application of the medical diagnostic kit **100** provides increased cost-effectiveness and process efficiency by allowing the patient visit to be conducted by an onsite medical assistant or a person of higher medical training and licensing as appropriate based on the goal of the medical examination, under continual supervision and direction of a remote physician.

[00138] In a nursing home or other congregate care environments, the medical diagnostic kit **100** is utilized on a mobile, patient room-to-patient room basis, by existing end-user medical assistant or facility staff acting as onsite care coordinators (OCCs), to connect with off-site physician support from locations that have insufficient, or non-existent, on-site physician staffing. The application of the medical diagnostic kit **100** reduces the risk of

patient-physician cross-infection resulting from direct patient-physician contact, and physicians can efficiently serve multiple patient locations without the need for physician travel.

[00139] The medical diagnostic kit **100**, being component-based, is adaptable to close care gaps over a large geographic area. If there is underutilized physician availability in a geographic area, the medical diagnostic kit **100** allows that physician resource to be used as long as the physician has access to an internet connection, for example, a satellite internet connection provided by a satellite internet constellation such as the Starlink[®] internet constellation operated by Space Exploration (SpaceX) Technologies Corporation. If there are underserved patient populations due to scarcity of geographically local physicians, those patients can be served, as long as the medical diagnostic kit **100** has been delivered locally and there is a trained operator for the medical diagnostic kit **100**.

[00140] FIG. **14** illustrates a telemedicine system **1400** for practicing telemedicine. As illustrated in FIG. **14**, the telemedicine system **1400** comprises the medical diagnostic kit **100**, the cloud computing environment **1406**, and the remote computing device **1408** of the remote health care practitioner, each connected to the communication network **1404**. Also, as illustrated in FIG. **14**, the software application **1402** is hosted on the diagnostic computer **114** of the medical diagnostic kit **100**. In an embodiment, the software application **1402** in the diagnostic computer **114** is configured to integrate a hardware driver of any of the clinical examination devices **118**, **147**, **119**, **120**, **121**, **124**, etc., illustrated in FIGS. **1**, **7A** and **7B**, with the click of a button. The button is either an illuminating control element **109** illustrated in FIG. **1** or a button displayed on the display screen of the diagnostic computer **114**. The software application **1402**, for example, comprises drivers for integrating any new clinical examination device that is connected to the medical diagnostic kit **100**. In an embodiment, the software application **1402** identifies a new clinical examination device that is connected to the medical diagnostic kit **100**. When the software application **1402** does not find a matching hardware driver for the new clinical examination device, the software application **1402** is configured to scan a library, for example, a local library or an online library, to determine if a matching hardware driver exists. If a matching hardware

driver exists, the matching hardware driver is loaded onto the diagnostic computer **114**. The software application **1402** therefore supports changes in hardware of the clinical examination devices, for example, the multi-organ imaging system **118**, the electrocardiograph **119**, the blood pressure monitor **120**, the oximeter **121**, the otoscope **124**, the secondary camera **147**, the stethoscope **122**, etc. For example, if a clinical examination device is replaced by another clinical examination device of a different brand, the software application **1402** identifies the replacement clinical examination device and loads the matching hardware driver for the replacement clinical examination device to enable the replacement clinical examination device to function seamlessly.

[00141] In an embodiment, the software application **1402** is a Windows application that allows any device, for example, a clinical examination device, connected to the diagnostic computer **114** of the medical diagnostic kit **100**, and that provides a display on the diagnostic computer's **114** screen to be "integrated" to the medical diagnostic kit **100**. In an embodiment, the software application **1402** integrates clinical examination devices that provide audible and other type of outputs. FIGS. **18A-18G** illustrate configuration screens of the various clinical examination devices. In an embodiment, the software application **1402** is configured to display a configuration screen, on the display screen of the diagnostic computer **114** of the medical diagnostic kit **100** to allow for a software administrator, for example, an OCC to add a new instrument or a new clinical examination device. As illustrated in FIGS. **18A-18G**, the OCC selects the new instrument or the new clinical examination device by its registered name in the Windows Registry name, or by supplying the path to the custom hardware driver if the device does not have an installable hardware driver. As shown in FIGS. **18A-18C** and **18E-18G**, "Path to executable file" refers to the path to the custom hardware driver of the clinical examination device. Either way, the new instrument or the new clinical examination device connected can be initiated from the display screen of the diagnostic computer **114** of the medical diagnostic kit **100** via a dedicated button or via an illuminating control element **109**. By default, the settings of the diagnostic computer **114** of the medical diagnostic kit **100** support a standard set of clinical examination devices, for example, the multi-organ imaging system **118**, the electrocardiograph **119**, the blood pressure monitor **120**, the oximeter **121**, the otoscope

124, the secondary camera **147**, the stethoscope **122**, etc. FIGS. **18A-18C** and **18E-18G** also show a “Path to data folder” where the medical data captured by the clinical examination device is stored. The clinical examination device may also be enabled or disabled using a toggle switch displayed on the display screen of the diagnostic computer **114**, as shown in FIGS. **18A-18G**.

[00142] FIGS. **15** and **16** illustrate screenshots of a graphical user interface (GUI) rendered by the software application **1402** showing lists of clinical examination devices connected to the medical diagnostic kit **100**. The software application **1402** is configured to provide a visual output of the measurement or reading provided by the clinical examination devices, including the new clinical examination device, on a display of the diagnostic computer **114**. Furthermore, as explained earlier, the software application **1402** is configured to receive, create, record, process, store, and securely transmit medical data from the clinical examination device(s) to the remote computer **1408** of the practitioner and to a data store **1406** via a communication network **1404**, for example, a wireless communication network. For example, the software application **1402** is configured to take a single screenshot, take screenshots periodicity, or start a continuous recording of the images and/or videos displayed on the display screen of the diagnostic computer **114** and computing device **115** and save them in the cloud data store. As illustrated in FIGS. **15** and **16**, the software application **1402** provides buttons on the display screen of the diagnostic computer **114** to allow a user, for example, the OCC to take a single screenshot, take screenshots periodicity, or start a continuous recording of the images and/or videos displayed on the display screen of the diagnostic computer **114** and computing device **115**. In an embodiment, the software application **1402** is configured to securely transmit the medical data from the clinical examination device(s) directly to the remote computer **1408** of the practitioner via the communication network **1404**. In another embodiment, the software application **1402** is configured to securely transmit the medical data from the clinical examination device(s) to both the cloud data store **1406** and the remote computer **1408** of the practitioner via the communication network **1404**.

[00143] In an embodiment, the software application **1402** is further capable of encrypting the medical data produced as a result of the data being captured using one or more clinical examination devices, including all audio and video data. FIGS. **15** and **16** also illustrate an appointment log button on the GUI rendered by the software application **1402**. In an embodiment, the software application **1402** comprises an appointment scheduling module **1402a**, illustrated in FIG. **14**. The appointment scheduling module **1402a** allows users to create appointments in both a local mode and a live mode. Local Mode allows the clinical examination to take place without having to send the medical data to the cloud data store. Instead, the medical data is stored locally in an encrypted format and the encrypted medical data is configured to be copied into an encrypted external storage device or safely deleted. In an embodiment, the encrypted medical data is uploaded to cloud storage and decrypted at the cloud storage. In another embodiment, the medical data is always stored in an encrypted format on the medical diagnostic kit **100**. In an embodiment, the onsite care coordinators (OCCs) who travel to patients' private homes create the appointments through local mode. In an embodiment, the appointments are created by the patients themselves. In the live mode, appointments are booked by a user via the web-based platform provided by software application **1402** in the diagnostic computer **114** or created directly on the medical diagnostic kit by an operator without the user booking it, and the appointments are synchronized with a "Practice storage" in a remote data store, as illustrated in FIG. **14**. A remote data store, as used herein, is for example, the cloud data store **1406a** shown in FIG. **14**. The local mode of appointment can be used for a quick in-field triage where the medical data of a patient must be quickly copied and the medical data cannot be saved to the remote data store as it may not belong to any practice, for example, emergency operation during COVID for popup tent triage. A "Practice Storage" is a HIPAA-complaint file storage secured with appropriate Access Control List (ACL) settings into which the medical data from the live or real-time medical examination of a patient is sent. That medical data is converted into an appropriate format. For example, raw videos in the medical data are converted for viewing in various resolutions, video files and other files in the medical data are encrypted, etc. As used herein, raw video refers to uncompressed original video captured by the secondary camera **147** at the medical diagnostic device **100**. Furthermore, links or URLs to the files of the medical data are stored in the cloud data store **1406a** and

sent to the patients for future viewing. For example, the links or URLs are stored in the electronic health record of a patient. In an embodiment, the links or URLs to the files of the medical data are sent to the remote health care practitioner.

[00144] Furthermore, the software application **1402** is capable of logging all the appointments for support. The software application **1402** is further capable of setting alerts in between the on-site care coordinators (OCCs). Alerts are sent by the software application **1402** to notify the OCCs regarding possible malfunction in the medical diagnostic kit **100**. For example, in an ongoing telemedicine session, the software application **1402** sends alerts to the OCC using the medical diagnostic kit **100** about possible malfunctions in the medical diagnostic kit **100**. In another embodiment, the software application **1402** sends alerts to the OCC about issues and notes from the previous operator of the medical diagnostic kit **100** with possible remedies. The software application **1402** is further capable of placing the medical diagnostic kit **100** into a maintenance mode. For example, the software application **1402** is programmed to place the medical diagnostic kit **100** into the maintenance mode when one or more of the clinical examination devices of the medical diagnostic kit **100** are replaced, when the software application **1402** is updated, etc. In an embodiment, the user, for example, the OCC can also place the medical diagnostic kit **100** in the maintenance mode with the click of a button. The button is either an illuminating control element **109** illustrated in FIG. 1 or a button displayed on the diagnostic computer **114**. FIG. 19 illustrates a screenshot of the graphical user interface (GUI) rendered by the software application **1402** on the display screen of the diagnostic computer **114** showing a button to place the medical diagnostic kit **100** in the maintenance mode. Also, the medical diagnostic kit **100** can be placed in the maintenance mode to avoid using it in the future until it is serviced. A record of defects in the medical diagnostic kit **100**, a record of the time instances when the medical diagnostic kit **100** was placed under maintenance, reasons for placing the medical diagnostic kit **100** under maintenance, and repairs and replacement performed during maintenance are all be saved either on the medical diagnostic kit **100** and/or the cloud data store **1406a** for the future analysis and for planning capacity utilization the medical diagnostic kit **100**.

[00145] In an embodiment, medical data and appointment data of a patient are used to produce a bill using the medical diagnostic kit **100** using the recoded medical data, for example, screenshots, audio data and/or video data as supporting document for billing. The bill is either an intermediary bill or a final bill.

[00146] The software application **1402** is further capable of synchronizing the medical data, for example, the data in the medical diagnostic kit **100**, in real-time into the cloud data store **1406a**. The medical diagnostic kit **100** is configured to synchronize the medical data, for example, the patient's vital signs, sonograms, electrocardiograms (ECGs), auscultation sounds, camera pictures, etc., stored securely in an internal storage device of the medical diagnostic kit **100** with a physician's remote computing device or the remote cloud data store **1406a**. In an embodiment, the software application **1402** provides provisions for leaving messages from one operator/user to another operator/user between successive medical examinations. A headset **902** with a microphone exemplarily illustrated in FIG. **9** is used to record audio messages. In an embodiment, a secondary camera **147** exemplarily illustrated in FIGS. **7A-7B** is used to record video messages. Furthermore, operators can exchange the messages using the Maintenance options in the medical diagnostic kit **100**. An operator can leave a message to the next operator that uses the medical diagnostic kit **100**. FIG. **21** illustrates a screenshot of the graphical user interface (GUI) rendered by the software application **1402** on the diagnostic computer **114** for accessing messages stored in the medical diagnostic kit **100**.

[00147] The software application **1402** is further capable of creating a transaction log that automatically records usage of all clinical examination devices, including the sequence of usage of the clinical examination devices, frequency of usage of each of the clinical examination devices. The software application **1402** is further capable of capturing the timeline of each clinical examination device usage with captured screenshots that can serve as proof for the insurance companies that a medical examination was actually conducted. This feature is very relevant at the present time where telehealth is difficult to regulate. The software application **1402** is further capable of synchronizing medical data of a patient and appointment data with electronic health record of the patient at the physician's remote

computing device or the cloud-data store, thereby providing ready access of all files and medical data of the patient to the remote health care practitioner at any point in time. In an embodiment, the medical data is synchronized during the appointment, in case the doctor requires the most updated medical data. In another embodiment, the medical data is synchronized at a later point of time. In an embodiment, upon reaching the count of 10 unsynchronized appointments stored on the medical diagnostic kit **100**, the medical diagnostic kit **100** blocks the OCC to use the software application **1402** until the medical data and appointments are synchronized.

[00148] FIG. **17** illustrates an appointment log created by the software application **1402**. In an embodiment, using each clinical examination device in an order or using one or more clinical examination devices creates an automatic appointment log in the appointment data of the patient. The appointment log is, for example, a form where events of calling the one or more clinical examination devices are captured along with screenshots and/or video displayed on the display screen of the diagnostic computer **114** and/or the display unit **115a** of the communication device **115**, corresponding to the clinical examination device in use. The screenshots and/or video displayed on the display screen of the diagnostic computer **114** and/or the display unit **115a** of the communication device **115** are configured to be recorded. In an embodiment, the medical diagnostic kit **100** records the medical data from two or more clinical examination devices **118**, **147**, **119**, **120**, **121**, **124**, etc., when that are used simultaneously. The medical diagnostic kit **100** comprises a “recording” panel, illustrated in FIGS. **15** and **16** which allows the OCC of the medical diagnostic kit **100** to initiate recording of either:

- a continuous screencast of the medical examination content displayed on the display screen of the diagnostic computer **114** and/or the display unit **115a** of the communication device **115**;
- a single screenshot on button press, or
- screenshots at intervals of 15 seconds.

[00149] In an embodiment, the software application **1402** is further configured to block the usage of the medical diagnostic kit **100** until appointment data is synchronized. In an embodiment, the appointment data is deleted from the diagnostic computer **114** by the software application **1402** after synchronization. The file system in the diagnostic computer **114** places a restriction on the final size of a file, for example, the appointment data and therefore, the diagnostic computer **114** is not used as a permanent storage and instead the medical data, including appointment data, is encrypted and stored in the diagnostic computer **114** only till the medical data reaches the final size. In another embodiment, the medical data is stored in the diagnostic computer **114** for a temporary period of time. Beyond the temporary period of time, the encrypted medical data is synchronized with the medical data on the cloud data store **1406a**. At any time during the clinical examination, the local recorded data collected at the medical diagnostic kit **100** can be synchronized with the cloud data store **1406a** so that, during a videoconference, if the communication network **1404** connection is not strong enough to produce a video of adequate sharpness for the remote health care practitioner to view, if image resolution is lower compared to the original image, if image on the screen is blurry or pixelated, or if the screen is too small and the remote health care practitioner is required to zoom in. In an embodiment, by maintaining a connection to the communication network **1404**, the local recorded data can be pushed into the cloud data store constantly at a frequency which can make this a part of remote monitoring activity. The OCC can switch between various audio/video conference connections treating a number of patients at the same time, resembling a real physical office. If a communication link to the physician's remote computing device is not available, the medical diagnostic kit **100** and the software application **1402** are configured to store medical data, for example, the patient's vital signs, sonograms, electrocardiograms (ECGs), auscultation sounds, camera pictures, etc., securely in an internal storage device for a later upload or an artificial intelligence (AI)-enabled batch upload to the physician's remote computing device, when the communication network **1404** is available.

[00150] The medical diagnostic kit **100** provides a user-friendly, web-based platform with an integrated video/audio conference connection enabling remote real-time exams. The

medical data recorded during the remote, real-time medical examinations is securely stored electronically for future diagnostic and/or therapeutic use. The software application **1402** and the medical diagnostic kit **100** gather medical data in real-time where the medical data comprises physical exam data and chronic conditions related data. The medical data also comprises audio-visual data from the secondary camera **147**, the microphone of the diagnostic computer **114**, the microphone signal from the headset **803**, etc. The audio-visual data is collected in concert so that the collected data aids a remote healthcare practitioner in effectively diagnosing the patient's condition and not collected just for transmitting the data to the cloud data store. The audio-visual data comprises raw data having video, screencast and audio together to create an effect of the full physical examination. As used herein, raw data, refers to uncompressed original video, audio and/or image data. In embodiment, the software application **1402** utilizes machine learning and/or artificial intelligence in between collecting medical data and reception of medical data at the remote computing device of the remote health care practitioner for enhanced real time diagnostic. The cloud computing environment **1406** utilizes a machine learning/artificial intelligence engine **1406b**, herein referred to as ML/AI engine **1406b** coupled to a processor **1406c** and a memory **1406d**, as illustrated in FIG. **14**, for analyzing the recorded medical data in real-time automatically through machine learning and artificial intelligence algorithms to diagnose medical conditions and probable patterns of illnesses in a patient. In an embodiment, the machine learning and artificial intelligence algorithms are stored in the cloud data store **1406a**. The cloud data store **1406a** comprises medical data of a patient along with medical data of other patients. The ML/AI engine **1406b** is also linked to external databases **1410** that comprise information of various illnesses. The ML/AI engine **1406b** is configured to utilize the machine learning and artificial intelligence algorithms to compare the medical data of a patient against the information in the external databases **1410** to diagnose medical conditions and probable patterns of illnesses in the patient. Information related to the diagnosed medical conditions and probable patterns of illnesses in the patient are relayed in real-time to the physician's remote computing device **1408**.

[00151] The diagnostic computer **114** allows a user, for example, an operator of the medical diagnostic kit **100**, to sign in to the software application **1402** through a restricted

user account and rotated password. In an embodiment, the medical diagnostic kit **100** is connected to an application **1402** on the cloud computing environment. The user, for example, an OCC, is automatically authenticated against user data in the Data store of the cloud computing environment **1406**. If the user's credentials are accurate, the medical diagnostic kit **100** authenticates the user and pulls the scheduled appointment data from the cloud data store **1406a**. FIG. **20** illustrates a user profile displayed on the display screen of the diagnostic computer **114** after the medical diagnostic kit **100** authenticates the user. If the OCC has an appointment scheduled, the OCC can start the appointment. Alternatively, the OCC can create appointments manually. Each appointment is connected to the electronic health record of the patient at the physician's remote computing device or the cloud-data store. In an embodiment, the cloud data store is HIPAA-compliant.

