(51) International Patent Classification:
A61B 3/12 (2006.01)  A61B 5/00 (2006.01)
A61B 1/227 (2006.01)

(21) International Application Number:
PCT/US2013/076678

(22) International Filing Date:

(25) Filing Language: English
(26) Publication Language: English

(30) Priority Data:
61/761,667 6 February 2013 (06.02.2013) US

(54) Title: TRANSFORMABLE MEDICAL DEVICE

(57) Abstract: A transformable medical device including an ophthalmoscopic head, a handle permanently attached to or integral with at least a portion of the ophthalmoscopic head, and an add-on diagnostic module receiver configured to couple an add-on diagnostic module, such as an otoscopic cone to the ophthalmoscopic head. The transformable medical device converts from an ophthalmoscope to an add-on diagnostic tool such as an otoscope upon or after coupling of the add-on diagnostic module to ophthalmoscopic head.

FIG. 9

Declarations under Rule 4.17:

— as to applicant’s entitlement to apply for and be granted a patent (Rule 4.17(i))

— as to the applicant’s entitlement to claim the priority of the earlier application (Rule 4.17(ii))

Published:

— with international search report (Art. 21(3))
TRANSFORMABLE MEDICAL DEVICE

CROSS-REFERENCE TO RELATED APPLICATIONS


BACKGROUND OF THE INVENTION

[0002] The physical exam is an essential part of any doctor's visit. A variety of tools are used in routine and symptom-based examinations. Some aspects of a routine examination such as a physical examination include an evaluation of the patient's history. Complaints or concerns about the patient's health are discussed, and the practitioner (whether it is a medical doctor or other trained examiner) will likely follow up on any of these complaints or concerns using the appropriate tools and methods. The practitioner may quiz the patient about important behaviors, like smoking, excessive alcohol use, sexual health, diet, and exercise. The practitioner may also check on the vaccination status and update the patient's personal and family medical history.

[0003] A variety of tools are used in a routine or symptom-based or other medical examination or treatment. For example, in a routine examination, various vital signs may be taken using a variety of tools. The practitioner may include evaluations using a variety of tools to investigate: blood pressure, heart rate or pulse rate, respiration rate, temperature, general appearance (watching and talking to the patient, memory and mental quickness, healthy skin appearance, ease of movement, standing or walking, for non-limiting example), heart examination, lung examination, head and/or neck examination (eyes, ears, mouth, throat, tonsils, teeth, gums, nose, sinuses, lymph nodes, thyroid, and/or carotid arteries, for non-limiting example), abdominal examination, weight and body habitus, neurological examination (nerves, muscle strength, reflexes, balance, mental state, for non-limiting example), dermatological examination (skin, nails, for non-limiting example), extremities examination (pulses in extremities, joint examinations, sensory examinations in extremities, for non-limiting example).

[0004] Moreover, a variety of tools are used in treatments, evaluations, or other medical procedures. Practitioners need reliable tools for each of these scenarios.

SUMMARY OF THE INVENTION

[0005] There is a need for eco-friendly devices that possess reliable, durable, and on-the-go use in rural, third-world, disaster prone areas, as well as out-of-the-office/clinic or home-based locations. There is a need to integrate ergonomic and functional designs not currently found in otoscope and ophthalmoscope devices. A more user-friendly interface with more efficient
practice, rugged durability, and self-powering technology allows for use without prolonged advanced charging and preparation.

[0006] Provided herein is a transformable medical device comprising an ophthalmoscopic head, a handle permanently attached to or integral with at least a portion of the ophthalmoscopic head, and an otoscopic cone receiver configured to couple an otoscopic cone to the ophthalmoscopic head. In some embodiments, the transformable medical device converts from an ophthalmoscope to an otoscope upon or after coupling of the otoscopic cone.

[0007] In some embodiments, the otoscopic cone receiver comprises a snap-fit guide, sliding rail guide, magnetic guide, a winding thread, an elastic guide, a twist-lock guide, or a push-fitting guide.

[0008] In some embodiments, the otoscopic cone receiver is compatible with a universal disposable specula tip.

[0009] In some embodiments, the otoscopic cone is a disposable specula tip.

[0010] In some embodiments, the otoscopic cone is disposable.

[0011] In some embodiments, the otoscopic cone receiver is compatible with a tip designed for the Welch Allyn MacroView Otoscope.

[0012] In some embodiments, the otoscopic cone receiver is compatible with multiple sizes of otoscopic cones.

[0013] In some embodiments, the transformable medical device further comprises a switch configured to convert the ophthalmoscope to an otoscope. In some embodiments, the switch is a biased switch, a toggle switch, a reed switch, a key switch, a microswitch, a relay switch, a pushbutton switch, a slide switch, a proximity switch, or a rocker switch.