[00152] FIG. **22** illustrates a method for practicing telemedicine. The method comprises providing **2202** a medical diagnostic kit **100** that is communicatively coupled to a cloud computing environment **1406** and a remote computing device **1408** through a communication network **1404**. The method further comprises authenticating **2204** a user to operate the medical diagnostic kit **100**. Furthermore, the method comprises detecting **2206** one or more clinical examination devices connected to the medical diagnostic kit **100**. The method further comprises recording **2208** medical data of a patient at the medical diagnostic kit **100**. The medical data comprises medical data from the one or more clinical examination devices and audio-visual data from a secondary camera **147** attached to the medical diagnostic kit **100**. The method further comprises transmitting **2210** the recorded medical data in real-time to the remote computing device **1408** of the remote health care practitioner via the diagnostic computer **114** for enabling both real-time and off-line medical examination by a healthcare practitioner. As used herein, off-line medical examination comprises review of the medical data of a patient stored in the cloud data store **1406a**. The method further comprises mapping **2212** the medical examination of a patient with a predefined set of the clinical examination devices for use to fulfil a specific medical examination. The specific medical examination is part of a routine Chronic Condition Management program, a routine wellness examination, an annual vaccination, an annual Health Risk Assessment survey, and/or an urgent care visit. The step of mapping the

medical examination further comprises mapping one or more medical procedures with the predefined set of the clinical examination devices. Examples of medical procedures comprise the auscultation procedure, electrocardiography, etc. For the auscultation procedure, the software application **1402** selects the stethoscope **122** on the diagnostic computer **114** and after the auscultation, the software application **1402** selects the internal conferencing microphone to communicate with the patient. As exemplarily illustrated in FIG. 8, an audio cable of the stethoscope **122** is connected to an USB audio card **801** via the stethoscope interface component **802**. The audio card **801** is configured to transmit the second audio signal from the stethoscope **122** to the remote computing device **1408** of the remote health care practitioner via the diagnostic computer **114**. For the software application **1402** selects the electrocardiography procedure, electrocardiograph (ECG) **119** and instructs the operator of the medical diagnostic kit **100** to connect the leads of the electrocardiograph (ECG) **119** to the patient. The electrical activity of the heart of the patient is transmitted to the remote computing device **1408** of the remote health care practitioner via the diagnostic computer **114**. As described above, the medical data, for example, the second audio signal and the electrical activity of the heart are also transmitted to the cloud data store **1406a**.

[00153] In an embodiment, during a telemedicine session, the software application **1402** allows a remote health care practitioner to remotely instruct an operator, for example, the OCC, of the medical diagnostic kit **100** to perform one or more procedures and/or specific medical examinations by using a predefined set of the clinical examination devices. Typically, such instructions to the operator of the medical diagnostic kit **100** are traditionally issued verbally, for example, through a voice connection, cell phone connection, etc. The software application **1402** allows the remote health care practitioner to issue such instructions through a GUI rendered by the software application **1402** on the diagnostic computer **114** of the medical diagnostic kit **100**. Providing instructions through the GUI rendered by the software application **1402** eliminates human error that may be caused when a verbal instruction is misunderstood, misheard, etc.

[00154] FIG. 23 illustrates a Graphical User Interface (GUI) rendered by the software application 1402 on a display screen of the diagnostic computer 114 showing specific medical examinations and procedures suggested by a health care practitioner. FIG. 24 illustrates a Graphical User Interface (GUI) rendered by the software application 1402 showing instructions issued remotely to an operator by a remote health care practitioner for a selected procedure. As shown in FIG. 24, the procedure selected is a “Health Check-up” for the patient. FIG. 24 shows the order of steps that the operator should perform, for example, filling an intake form, obtaining payment details such as insurance or other payment, updating symptoms, etc. FIG. 24 also shows the order of clinical examination devices to be used, for example, use Thermometer, followed by Pulse Oximeter, Blood Pressure Monitor, Weight Scales, Stethoscope, Camera, etc. FIG. 25 illustrates a Graphical User Interface (GUI) rendered by the software application 1402 showing an order of the clinical examination devices that should be used for the selected procedure. The operator of the medical diagnostic kit 100 taps on the GUI of the software application 1402 to select a specific medical examination, procedure, or clinical examination device on the GUI as directed by the remote health care practitioner. In another embodiment, the remote health care practitioner may directly select the same specific medical examination, procedure, or clinical examination device on a GUI of his or her Remote Computing Device 1408. The selection made by the remote health care practitioner on the GUI of his or her Remote Computing Device 1408 is reflected on the GUI rendered by the software application 1402 on the display screen of the diagnostic computer 114 so that the order, reason and medical code used for specific medical examination, procedure, or clinical examination device is reflected in the transaction log and/or appointment log for medical coding used during the billing process for creation of either the intermediary bill or the final bill.

[00155] As used herein, medical codes are numbers assigned to every task and service a health care practitioner, for example, a doctor, an OCC, etc., may provide to a patient including medical, surgical, and diagnostic services. Medical codes are used by insurers to determine the amount of reimbursement that a health care practitioner will receive by an insurer for that service. Since everyone uses the same codes to mean the same task or

service, the medical codes ensure uniformity, and help in both tracking and billing purposes.

[00156] The order or sequence of selecting the specific medical examination, procedure, or clinical examination device, and the reason for that order or sequence is recorded, regardless of whether it is the remote health care practitioner that taps on the buttons on the GUI of the Remote Computing Device **1408** or if it is the operator of the medical diagnostic kit **100** that taps on the GUI on the diagnostic computer **114** of the Medical Diagnostic Kit **100**, as a result of the verbal instruction from the remote health care practitioner. When the remote health care practitioner taps on the buttons on the GUI of the Remote Computing Device **1408**, there is no need for operator to even determine if the remote health care practitioner speaks the same language as the operator. Even if the remote health care practitioner speaks the same language as the operator, there is no need for the operator to understand what the remote health care practitioner speaks. FIG. **27** illustrates a GUI rendered on the display screen of the Remote Computing Device of the remote health care practitioner. FIG. **28** illustrates a command window displayed by the software application showing textual and video instructions on how to perform a procedure requested by the remote health care practitioner. The command window illustrated in FIG. **28** pops up as a result of the remote health care practitioner pressing a button on the GUI of the Remote Computing Device **1408** or the operator pressing a button on the GUI on the diagnostic computer **114** in response to the instructions received from the remote health care practitioner. As shown in FIG. **28**, the command window has both textual and video instructions on how to perform a procedure requested by the remote health care practitioner. The textual and video instructions further eliminate human error by the operator.

[00157] The embodiments disclosed herein are configured to operate in a network environment comprising one or more computing devices that are in communication with one or more clinical examination devices, accessories, and/or a storage platform via a network. In an embodiment, the devices communicate with each other directly or indirectly, via a wired medium or a wireless medium such as the Internet, a local area

network (LAN), a wide area network (WAN) or the Ethernet, satellite internet, or via any appropriate communications mediums or combination of communications mediums. Each of the devices comprises processors and communication components that are adapted to communicate with other devices. In an embodiment, each of the devices is equipped with a network communication device, for example, a network interface card, a modem, or other network connection device suitable for connecting to a network. One or more of the devices execute an operating system. While the operating system may differ depending on the type of computing device, the operating system provides the appropriate communications protocols to establish communication links with the network and the clinical examination devices. Any number and type of machines may be in communication with the computing devices. The embodiments disclosed herein are not limited to a particular computer system platform, processor, operating system, or network.

[00158] The foregoing examples and illustrative implementations of various embodiments have been provided merely for explanation and are in no way to be construed as limiting of the embodiments disclosed herein. While the embodiments have been described with reference to various illustrative implementations, drawings, and techniques, it is understood that the words, which have been used herein, are words of description and illustration, rather than words of limitation. Furthermore, although the embodiments have been described herein with reference to particular means, materials, techniques, and implementations, the embodiments herein are not intended to be limited to the particulars disclosed herein; rather, the embodiments extend to all functionally equivalent structures, methods and uses, such as are within the scope of the appended claims. It will be understood by those skilled in the art, having the benefit of the teachings of this specification, that the embodiments disclosed herein are capable of modifications and other embodiments may be effected and changes may be made thereto, without departing from the scope and spirit of the embodiments disclosed herein.

CLAIMS

We claim:

1. A medical diagnostic kit comprising:

a casing comprising an upper shell and a lower shell connected to each other via a hinged connection, wherein the upper shell is in movable relation to the lower shell via the hinged connection between an open position and a closed position of the casing;

a universal cable storage compartment accommodated in the casing, wherein the universal cable storage compartment comprises movable dividers configured to create configurable cable compartments for accommodating cables of a plurality of clinical examination devices without mutual entanglement;

a deck positioned on the universal cable storage compartment, wherein the deck comprises a plurality of cutouts positioned in a one-to-one correspondence to the configurable cable compartments of the universal cable storage compartment, and wherein the cutouts of the deck are configured to support the clinical examination devices and accessories in a plurality of configurations;

multi-port hubs positioned inside the casing, wherein the multi-port hubs are configured to permanently and securely connect individual cable connectors of the clinical examination devices and the accessories and selectively power and communicate data with one or more of the clinical examination devices and the accessories;

one or more energy storage devices operably coupled to a multi-port charger inside the casing, wherein the one or more energy storage devices, when connected to a power source, are configured to receive power from the multi-port charger, and

wherein the one or more energy storage devices are configured to deliver the power to the multi-port hubs via a hubs disconnection switch for powering and communicating data with the one or more of the clinical examination devices and the accessories when the casing is in the open position;

the hubs disconnection switch operably coupled to the one or more energy storage devices and the multi-port hubs, wherein the hubs disconnection switch is in operable communication with a disconnection member operably connected between the upper shell and the lower shell of the casing, and wherein the hubs disconnection switch, when activated by the disconnection member, is configured to interrupt the delivery of the power from the one or more energy storage devices to the multi-port hubs when the casing is in the closed position; and

a plurality of computing devices supportably positioned in the casing, wherein one of the computing devices is a diagnostic computer configured to (a) activate one or more of the clinical examination devices; (b) execute media conference connections; (c) receive, create, record, process, store, and securely transmit medical data from the one or more of the clinical examination devices to a data store via a communication network; and (d) facilitate remote real-time medical examinations via a software application deployed on the diagnostic computer, and wherein another one of the one or more computing devices is a communication device in operable communication with the diagnostic computer via the communication network, and wherein the communication device is configured to display a media stream from the one or more of the clinical examination devices.

2. The medical diagnostic kit of claim 1, wherein the upper shell of the casing comprises an upper support wall adjoined by side walls oriented substantially perpendicular to the upper support wall to define an upper cavity, and wherein the lower shell of the casing comprises a lower support wall adjoined by side walls oriented substantially perpendicular to the lower support wall to define a lower cavity.

3. The medical diagnostic kit of claim 2, wherein the universal cable storage compartment, the deck, the multi-port hubs, the one or more energy storage devices, an air-cooling fan system, a power distribution board, a hubs disconnection switch board, a stethoscope interface component, and the multi-port charger are accommodated in the lower cavity of the lower shell of the casing, and wherein the computing devices are supportably positioned in the upper cavity of the upper shell of the casing.
4. The medical diagnostic kit of claim 1, further comprising a side door hinged to a door frame exteriorly positioned on a side wall of the casing, wherein the side door is configured to close and protect inlet ports and outlet ports of the medical diagnostic kit.
5. The medical diagnostic kit of claim 4, wherein the inlet ports comprise an air intake port with a particle filter and an alternating current fused inlet, and wherein the alternating current fused inlet is configured to provide the power from the power source to the multi-port charger for charging the one or more energy storage devices, the computing devices, the clinical examination devices, and the accessories inside the casing, and wherein the outlet ports comprise louvers in fluid communication with an air-cooling fan system positioned in the casing and configured to direct heated internal air in an upward direction into an upper cavity defined by the upper shell of the casing without mixing with incoming external air flowing in a lower cavity defined by the lower shell of the casing for optimal cooling in the medical diagnostic kit.
6. The medical diagnostic kit of claim 1, further comprising a fan protector affixed to the deck, wherein the fan protector is configured to protect an exhaust fan of an air-cooling fan system interiorly positioned proximal to a side wall of the casing and supported by a fan backplate.
7. The medical diagnostic kit of claim 1, further comprising air circulation holes configured proximal to an edge of the deck, wherein the air circulation holes are configured to assist in movement of forced air provided by an air-cooling fan system, from a lower cavity defined by the lower shell of the casing to an upper cavity defined

by the upper shell of the casing, during charging of the computing devices, the clinical examination devices, and the accessories powered by the multi-port charger.

8. The medical diagnostic kit of claim 1, further comprising a cushioning member comprising slots positioned on the deck in correspondence to the configurable cable compartments of the universal cable storage compartment, wherein the slots of the cushioning member are configured according to shapes of the clinical examination devices and the accessories to protectively accommodate the clinical examination devices and the accessories in the plurality of configurations.
9. The medical diagnostic kit of claim 1, wherein the communication device is a tablet computing device comprising a display unit configured to assist in aiming a camera lens of one of the clinical examination devices and visualizing one or more of a plurality of organs of a patient, and wherein the display unit is configured to receive and display a media stream of each of the visualized one or more of the organs captured by the one of the clinical examination devices via the camera lens.
10. The medical diagnostic kit of claim 1, wherein the communication device is configured to remotely control the software application deployed on the diagnostic computer.
11. The medical diagnostic kit of claim 1, further comprising a removable device holder lockably positioned in the casing, wherein the removable device holder is configured to accommodate the communication device, and when unlocked and removed from the casing, assist in attaching the communication device to one or more of the clinical examination devices.
12. The medical diagnostic kit of claim 1, further comprising a device holder pivotably connected to the casing, wherein the device holder is configured to accommodate the diagnostic computer, and wherein the device holder is configured to assist in aiming a camera of the diagnostic computer when pivoted.

13. The medical diagnostic kit of claim 1, further comprising a non-removable device holder positioned in the casing, wherein the non-removable device holder is configured to accommodate another one of the computing devices, and wherein the another one of the computing devices is a network-enabled mobile phone configured to provide access of the communication network to the diagnostic computer and the communication device.
14. The medical diagnostic kit of claim 1, further comprising a primary hub operably coupled to the multi-port charger, the diagnostic computer, and the multi-port hubs, wherein the primary hub is configured to receive the power from the multi-port charger and deliver the power to the diagnostic computer for charging the diagnostic computer and executing data communication between the diagnostic computer and the clinical data examination devices and the accessories.
15. The medical diagnostic kit of claim 1, wherein each of the multi-port hubs comprises a plurality of universal serial bus switchable ports configured to permanently and securely connect the individual cable connectors of the clinical examination devices and the accessories and selectively power and communicate data with the one or more of the clinical examination devices and the accessories.
16. The medical diagnostic kit of claim 1, further comprising a headset jack positioned at a predetermined mounting location in the casing, wherein the headset jack is configured to connect a headset for use during auscultation.
17. The medical diagnostic kit of claim 1, further comprising a stethoscope interface component operably coupled to one of the multi-port hubs via an audio card for executing a remote auscultation using a stethoscope accommodated in one of the cutouts on the deck, wherein the stethoscope is charged by the multi-port charger within the casing via the stethoscope interface component, and wherein the stethoscope interface component comprises:

an audio splitter operably coupled to the stethoscope for receiving a stethoscope signal from the stethoscope during the remote auscultation and splitting the stethoscope signal into a first audio signal and a second audio signal, wherein the first audio signal is transmitted to a headset, and wherein the second audio signal is transmitted to the audio card via an audio switch, and wherein the audio card is configured to transmit the second audio signal to a remote computing device via the diagnostic computer;

the audio switch configured to select between the second audio signal and a microphone signal from the headset for transmission to the audio card; and

a decoder operably coupled to an audio control element of the headset, wherein the decoder is configured to decode a control signal received from the audio control element and operate the audio switch.

18. The medical diagnostic kit of claim 1, further comprising an auxiliary port positioned at a predetermined mounting location in the casing, wherein the auxiliary port is configured to facilitate external connections to one of the multi-port hubs, and wherein the auxiliary port is operably coupled to the one of the multi-port hubs for delivering power to the external connections and executing data exchange with the external connections.
19. The medical diagnostic kit of claim 1, wherein the multi-port charger is electrically connected to and configured to charge the one or more energy storage devices, the computing devices, the clinical examination devices, and the accessories.
20. The medical diagnostic kit of claim 1, further comprising an air-cooling fan system comprising cooling fans positioned in the lower cavity and the upper cavity of the casing, wherein the air-cooling fan system is configured to produce an air flow within the lower cavity and the upper cavity of the casing for cooling the multi-port charger, the one or more energy storage devices, the computing devices, the clinical

examination devices, and the accessories to prevent overheating thereof when the casing is in the closed position during charging.

21. The medical diagnostic kit of claim 1, wherein the clinical examination devices comprise a stethoscope, an electrocardiograph, an otoscope, an ultrasound device, a thermometer, a blood pressure monitor, an oximeter, a throat exam camera, a skin exam camera, and a secondary camera, and wherein the accessories comprise one or more input devices and one or more output devices configured to interface with one or more of the computing devices; and electrocardiograph electrodes; and wherein the one or more input devices comprise a headset and a wireless keyboard, and wherein the one or more output devices comprise a wireless speaker.
22. The medical diagnostic kit of claim 21, wherein the secondary camera extends from a flexible mount in the casing, and wherein the flexible mount is configured to aim a camera lens of the secondary camera towards a patient and allow a health care practitioner at a remote site to view the patient when the patient is out of view of a camera of the diagnostic computer, and wherein the secondary camera is operably coupled to one of the multi-port hubs using an internal power supply and data communication cable positioned in the flexible mount.
23. The medical diagnostic kit of claim 1, further comprising illuminating control elements operably coupled to switchable ports of the multi-port hubs and configured to one of activate and deactivate the one or more of the clinical examination devices and one or more of the accessories to save battery power and provide visual information to an operator about the switchable ports being energized.
24. The medical diagnostic kit of claim 1, further comprising a magnetic charging connector system comprising one or more magnetic connectors operably coupled to the multi-port charger and magnetically engageable to one or more of the clinical examination devices and the accessories positioned proximal to the one or more

magnetic connectors to create an electrically conductive relationship therebetween, wherein each of the one or more magnetic connectors comprises:

a first magnetic connecting element protruding from each of one or more of the cutouts of the deck; and

a second magnetic connecting element operably coupled to a connector section of a battery of each of the one or more of the clinical examination devices and the accessories, wherein the second magnetic connecting element, when in close proximity to the first magnetic connecting element is configured to magnetically attract the first magnetic connecting element for receiving the power delivered by the multi-port charger.

25. The medical diagnostic kit of claim 1, wherein the software application is configured to display, on the diagnostic computer, a panel of the clinical examination devices and the accessories accommodated in the medical diagnostic kit and indications of one or more of the clinical examination devices and the accessories on the panel suggested by a health care practitioner at a remote site for usage during the remote real-time medical examinations.

26. A method for practicing telemedicine, the method comprising:

providing a medical diagnostic kit that is communicatively coupled to a cloud computing environment and a remote computing device through a communication network;

authenticating a user to operate the medical diagnostic kit;

detecting one or more clinical examination devices connected to the medical diagnostic kit;

recording medical data of a patient at the medical diagnostic kit, wherein the medical data comprises medical data from the one or more clinical examination devices and audio-visual data from a secondary camera attached to the medical diagnostic kit;

transmitting the recorded medical data in real-time to the remote computing device of the remote health care practitioner via the diagnostic computer for enabling real-time and off-line medical examination by a healthcare practitioner; and

mapping the medical examination with a predefined set of the clinical examination devices for use to fulfil a specific medical examination.

27. The method of claim 26, wherein recording the medical data of the patient at the medical diagnostic kit comprises recording the medical data from two or more clinical examination device simultaneously, and wherein transmitting the recorded medical data in real-time to the remote computing device comprises transmitting the simultaneously recorded medical data from the two or more clinical examination devices.

28. The method of claim 26, wherein authenticating the user comprises:

retrieving scheduled appointments for telemedicine sessions for the user from a cloud system of the telemedicine system, wherein each scheduled appointment comprises a Health Insurance Portability and Accountability Act (HIPAA)-compliant cloud-based record of a corresponding patient; and

determining if the patient has an appointment and if the patient does not have a scheduled appointment, creating an appointment for a telemedicine session and creating a record for the patient.

29. The method of claim 26, wherein transmitting the recorded medical data in real-time to the remote computing device of the remote health care practitioner further comprises:

transmitting the recorded medical data in real-time to a cloud data store in a cloud computing environment, wherein the cloud computing environment comprises a machine learning/artificial intelligence engine, coupled to a processor and a memory, for analyzing the recorded medical data in real-time automatically through machine learning and artificial intelligence algorithms to diagnose medical conditions and probable patterns of illnesses in the patient; and

relaying information of the diagnosed medical conditions and the probable patterns of illnesses in the patient, in real-time to the remote computing device of the remote health care practitioner.

30. The method of claim 29, wherein relaying information of the diagnosed medical conditions and the probable patterns of illnesses in the patient comprises synchronizing the data in real-time into the cloud for viewing by the health practitioner and video and/or audio conferencing with the health practitioner.

31. The method of claim 26, wherein mapping the medical examination further comprises mapping one or more medical procedures with the predefined set of the clinical examination devices, and wherein the specific medical examination is part of one or more of a routine Chronic Condition Management program, a routine wellness examination, an annual vaccination, an annual Health Risk Assessment survey, and an urgent care visit.