[0014] In some embodiments, the switch comprises an ophthalmoscope position and an otoscope position. In some embodiments, the switch is configured to be toggled between the two positions by a user or automatically.

[0015] In some embodiments, the transformable medical device further comprises a first feature that is not necessary to otoscopic evaluation, wherein upon or after moving the switch to an otoscope position, the first feature is either deactivated or disabled.

[0016] In some embodiments, the transformable medical device further comprises a first feature that is not necessary to otoscopic evaluation, wherein upon or after moving the switch to an ophthalmoscope position, the first feature is activated or enabled.

[0017] In some embodiments, the transformable medical device further comprises a first feature that is not necessary to otoscopic evaluation, wherein upon or after coupling of the otoscopic cone, the first feature is deactivated or disabled.
In some embodiments, the switch of the transformable medical device further comprises an off position.

In some embodiments, the transformable medical device further comprises one or more of a sensor, a trigger, a button, or a first feature controller that is configured to deactivate or disable the first feature.

In some embodiments, the transformable medical device further comprises a guard configured to allow only the otoscopic cone to deactivate or disable the first feature.

In some embodiments, the transformable medical device further comprises a first feature controller on the ophthalmoscopic head, wherein the first feature is deactivated or disabled by being covered by the otoscopic cone.

In some embodiments, the first feature comprises at least one of: an aperture dial further comprising at least one of: a micro aperture setting, a small aperture setting, a large aperture setting, a fixation star setting, and a semi-circle setting; a filter dial further comprising at least one of: a red-free filter, a blue filter, and a neutral filter; a multi-colored lens; a magnifying lens; an adjustable magnifying lens; a condensing lens; and a slit.

In some embodiments, the transformable medical device further comprises a second feature that is deactivated or disabled upon or after coupling the otoscopic cone to the ophthalmoscopic head, deactivated or disabled upon or after moving the switch to an otoscope position, or activated or enabled upon or after moving the switch to an ophthalmoscopic position. The second feature comprises at least one of: an aperture dial further comprising at least one of: a micro aperture setting, a small aperture setting, a large aperture setting, a fixation star setting, and a semi-circle setting; a filter dial further comprising at least one of: a red-free filter, a blue filter, and a neutral filter; a multi-colored lens; a magnifying lens; an adjustable magnifying lens; a condensing lens; and a slit.

In some embodiments, the transformable medical device further an energy storage element charged by a dynamo. In some embodiments, the dynamo is a twist-operated generator, crank-operated generator, shake-operated generator, pulling trigger generator, or pulling string generator.

In some embodiments, the transformable medical device further comprising an energy storage element charged by a solar cell.

In some embodiments, the transformable medical device further comprising an energy storage element charged by a wind powered element.

In some embodiments, the energy storage element comprises a charge sufficient to conduct a complete otoscopic examination, a complete ophthalmoscopic examination, a
complete rhinoscopic examination, a complete laryngoscopic examination, a complete
dermatoscopic examination, a complete anoscopy examination, or a combination thereof.