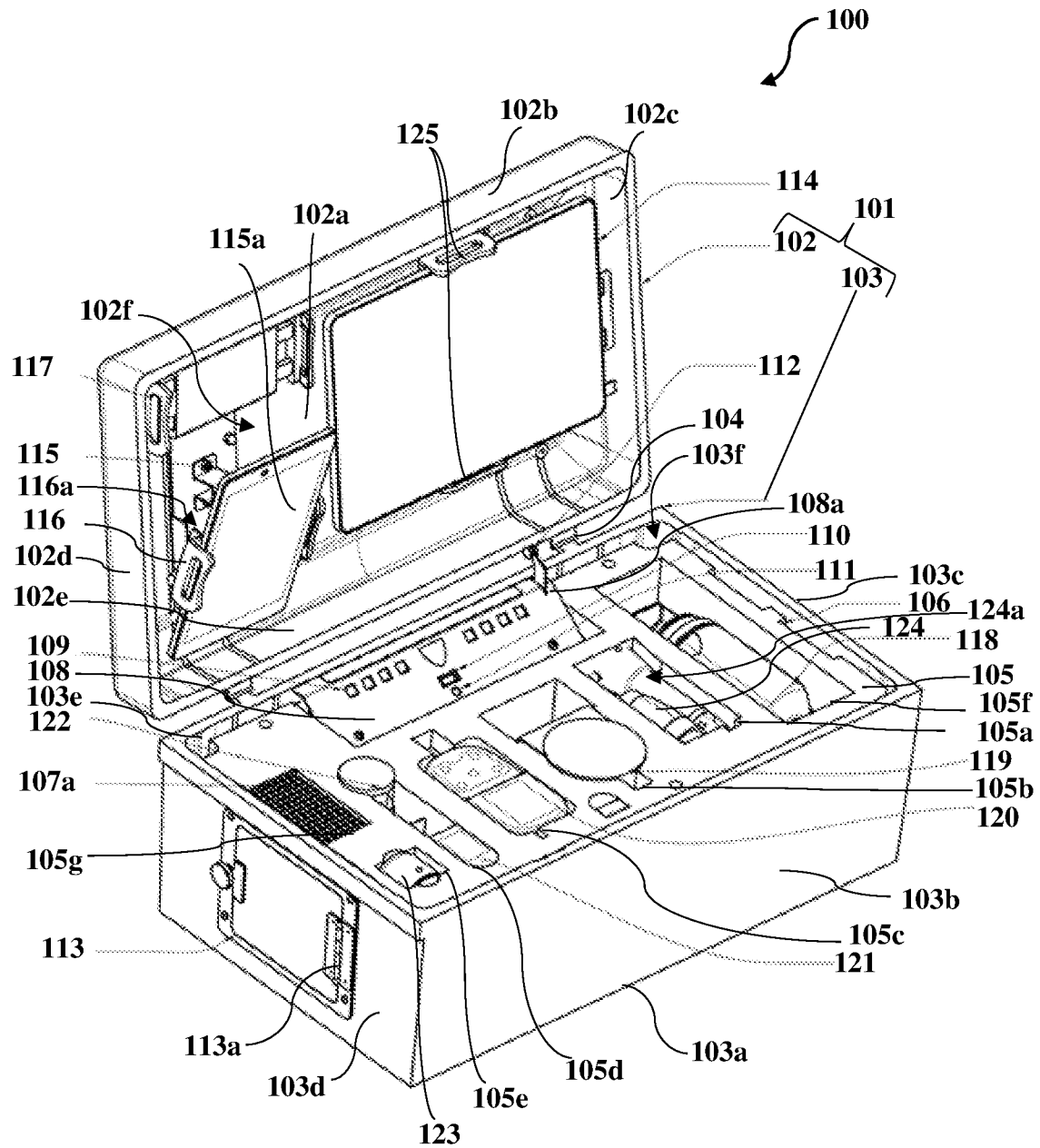


FIG. 1

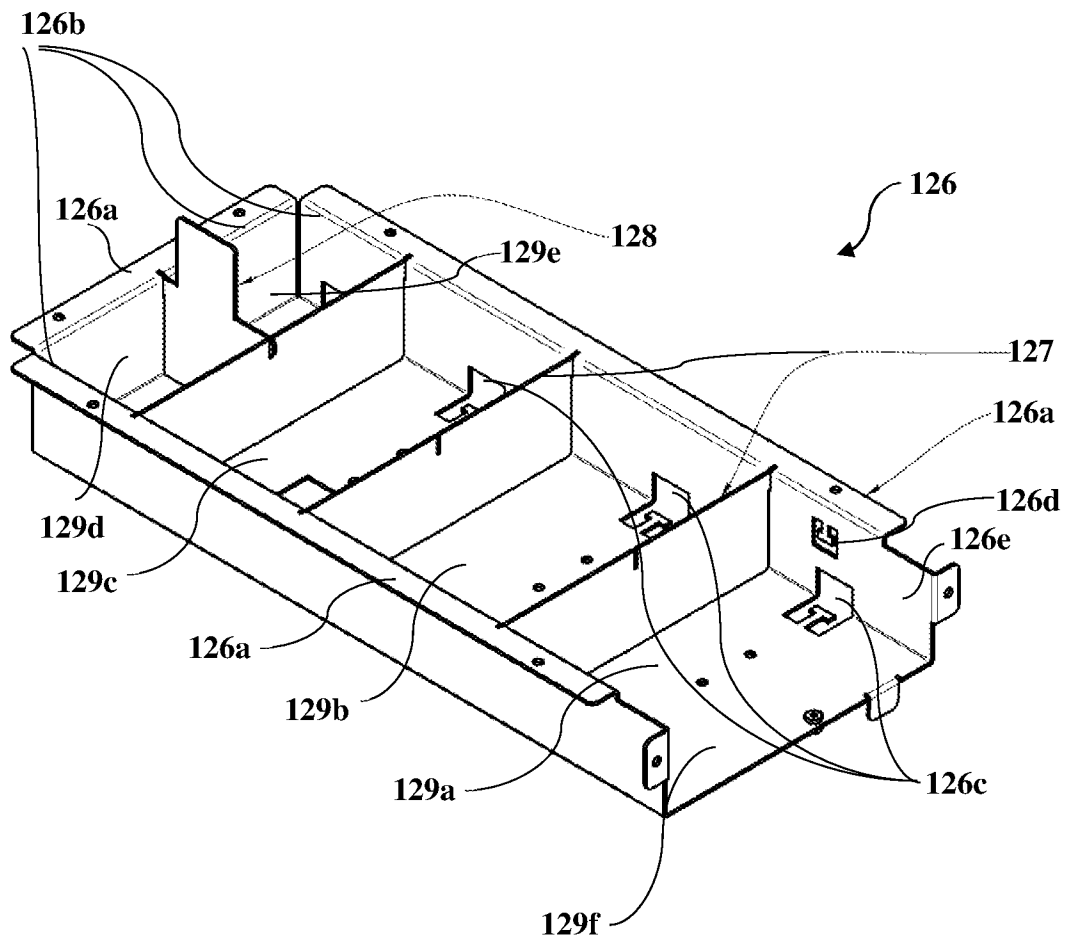


FIG. 2

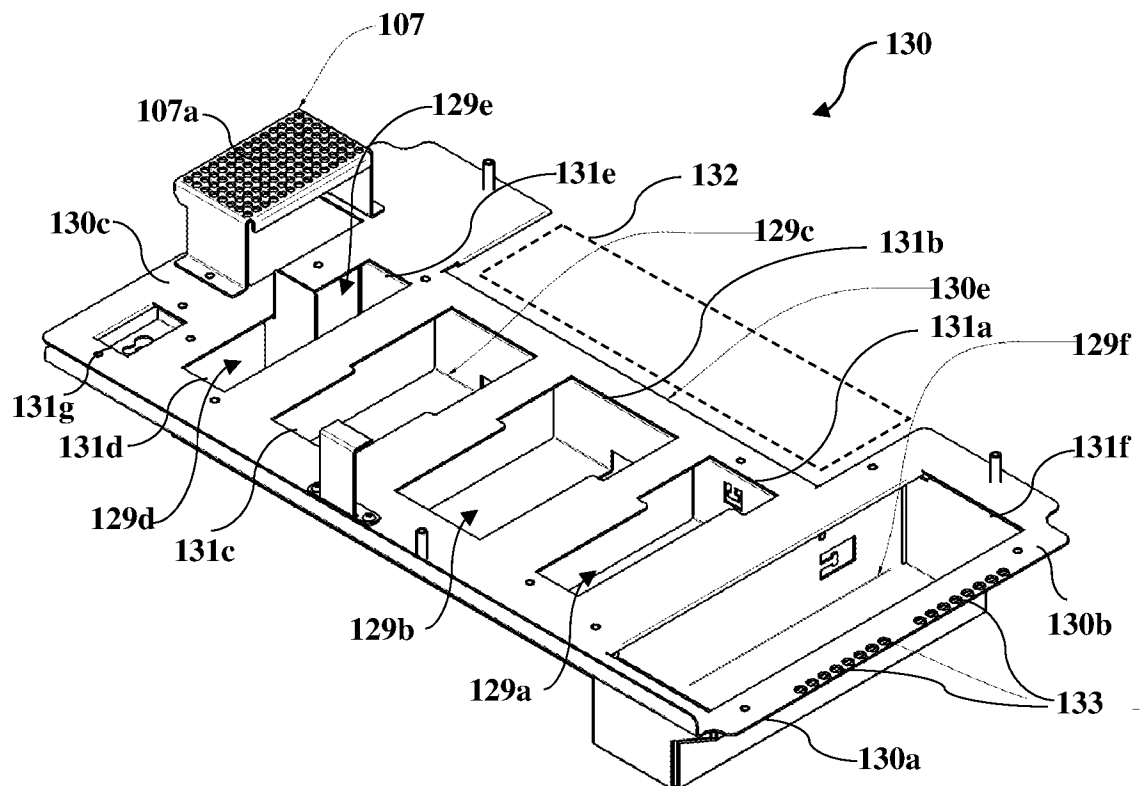


FIG. 3

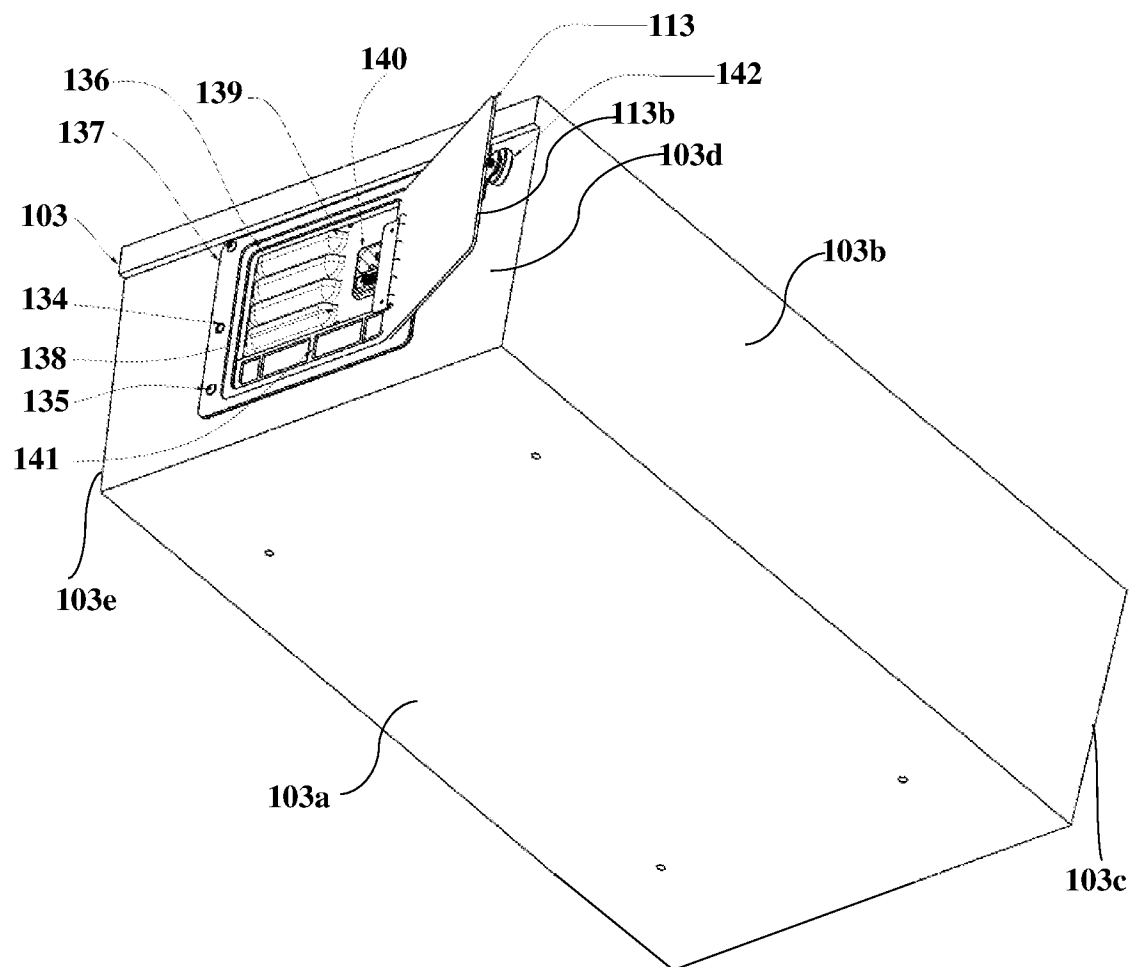


FIG. 4

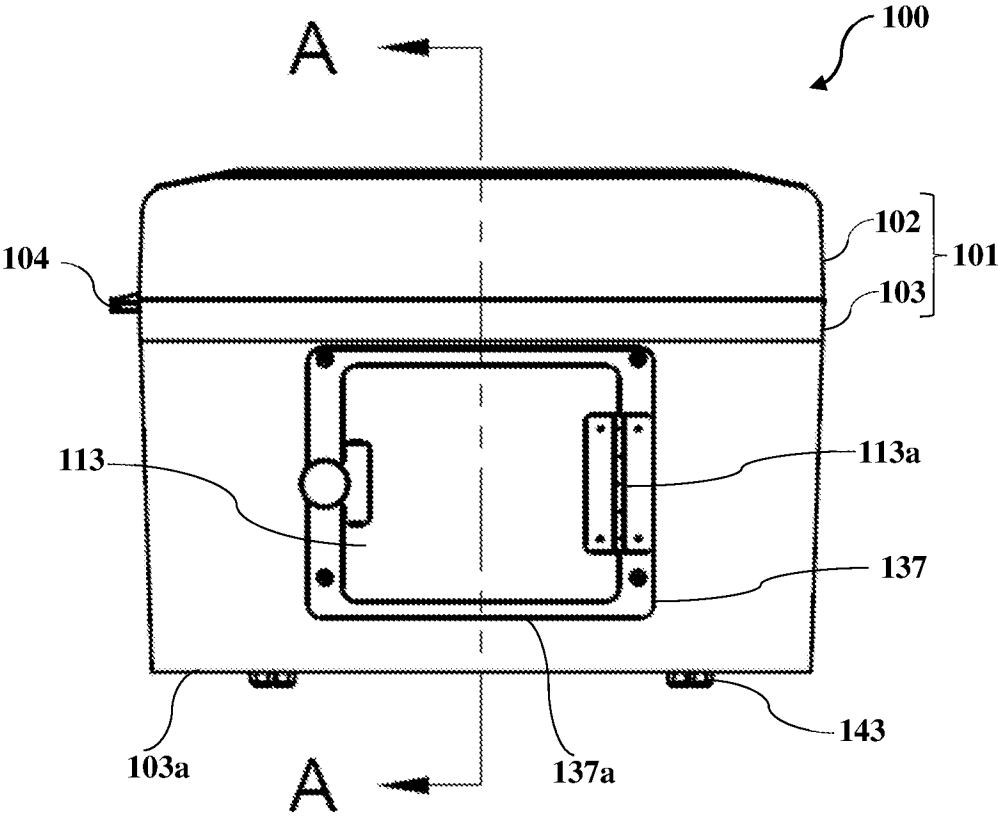


FIG. 5

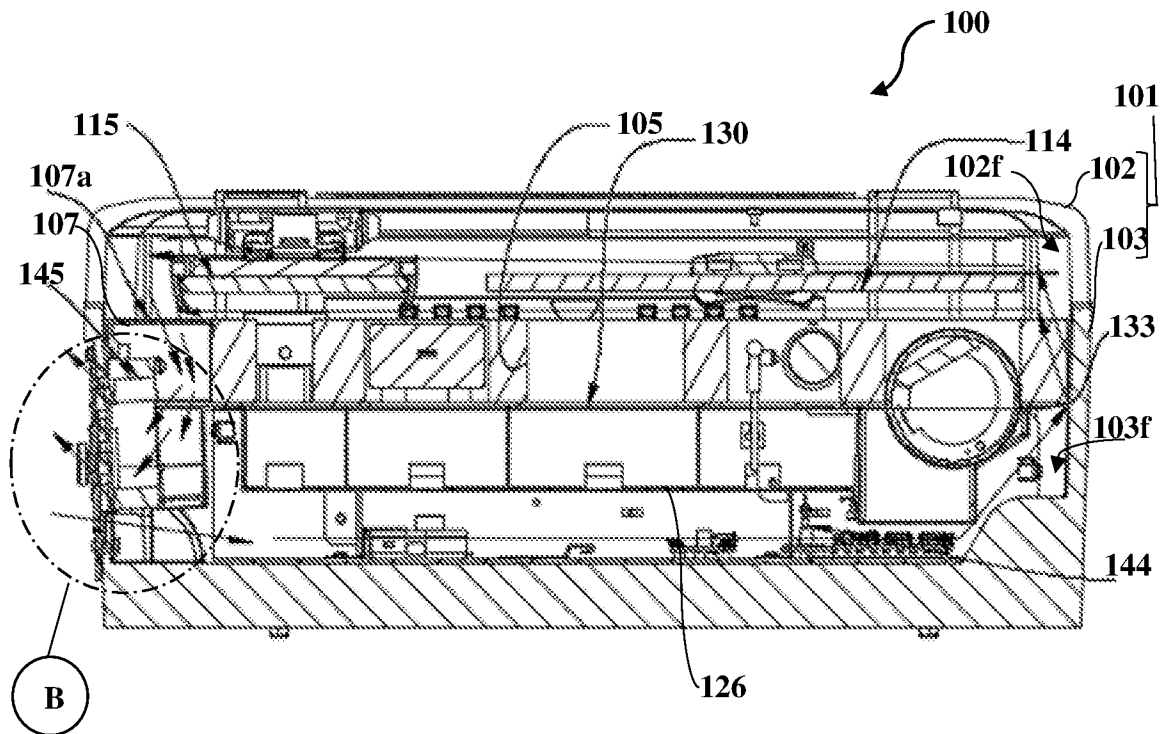


FIG. 6A

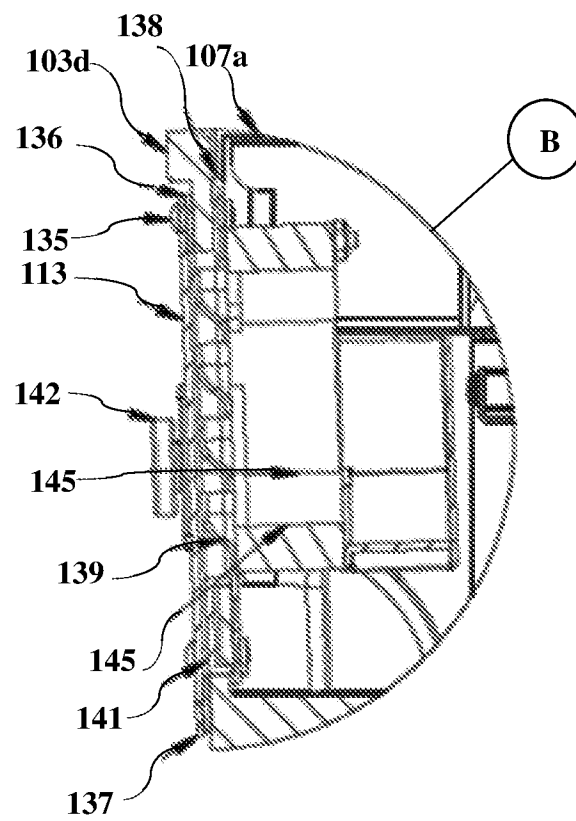


FIG. 6B

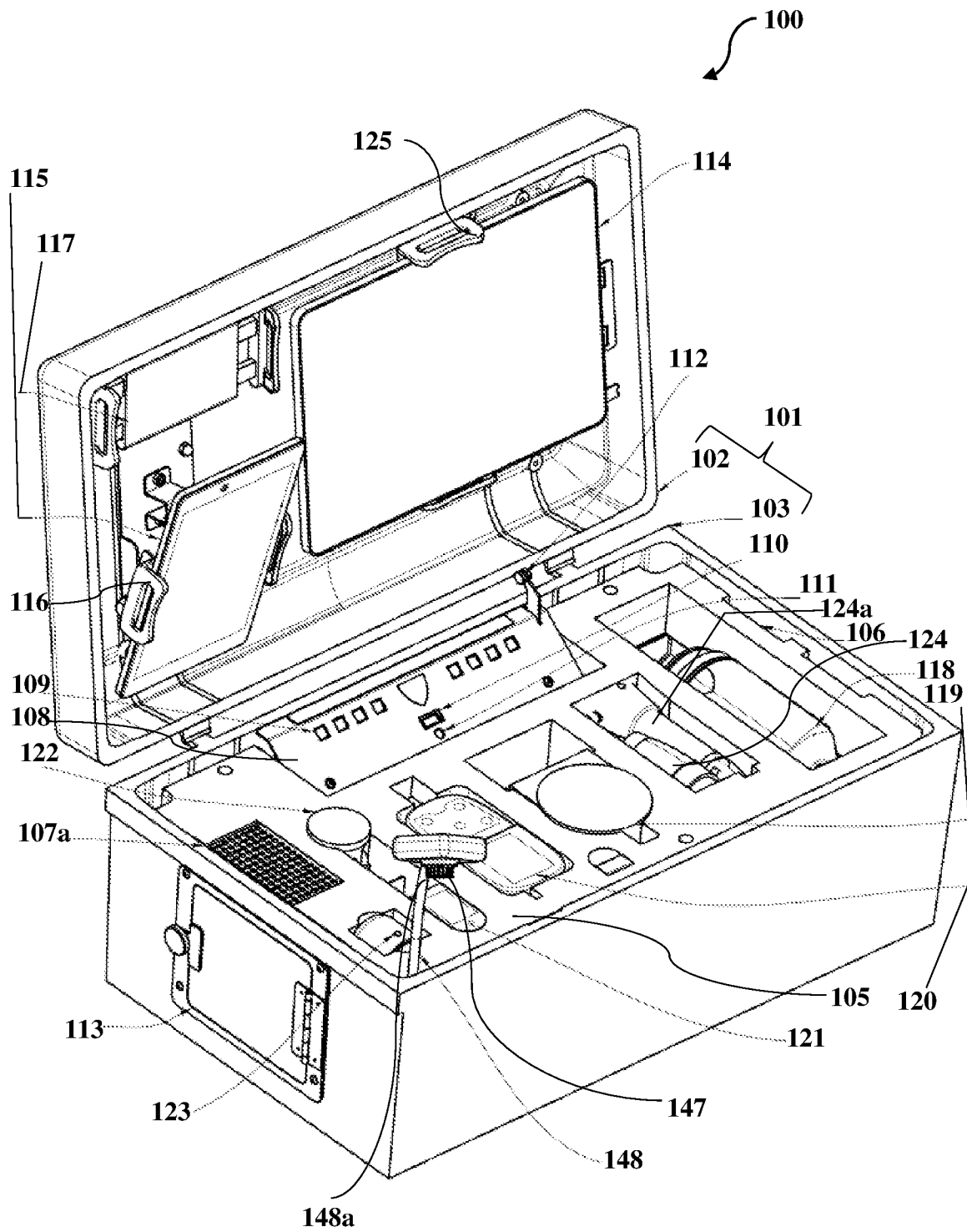


FIG. 7A

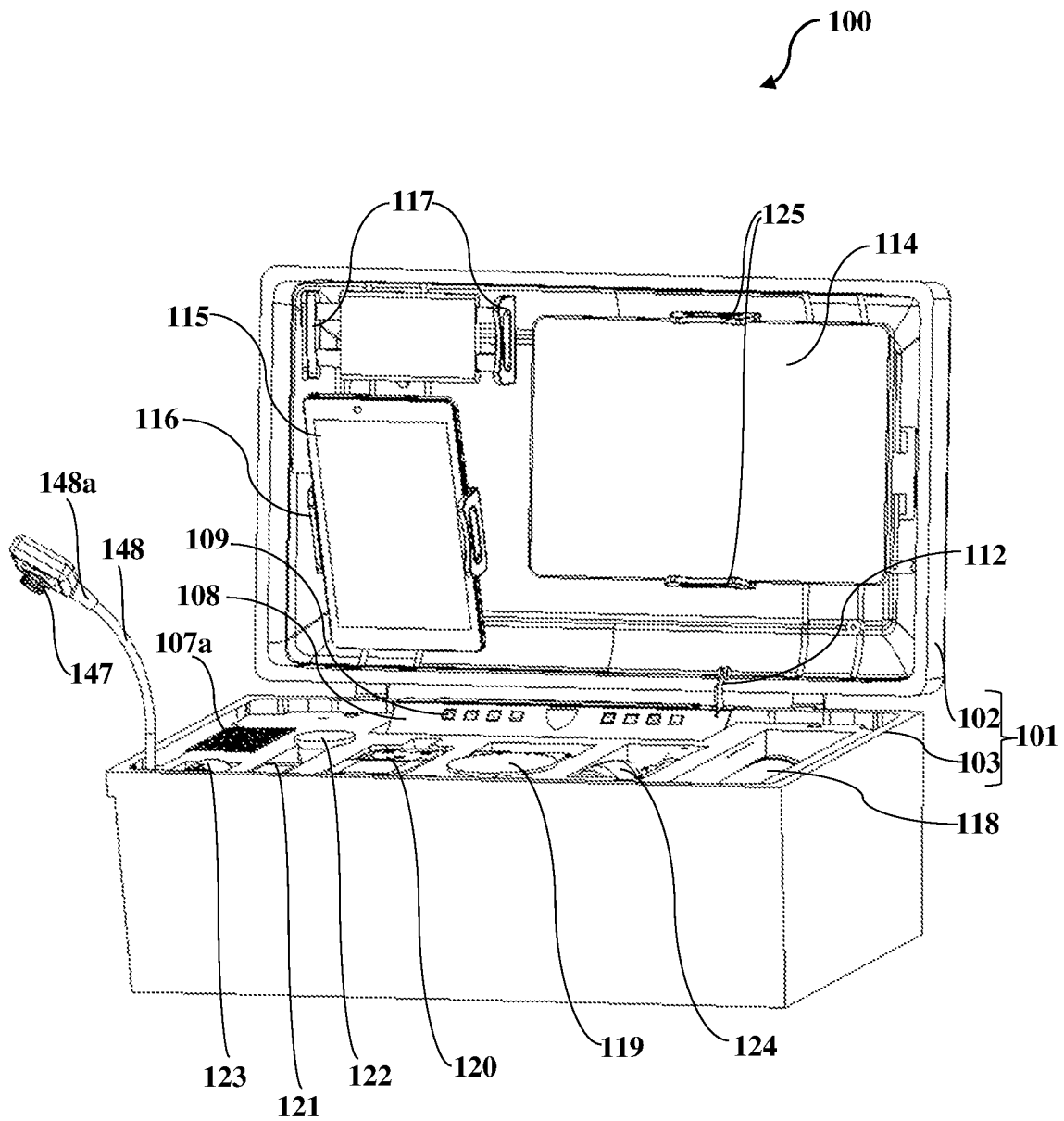


FIG. 7B

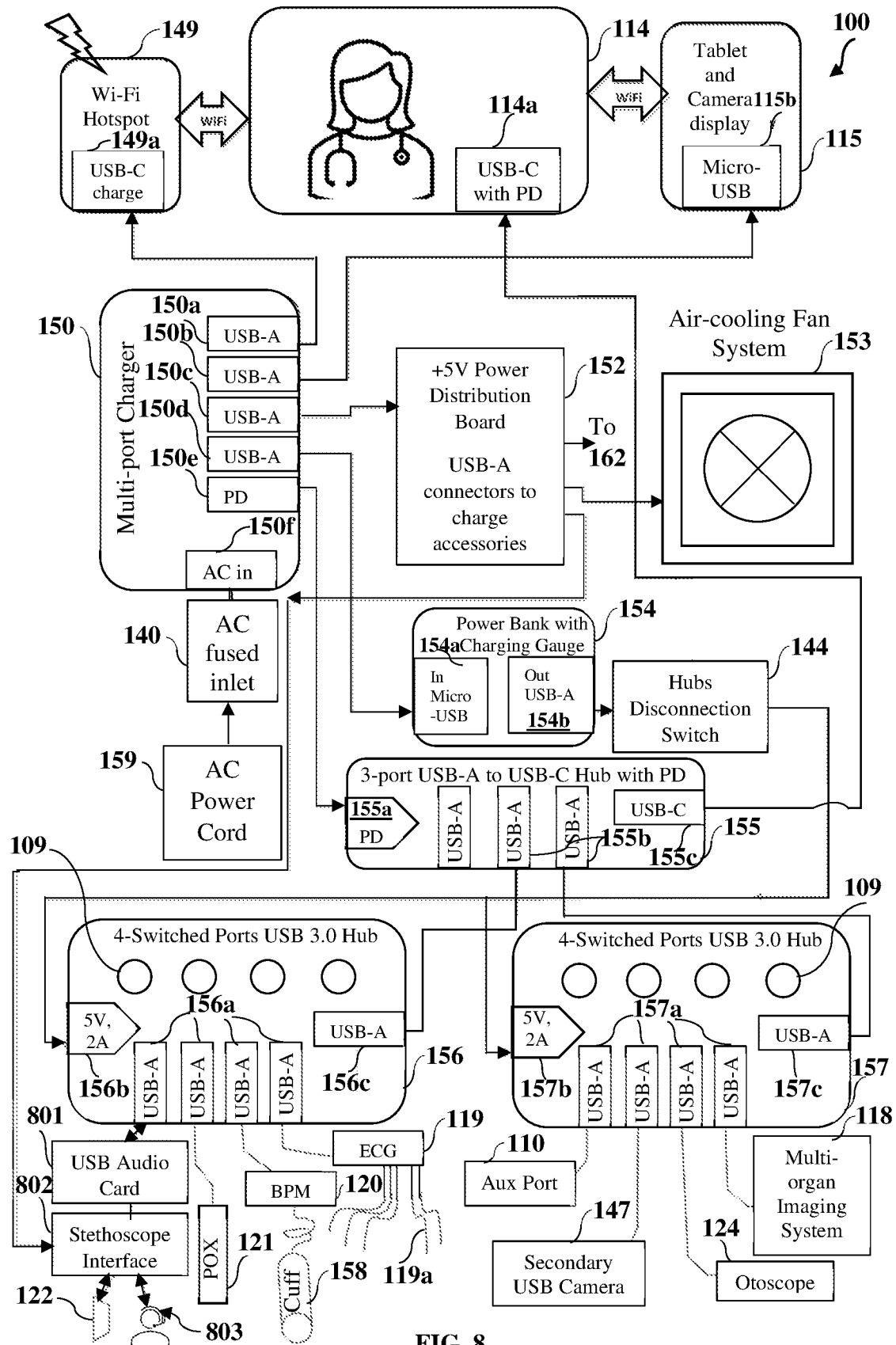


FIG. 8

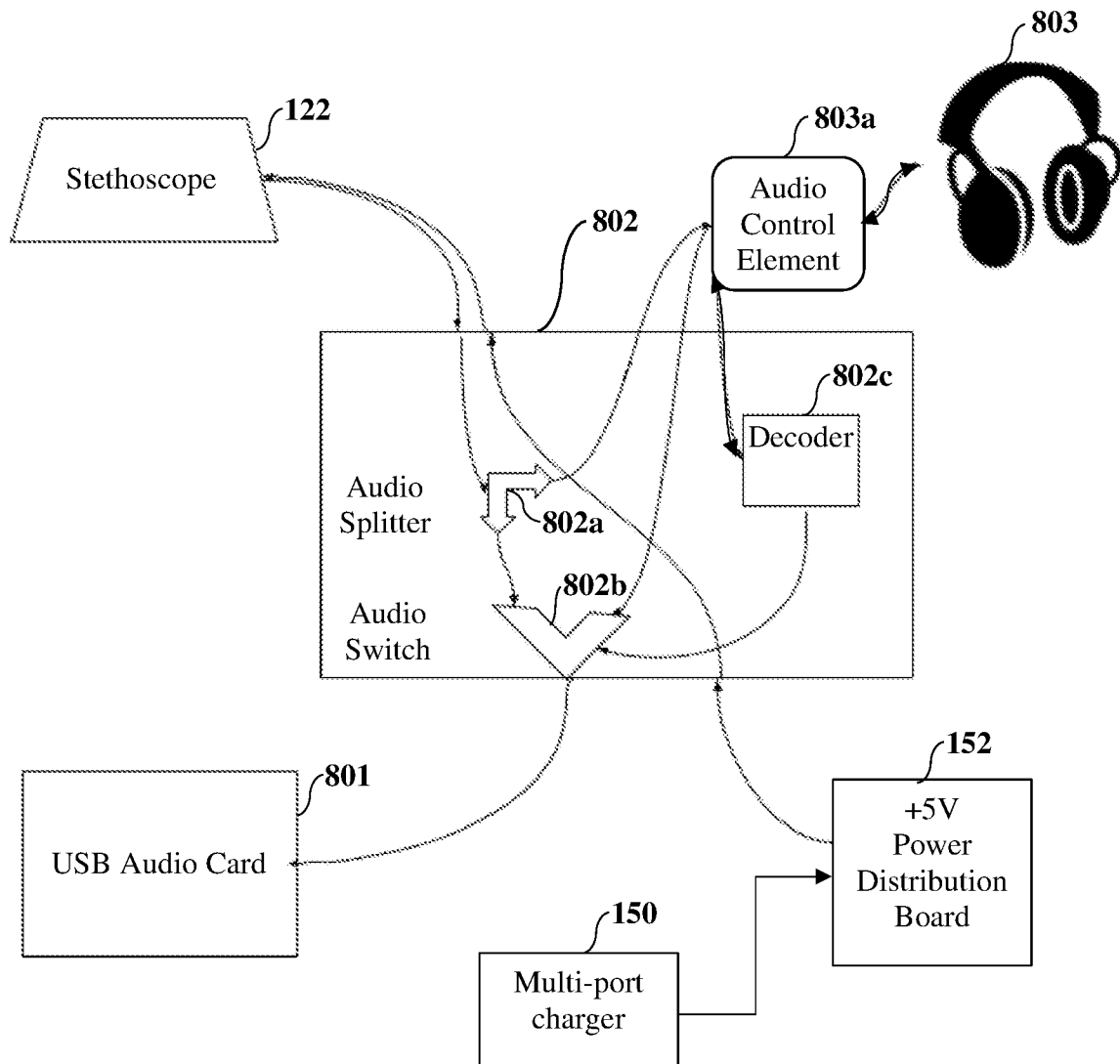


FIG. 9

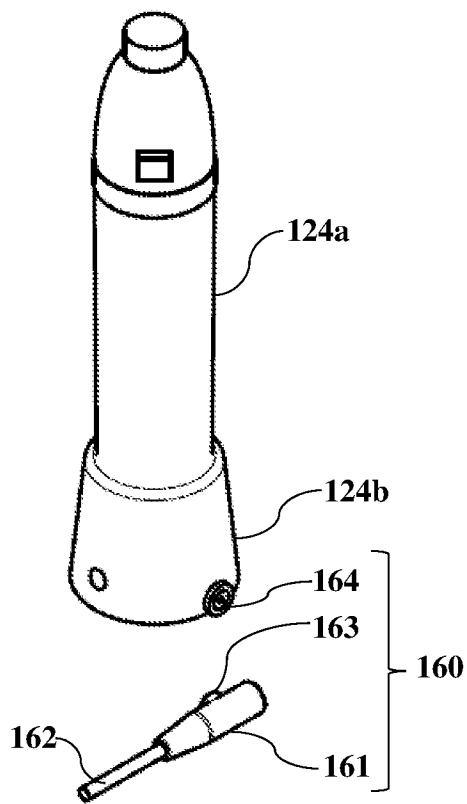


FIG. 10A

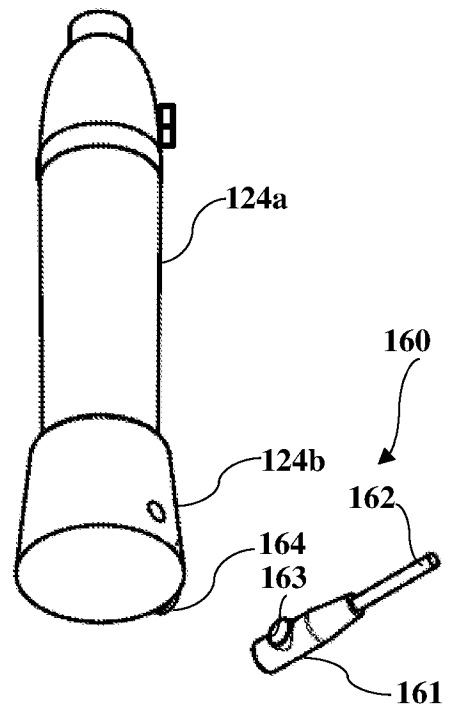


FIG. 10B

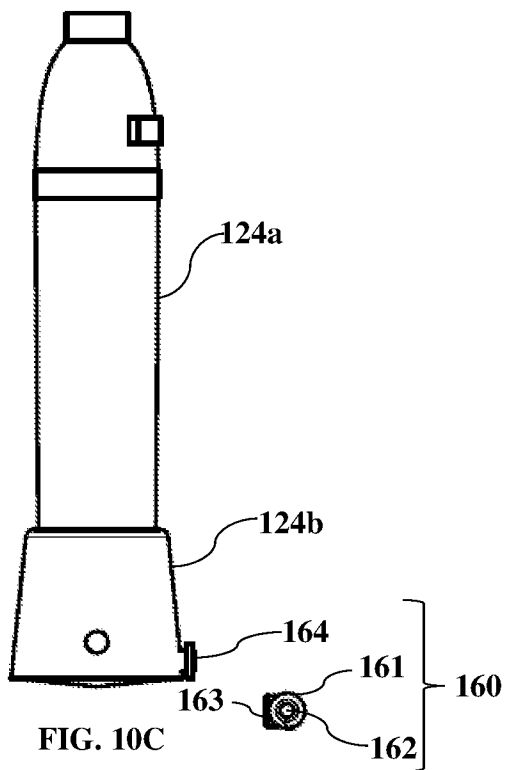


FIG. 10C

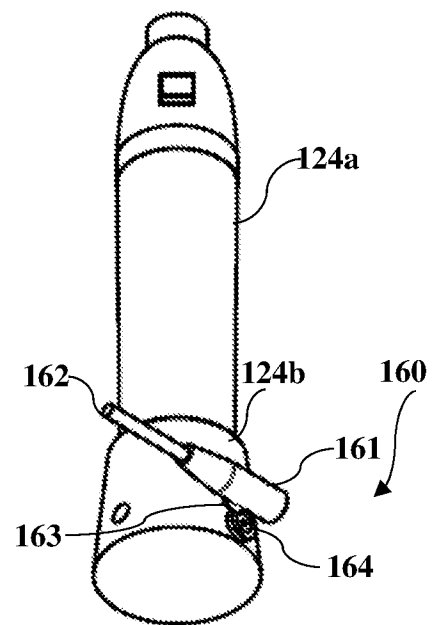


FIG. 10D

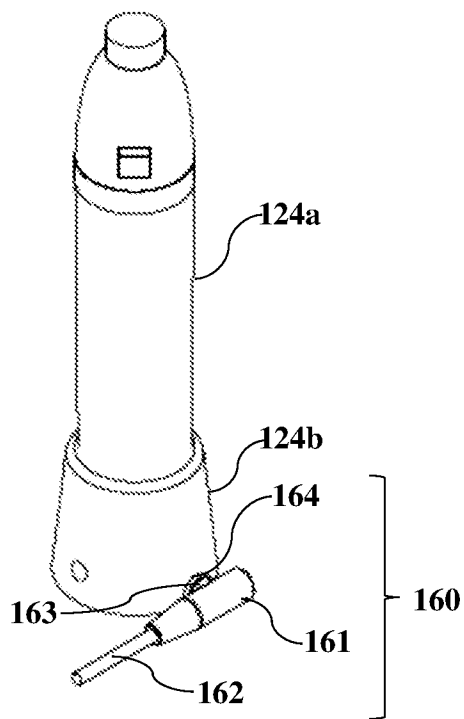


FIG. 11A

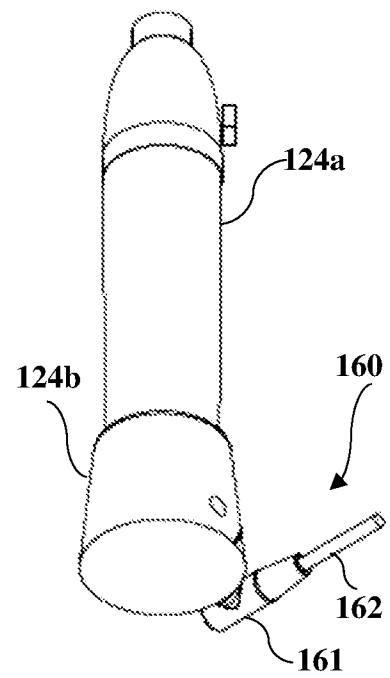


FIG. 11B

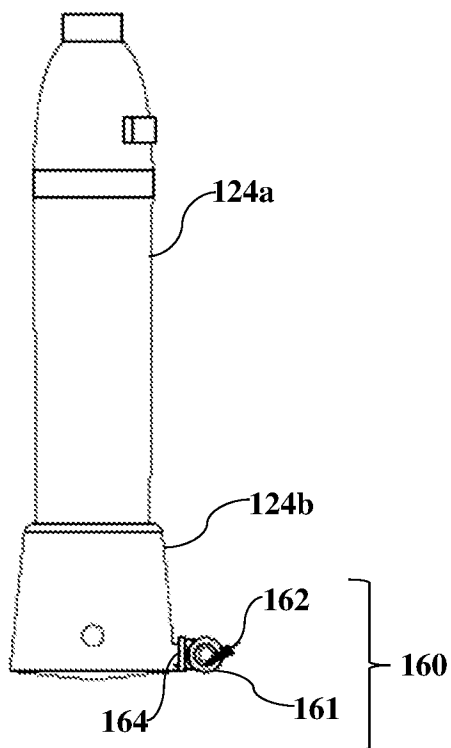


FIG. 11C

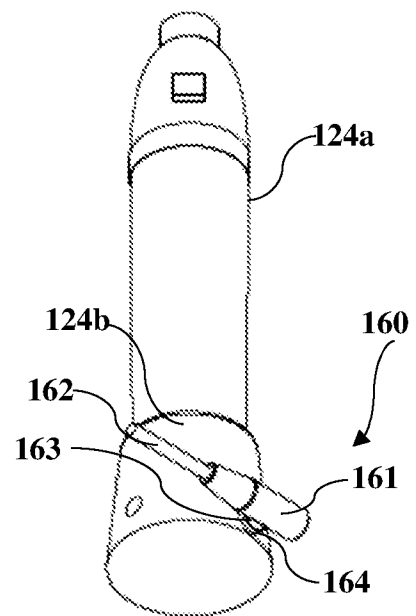


FIG. 11D

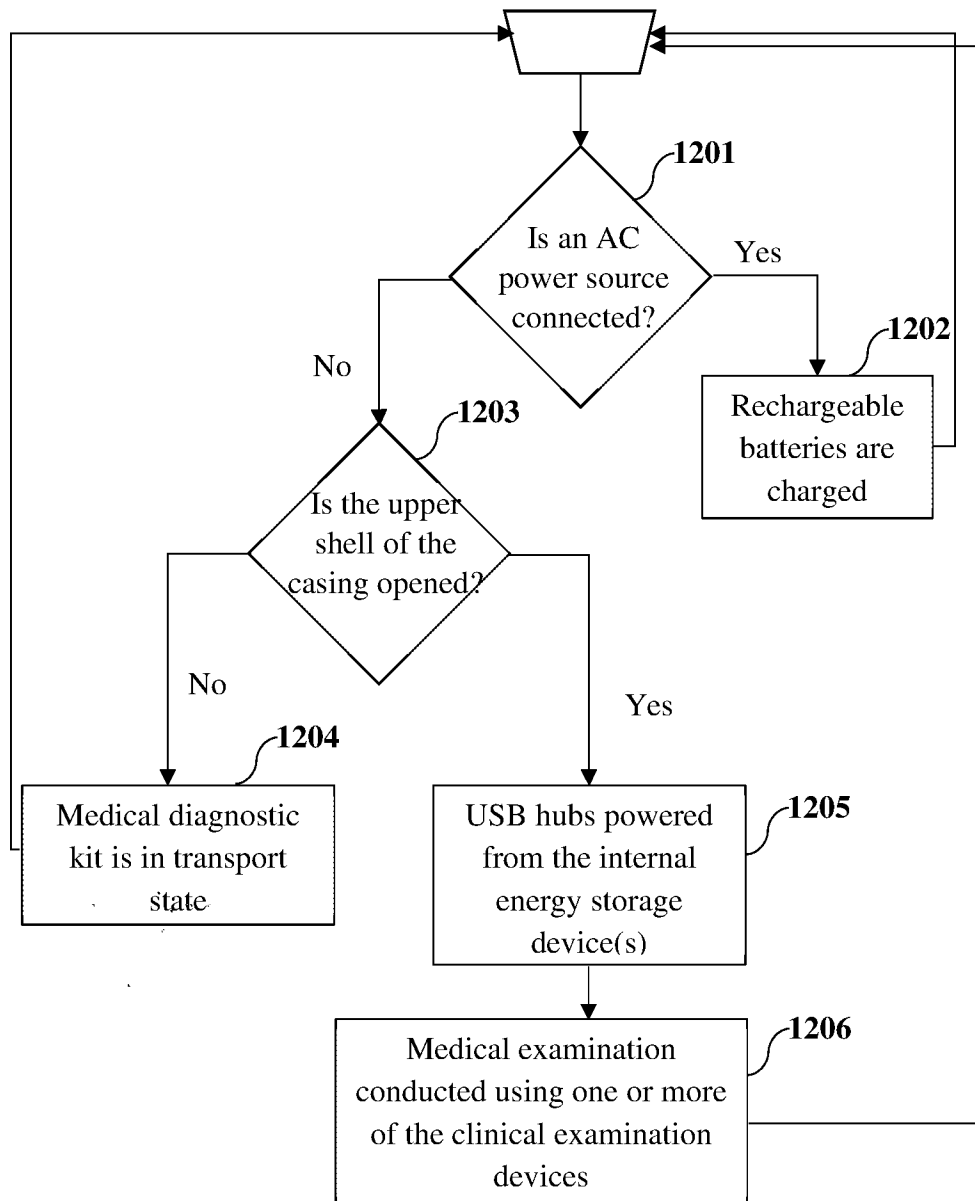


FIG. 12

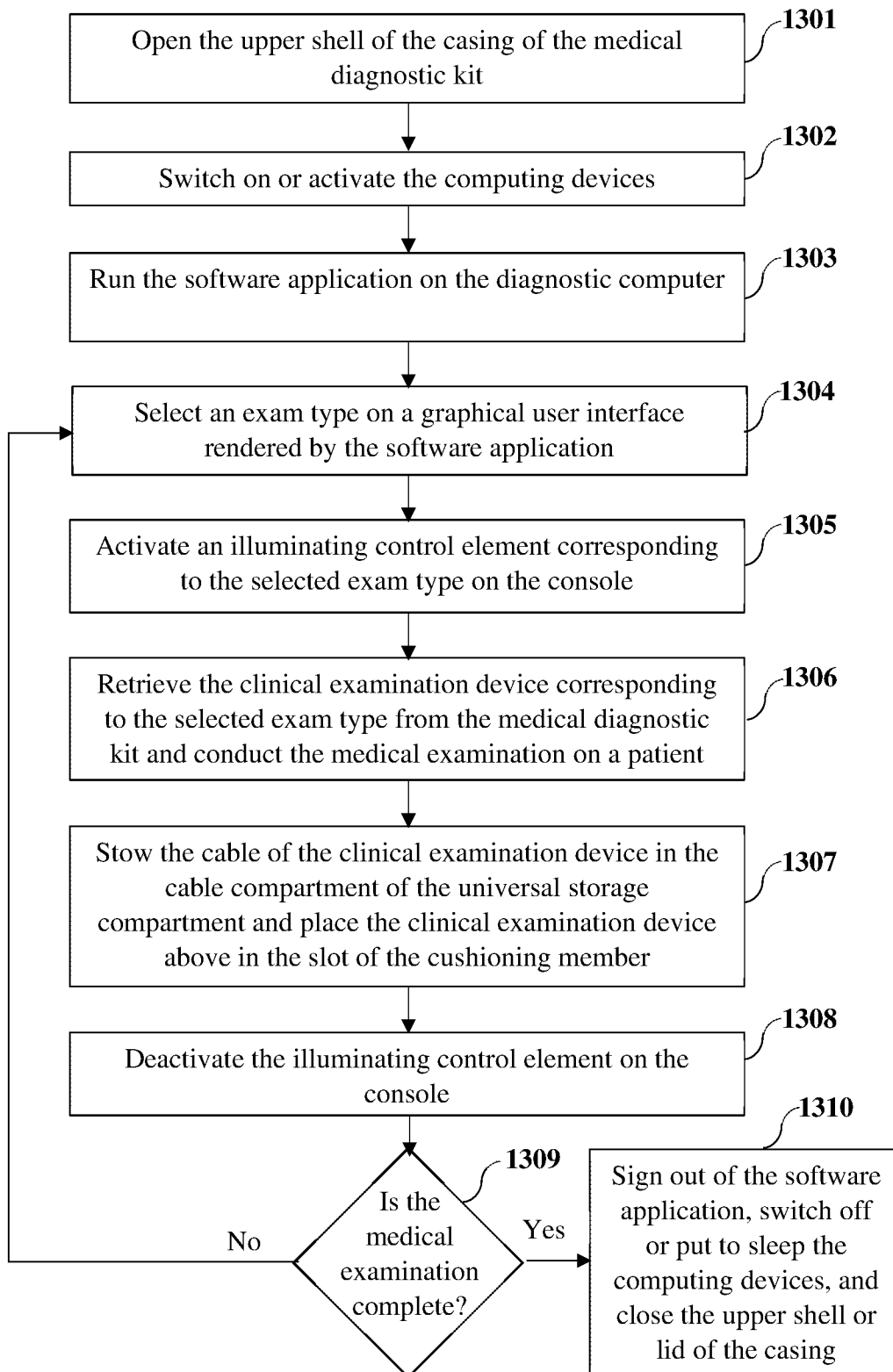


FIG. 13

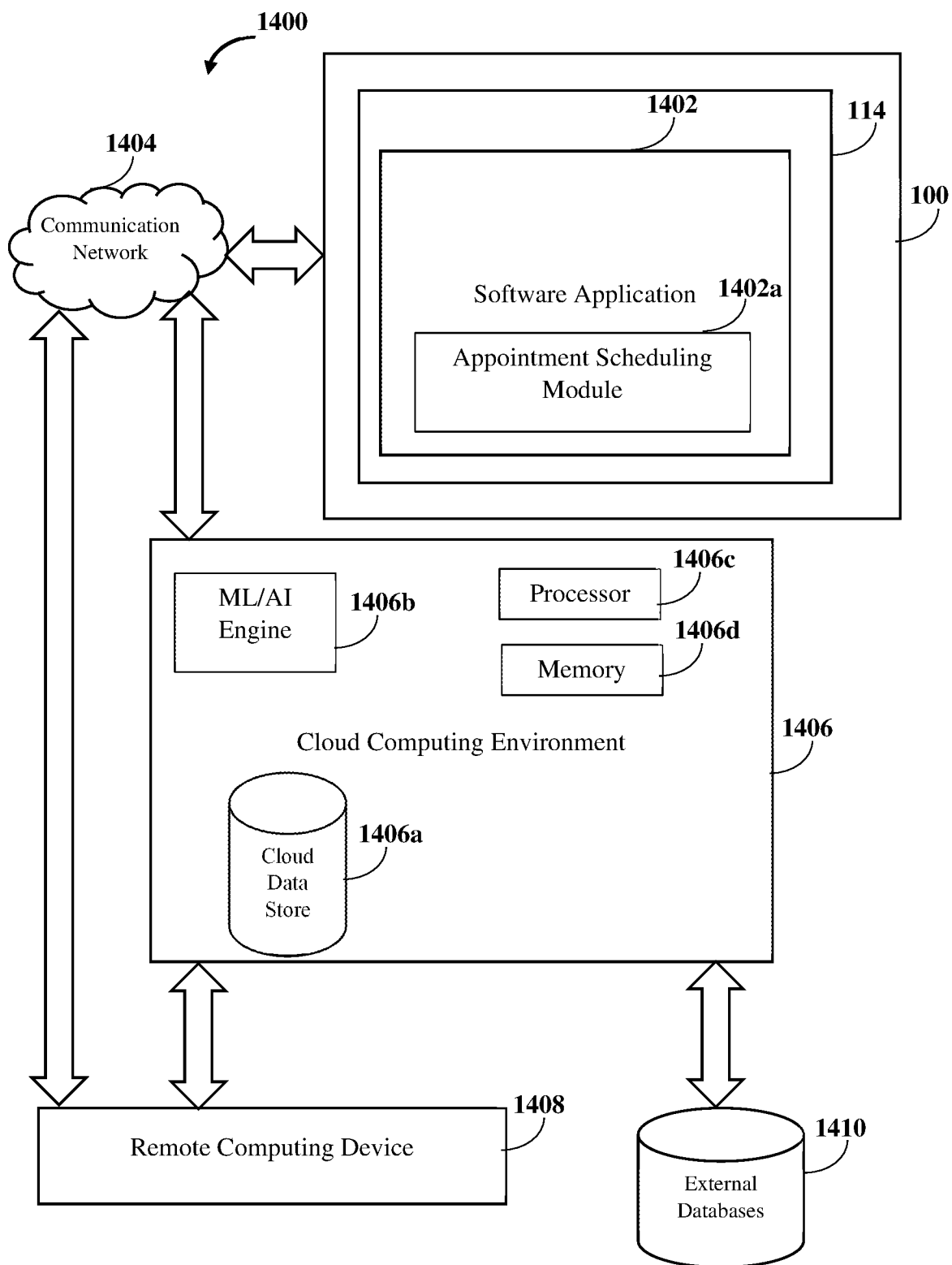


FIG. 14



FIG. 15