[0028] In some embodiments, the energy storage element comprises a charge that can power the
device for at least 1.5 hours, more than 1.5 hours, 1 hour to 1.5 hours, at least 1 hour, more than
1 hour, at least 45 minutes, more than 45 minutes, 45 minutes to 1 hour, 45 minutes to 1.5 hours,
at least 30 minutes, more than 30 minutes, 30 minutes to 45 minutes, 30 minutes to an hour, 30
minutes to 1.5 hours, at least 20 minutes, more than 20 minutes, 20 minutes to 30 minutes, 20
minutes to 45 minutes, 20 minutes to an hour, 20 minutes to 1.5 hours, at least 15 minutes, more
than 15 minutes, 15 minutes to 20 minutes, 15 minutes to 30 minutes, 15 minutes to 45 minutes,
15 minutes to an hour, 15 minutes to 1.5 hours, at least 10 minutes, more than 10 minutes, 10 to
15 minutes, 5 minutes to 10 minutes, at least 5 minutes, more than 5 minutes, 3 minutes to 5
minutes, 3 minutes to 10 minutes, at least 3 minutes, more than 3 minutes, at least 2 minutes,
more than 2 minutes, 2 minutes to 5 minutes, 2 minutes to 3 minutes, 2 minutes to 10 minutes, at
least 90 seconds, more than 90 seconds, 90 seconds to 10 minutes, 90 seconds to 5 minutes, 90
seconds to 3 minutes, 90 seconds to 2 minutes, at least 1 minute, more than 1 minute, 1 to 10
minutes, 1 minutes to 5 minutes, 1 minutes to 3 minutes, 1 minutes to 2 minutes, 1 minute to 90
seconds, at least 30 seconds, more than 30 seconds, 30 seconds to 10 minutes, 30 seconds to 5
minutes, 30 seconds to 3 minutes, 30 seconds to 2 minutes, 30 seconds to 90 seconds, 30
seconds to 1 minute, 30 seconds to 45 seconds, at least 20 seconds, more than 20 seconds, 20
seconds to 10 minutes, 20 seconds to 5 minutes, 20 seconds to 3 minutes, 20 seconds to 2
minutes, 20 seconds to 90 seconds, 20 seconds to 1 minute, 20 seconds to 30 seconds, 20
seconds to 45 seconds, at least 10 seconds, more than 10 seconds, 10 seconds to 10 minutes, 10
seconds to 5 minutes, 10 seconds to 3 minutes, 10 seconds to 2 minutes, 10 seconds to 90
seconds, 10 seconds to 1 minute, 10 seconds to 20 seconds, 10 seconds to 30 seconds, 10
seconds to 45 seconds, at least 5 seconds, more than 5 seconds, 5 seconds to 10 minutes, 5
seconds to 5 minutes, 5 seconds to 3 minutes, 5 seconds to 2 minutes, 5 seconds to 90 seconds, 5
seconds to 1 minute, 5 seconds to 10 seconds, 5 seconds to 20 seconds, 5 seconds to 30 seconds,
5 seconds to 45 seconds, about 5 seconds, about 10 seconds, about 20 seconds, about 30
seconds, about 45 seconds, about 1 minute, about 5 minutes, about 2 minutes, about 3 minutes,
about 90 seconds, about 10 minutes, about 15 minutes, about 20 minutes, about 30 minutes,
about 45 minutes, about an hour, or about 1.5 hours.

[0029] In some embodiments, the energy storage element comprises a charge that can power the
device for more than 1.26 seconds.

[0030] In some embodiments, the energy storage element is a super capacitor.
In some embodiments, the transformable medical device further comprises a light source in the ophthalmoscopic head. In some embodiments, the light source is a LED, a Halogen bulb, an Incandescent bulb, or a Xenon bulb.

In some embodiments, the LED emits light at a color temperature from 3500 Kelvin to 15,000 Kelvin, or a wavelength from 193 nanometers to 828 nanometers. In some embodiments, the LED emits light at a color temperature of about 3500 Kelvin, or a wavelength of about 828 nanometers. In some embodiments, the LED emits light at a color temperature of about 4000 Kelvin, or a wavelength of about 724 nanometers. In some embodiments, the LED emits light at a color temperature of about 5500 Kelvin, or a wavelength of about 527 nanometers. In some embodiments, the LED emits light at a color temperature below 3500 Kelvin, or at a wavelength below 828 nanometers.

In some embodiments, the Halogen bulb emits light at a color temperature from 2800 Kelvin to 3200 Kelvin, or a wavelength from 905 nanometers to 1035 nanometers. In some embodiments, the Halogen bulb emits light at a color temperature of about 3000 Kelvin, or a wavelength of about 966 nanometers. In some embodiments, the Halogen bulb emits light at a color temperature of about 3250 Kelvin, or a wavelength of about 892 nanometers.

In some embodiments, the Incandescent bulb emits light at a color temperature from 2000 Kelvin to 3000 Kelvin, or a wavelength from 966 nanometers to 1449 nanometers. In some embodiments, the Incandescent bulb emits light at a color temperature of about 2500 Kelvin, or a wavelength of about 1159 nanometers.

In some embodiments, the Xenon bulb emits light at a color temperature of about 3200 Kelvin, or a wavelength of about 905 nanometers.

In some embodiments, the transformable medical device further comprises a network connection to a network. In some embodiments, the network connection is wired or wireless.

In some embodiments, the transformable medical device further comprises a processor configured to transmit data, images, video, audio, or a combination thereof to cloud storage, a computer, a portable device, a smartphone, a television, or a diagnostic device through the network connection.

In some embodiments, the transmission of data, images, video, audio, or a combination thereof to the network is in real time.

In some embodiments, the transformable medical device further comprises a memory storage device configured to store data, images, video, audio, or a combination thereof in the medical device.
[0040] In some embodiments, the transformable medical device further comprises a processor configured to transmit data, images, video, audio, or a combination thereof stored in the memory storage device to cloud storage, a computer, a portable device, a smartphone, a television, or a diagnostic device through a network connection.

[0041] In some embodiments, the data, images, video, audio, or a combination thereof is used in telemedicine.