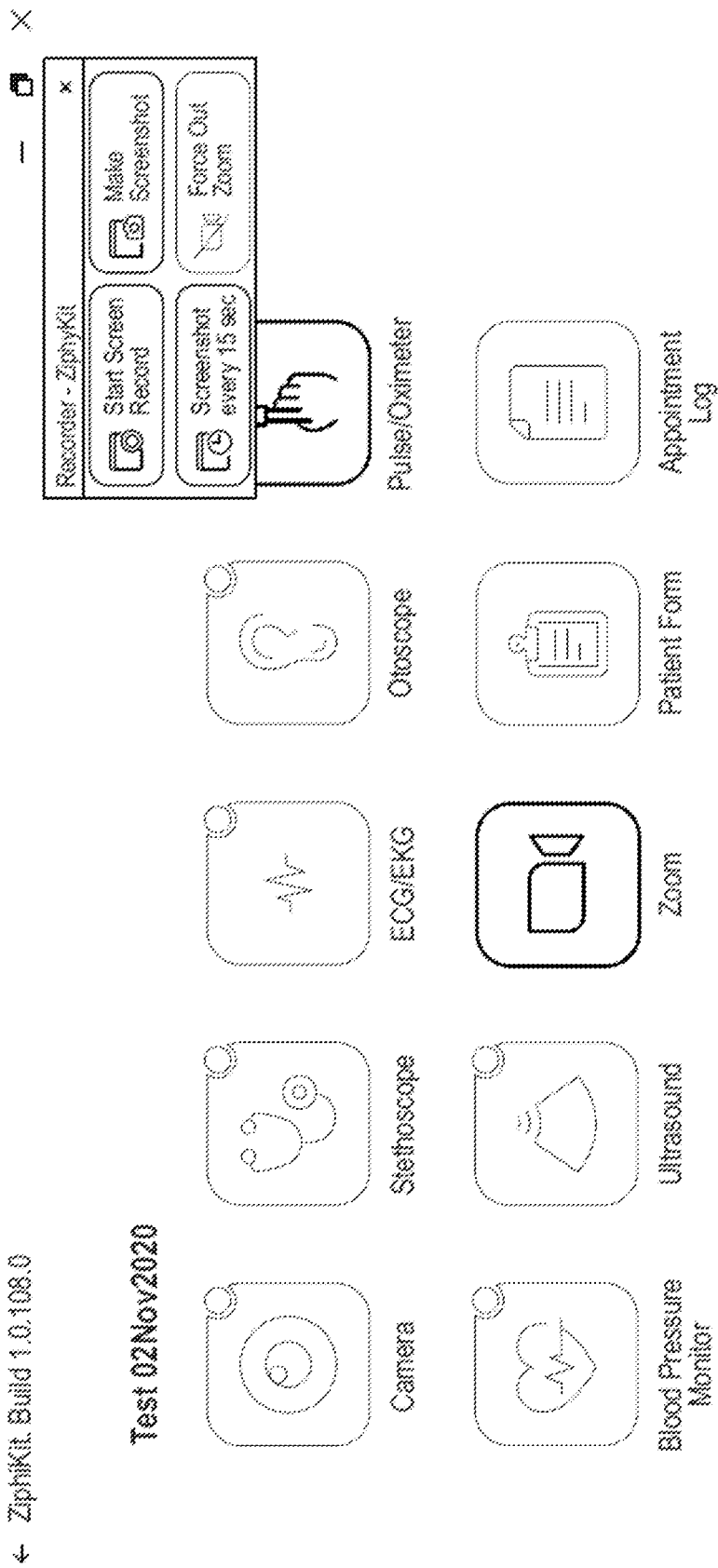
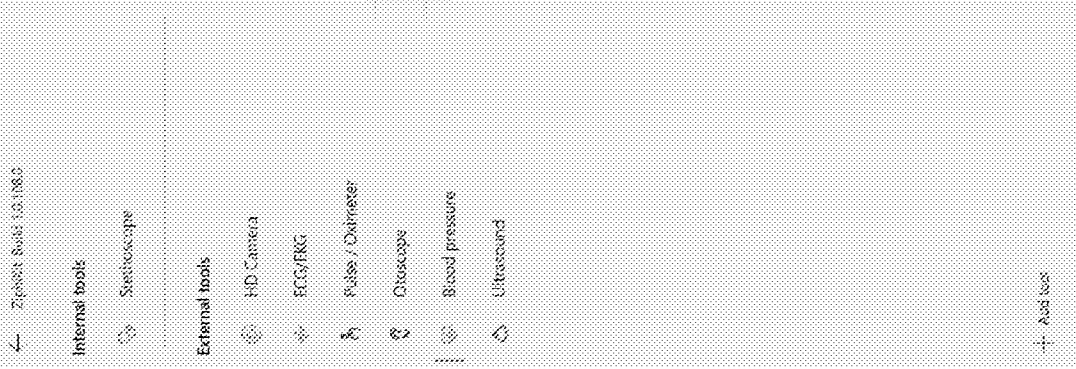


FIG. 16

Appointment Log		Delete data
08:43:15 AM	Appointment started	
09:44:32 AM	Created file (recorder) 	
09:44:40 AM	Patient form opened	
09:44:46 AM	Patient form submit	
09:44:48 AM	Created file (form) 	
09:45:13 AM	Created file (recorder) 	
09:46:42 AM	Stethoscope opened	
09:47:44 AM	Stethoscope Closed	

FIG. 17



Blood pressure settings

Allow to use the tool during visits on this device

● Off

Path to executable file:

C:\Program Files\ZK\ABPM\ABPM.exe

Path to data folder:

C:\Program Files\ZK\ABPM\data\ABPM

FIG. 18A

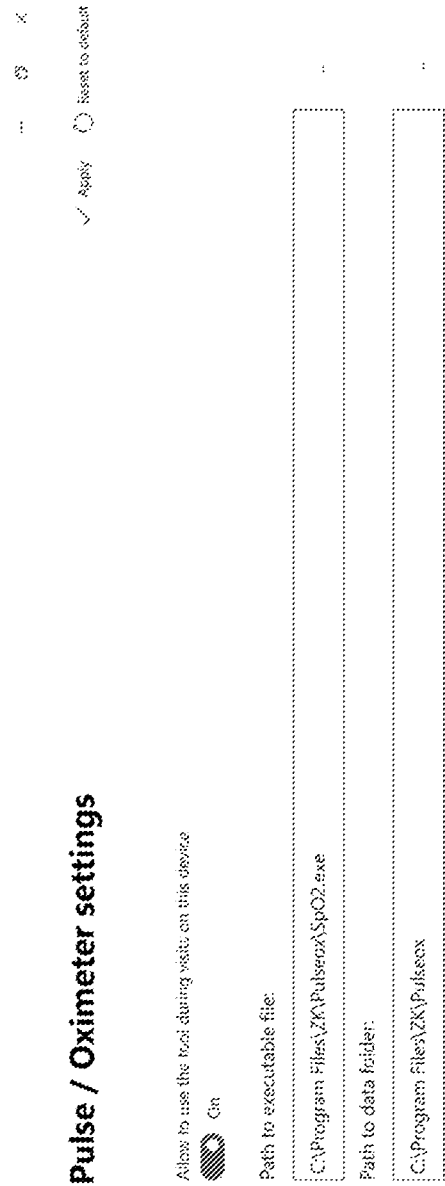


FIG. 18B

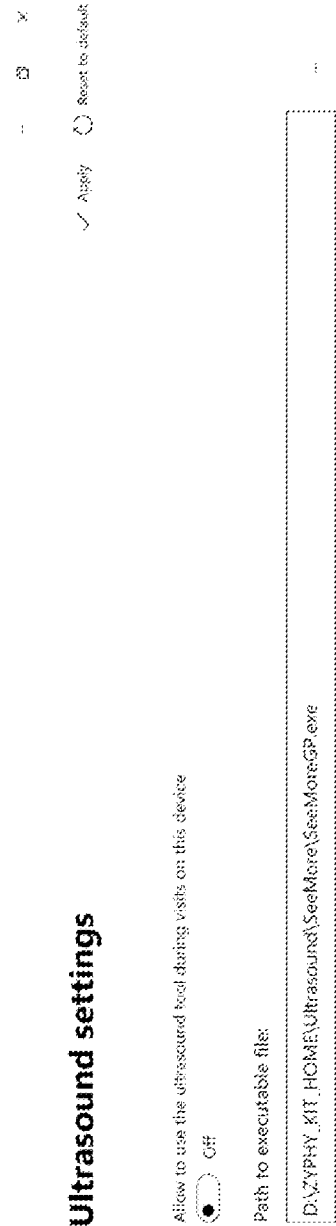


FIG. 18C

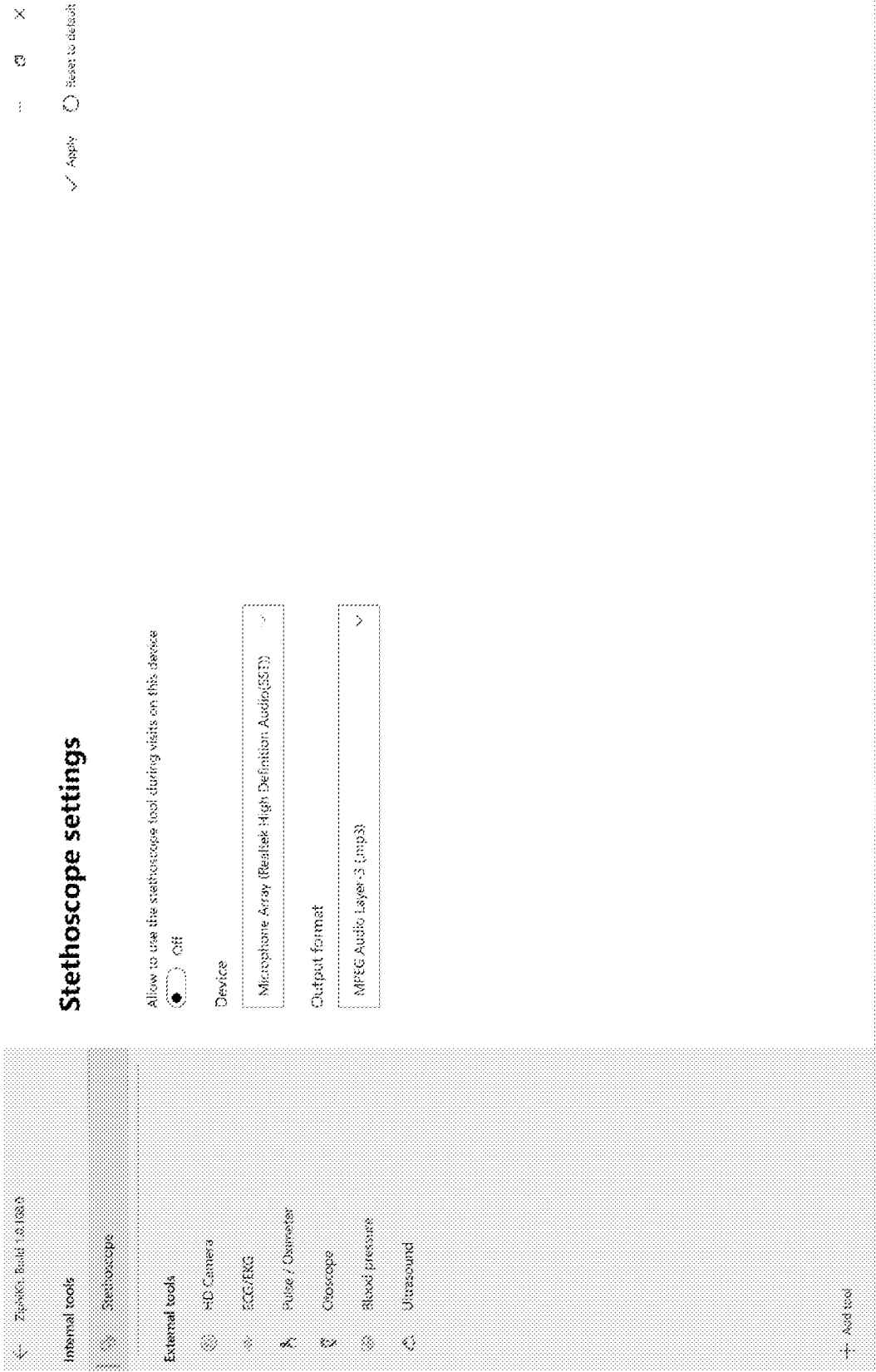


FIG. 18D

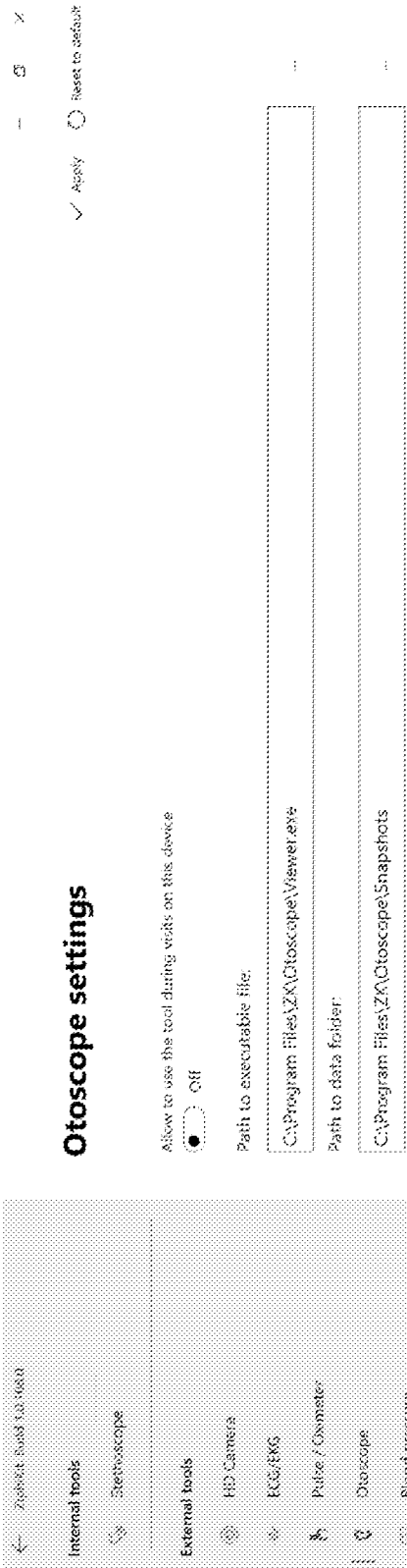


FIG. 18E

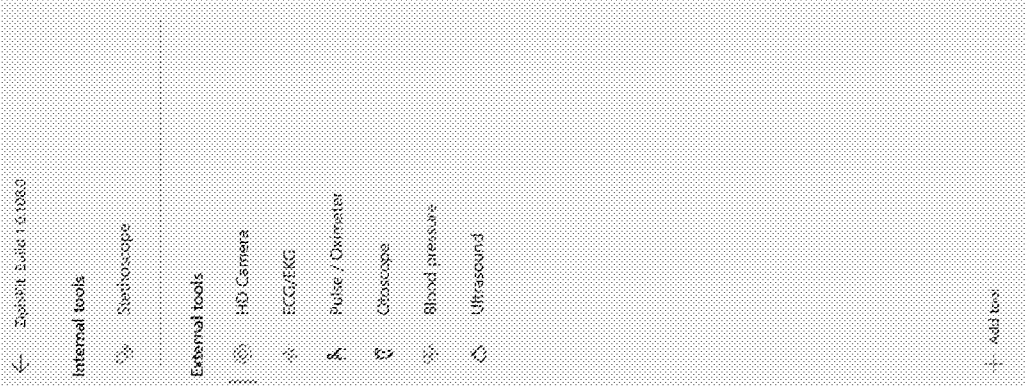
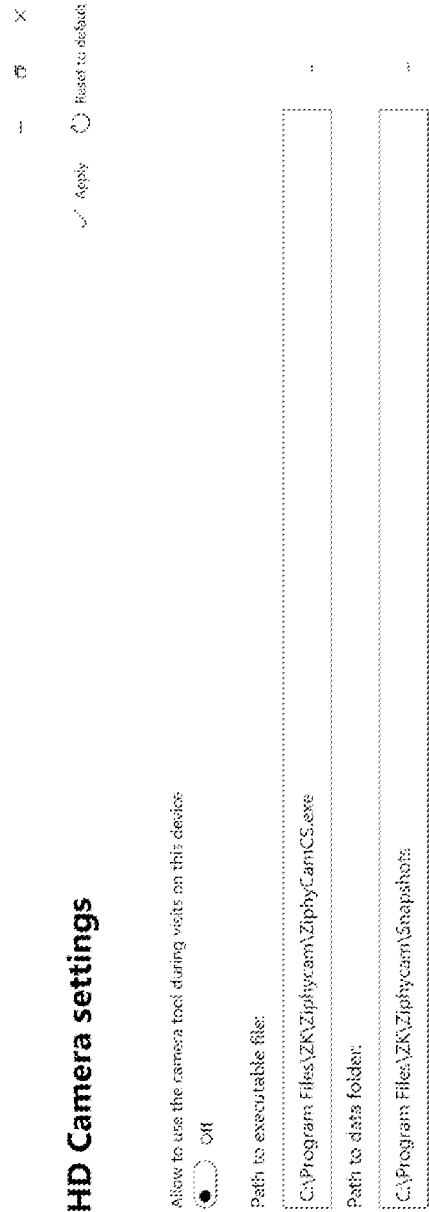


FIG. 18F

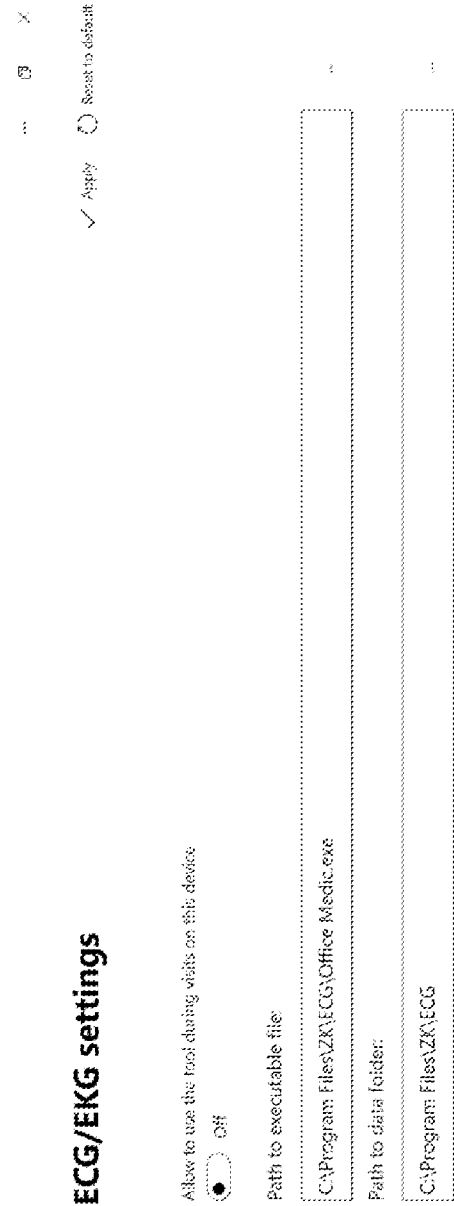
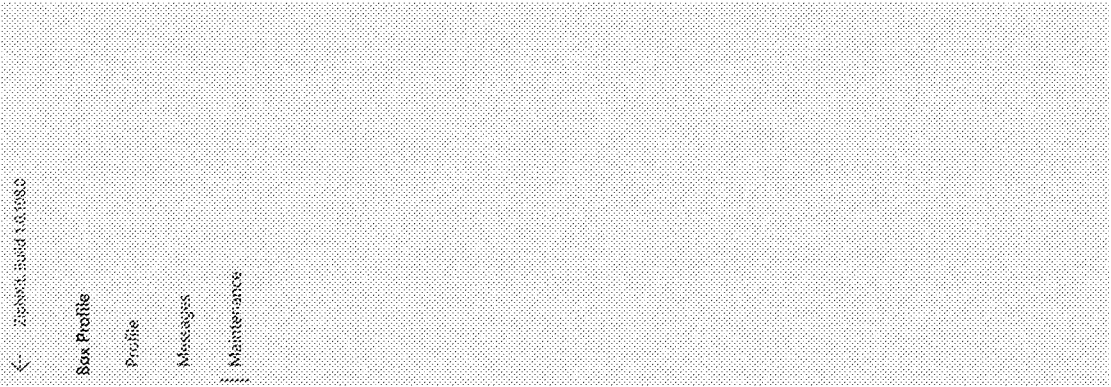


FIG. 18G



Maintenance

Maintenance Mode

● Off

Message

Maintenance

Update

Maintenance History

FIG. 19

×

□

!

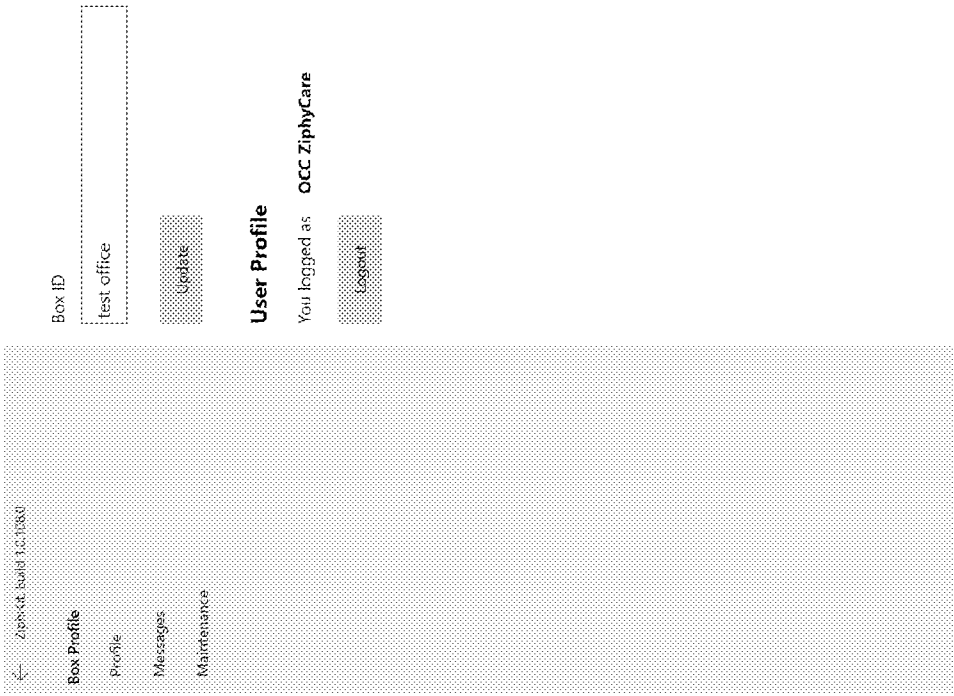


FIG. 20

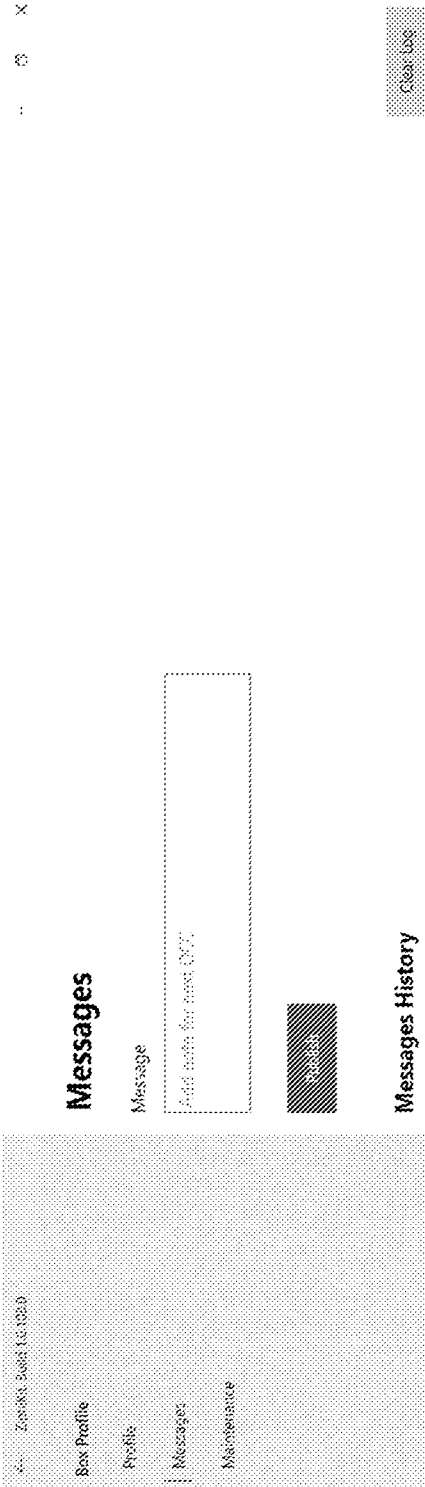


FIG. 21

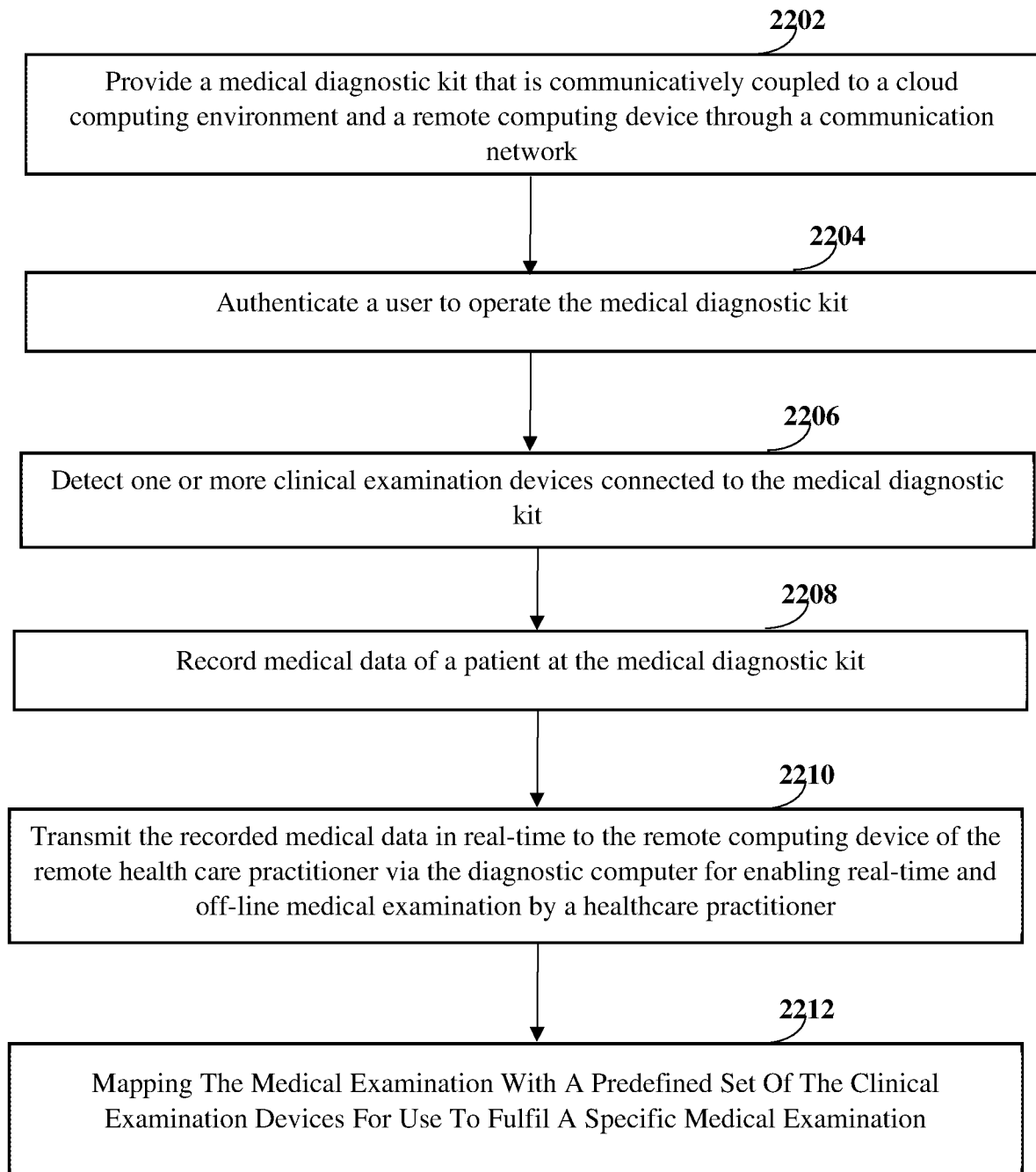


FIG. 22

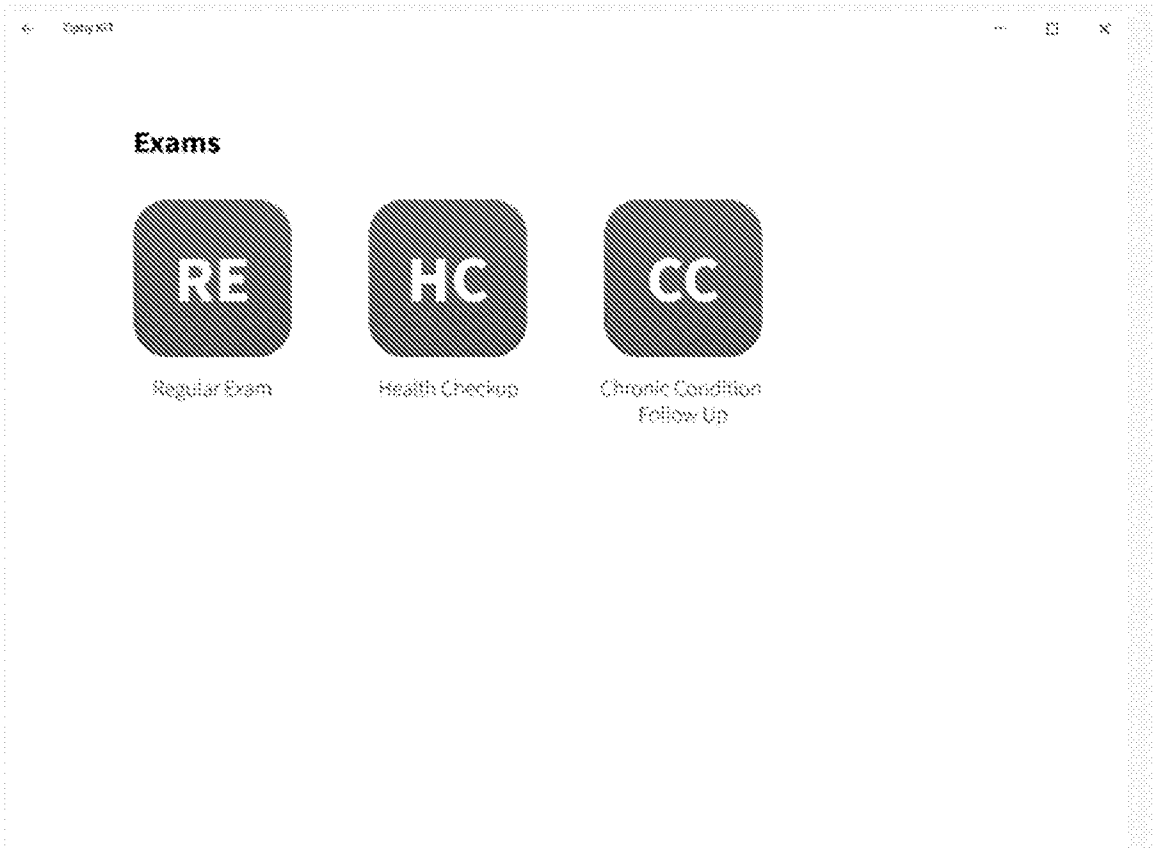


FIG. 23

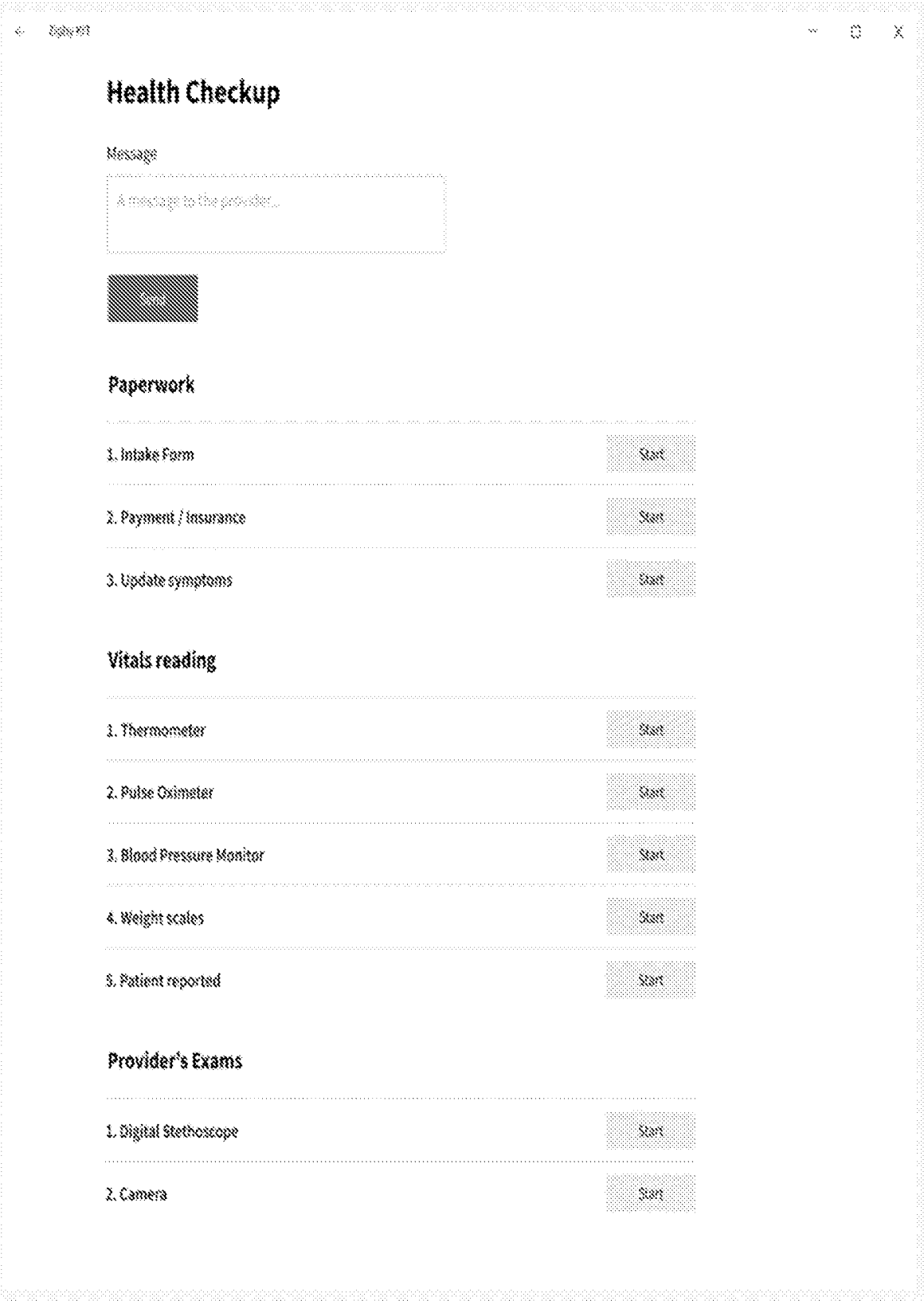


FIG. 24

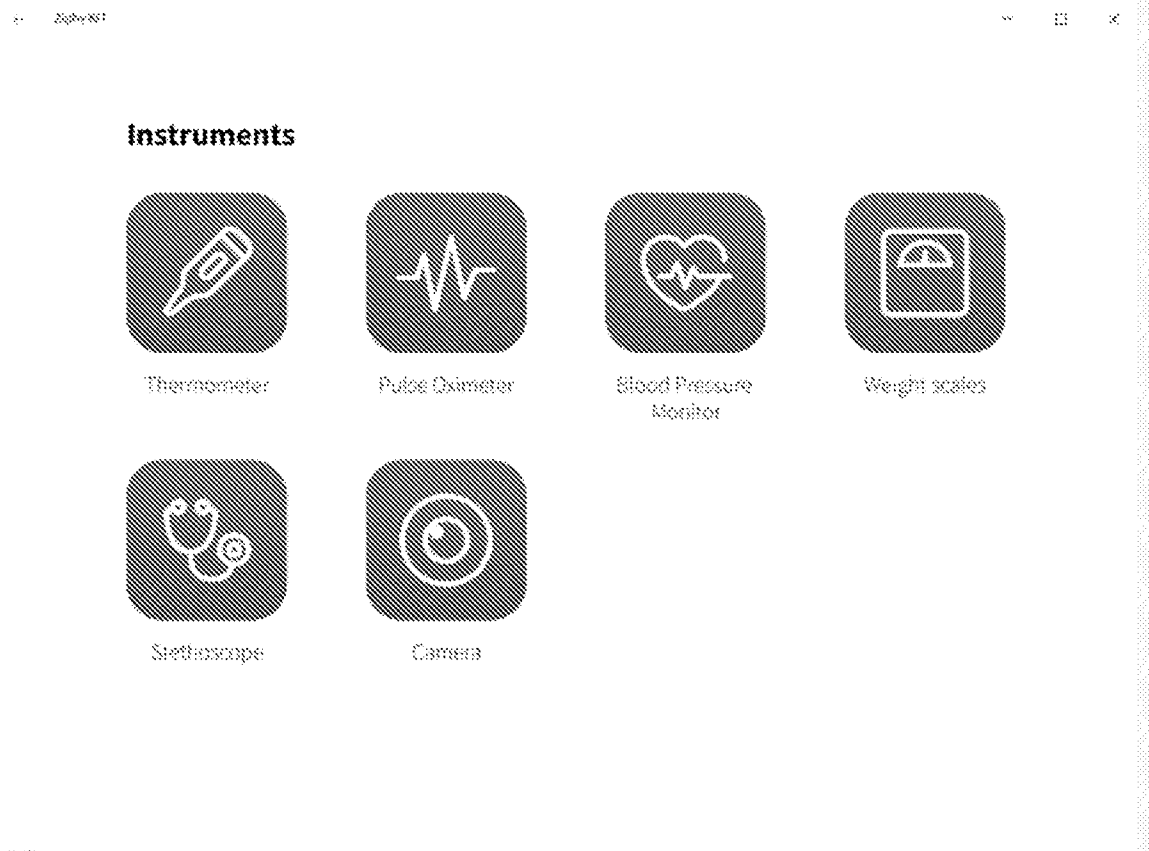


FIG. 25

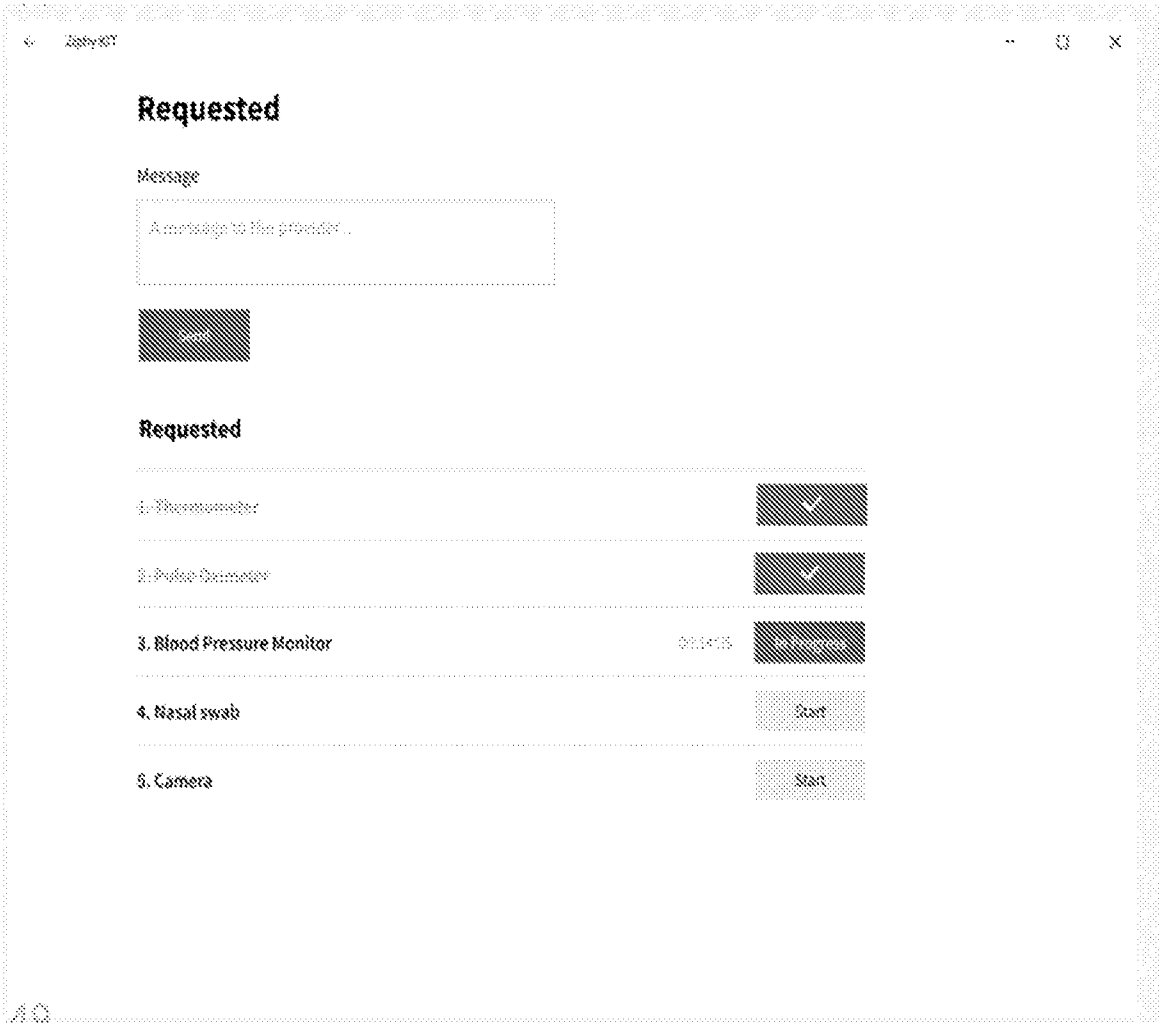


FIG. 26

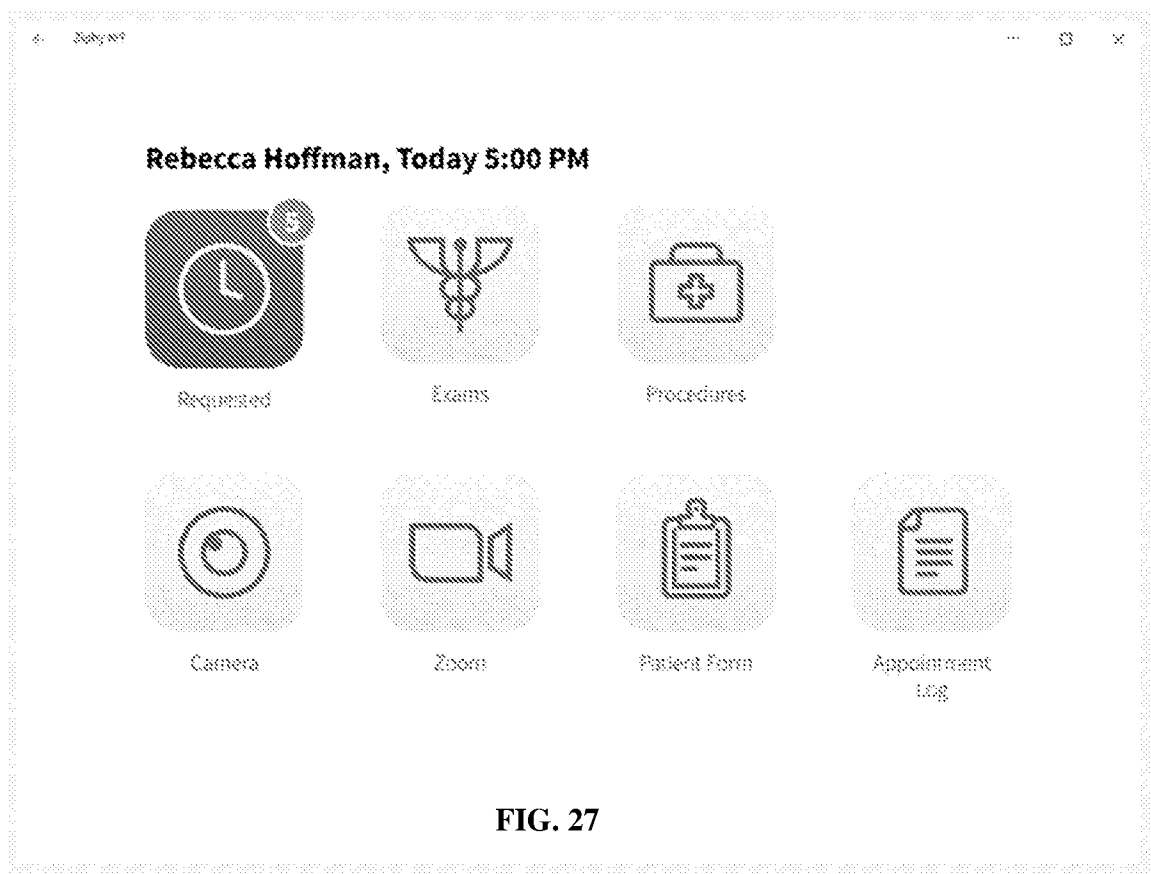


FIG. 27

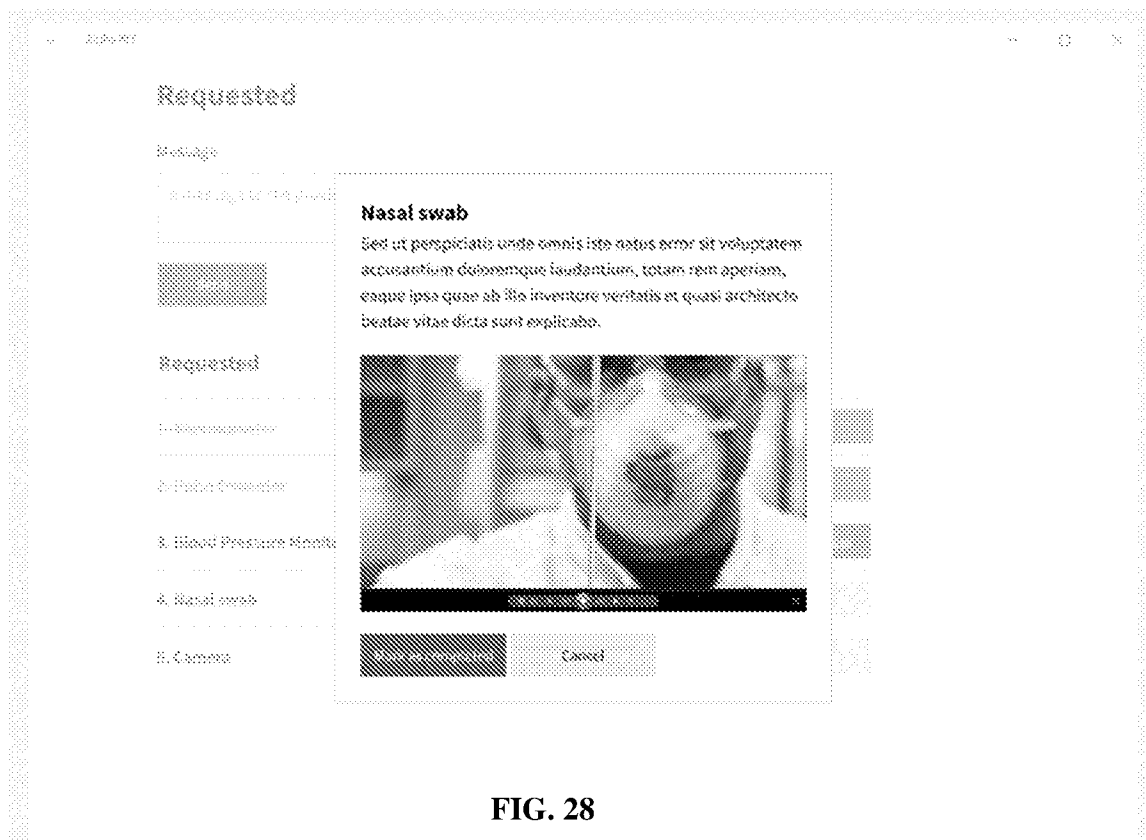


FIG. 28

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US21/61910

A. CLASSIFICATION OF SUBJECT MATTER

IPC - A61B 1/00; A61B 50/10; A61B 1/12; A61B 50/13; A61G 12/00; A61B 50/30 (2021.01)

CPC - A61B 1/00; A61B 2560/00; A61B 2560/02; A61B 2560/0204; A61B 2560/0214; A61B 6/56; A61B 6/4405; A61B 50/10; A61B 2050/185; A61B 1/12; A61B 50/13; A61G 12/001; A61G 12/00; A61B 50/30

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.
A ✓	CN 203898275 U (HEBEI EVIDENCE BASED MEDICINE TECHNOLOGY CO LTD) 29 October 2014; see machine translation	1-31
A ✓	DE 102013214080 A1 (SIEMENS AG) 22 January 2015; see machine translation	1-31
A ✓	KR 20200005744 A (MASIMO CORP) 16 January 2020; see machine translation	1-31

☐ 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

"D" document cited by the applicant in the international application

"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

10 May 2022 (10.05.2022)

Date of mailing of the international search report

MAY 23 2022

Name and mailing address of the ISA/US

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Authorized officer

Shane Thomas

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