[0042] In some embodiments, the transformable medical device further comprises a first media module coupled thereto. In some embodiments, the first media module comprises a camera, an audio recorder, a video recorder, a video display, a Bluetooth connection, an internet connection, a WI-FI connection, a USB connection, a touch screen, a touch display, a control panel, or a control screen. In some embodiments, the first media module comprises a camera, an audio recorder, a video recorder, a video display, a Bluetooth connection, a USB connection, a Bluetooth device, an internet connection, a WI-FI connection, a WI-FI device, a memory storage device, a touch screen, a touch display, a control panel, or a control screen. In some embodiments, the memory storage device comprises one or more of a USB flash drive, a portable memory storage device, a flash memory card, and an optical storage device.

[0043] In some embodiments, the first media module is removable.

[0044] In some embodiments, the first media module is configured to replace controls or other features of the ophthalmoscopic head or of an otoscope. In some embodiments, one or more controls or features of the ophthalmoscope, the otoscope, or an add-on diagnostic module are removed from the transformable medical device and replaced by the first media module.

[0045] In some embodiments, the first media module comprises a network connection, as described elsewhere herein.

[0046] In some embodiments, the first media module comprises the processor, as described elsewhere herein.

[0047] In some embodiments, the first media module comprises the memory storage device, as described elsewhere herein.

[0048] In some embodiments, the transformable medical device further comprises a second media module coupled to the medical device, wherein the second media module comprises a camera, an audio recorder, a video recorder, a video display, a Bluetooth connection, an internet connection, a WI-FI connection, a USB connection, a touch screen, a touch display, a control panel, or a control screen. In some embodiments, the second media module comprises a camera, an audio recorder, a video recorder, a video display, a Bluetooth connection, a USB connection, a Bluetooth device, an internet connection, a WI-FI connection, a WI-FI device, a memory storage device, and features of the diagnostic module.
storage device, a touch screen, a touch display, a control panel, or a control screen. In some embodiments, the memory storage device comprises one or more of a USB flash drive, a portable memory storage device, a flash memory card, and an optical storage device.

[0049] In some embodiments, the transformable medical device further comprises an ergonomic feature. In some embodiments, the ergonomic feature comprises at least one of: a thumb rest, a comfortable grip, and ergonomic controls.

[0050] In some embodiments, the transformable medical device further comprises a connection for an AC source of energy. In some embodiments, the AC source of energy is a wall source of energy.

[0051] In some embodiments, the transformable medical device further comprises a connection for a DC source of energy. In some embodiments, the DC source of energy comprises a battery.

[0052] In some embodiments, the transformable medical device further comprises a connection for a DC source of energy and a dynamo. In some embodiments, the DC source of energy is a backup power source. In some embodiments, the dynamo is a backup power source. In some embodiments, the dynamo is the primary power source.

[0053] In some embodiments, the transformable medical device further comprises an internal shock mounting.

[0054] In some embodiments, the transformable medical device further comprises a hermetic seal.

[0055] In some embodiments, the transformable medical device further comprises a bumper on an exterior of the device configured to absorb shock.

[0056] In some embodiments, the transformable medical device further comprises an ocular tonometer or features of an ocular tonometer permanently attached to or integral with the handle or with the ophthalmoscopic head.

[0057] In some embodiments, the transformable medical device further comprises an ocular tonometer or features of an ocular tonometer removably coupled to the handle or to the ophthalmoscopic head.

[0058] In some embodiments, the transformable medical device further comprises a first safety device that reduces the light brightness or intensity if the otoscopic cone is not coupled to the ophthalmoscopic head. In some embodiments, the first safety device detects whether or not the otoscopic cone is coupled to the head.

[0059] In some embodiments, the transformable medical device further comprises a second safety device that blocks or reduces the light brightness or intensity emitted from the
ophthalmoscopic head if the otoscopic cone is not coupled to the ophthalmoscopic head when the switch is in an otoscope position.

[0060] Provided herein is a transformable medical device comprising an ophthalmoscopic head, a handle permanently attached to or integral with at least a portion of the ophthalmoscopic head, and an add-on diagnostic module receiver configured to couple an add-on diagnostic module to the ophthalmoscopic head.

[0061] In some embodiments, the transformable medical device further comprises a first feature that is not necessary to evaluation using the add-on diagnostic module, wherein upon or after coupling of the add-on diagnostic module to the ophthalmoscopic head, the first feature is deactivated or disabled. In some embodiments, the add-on diagnostic module comprises one or more features of a laryngoscope, one or more features of a rhinoscope, one or more features of a dermatoscope, one or more features of an ocular tonometer, or one or more features of an anoscope. In some embodiments, the add-on diagnostic module comprises a laryngoscope, a rhinoscope, a dermatoscope, an ocular tonometer, or an anoscope.

[0062] In some embodiments, the transformable medical device further comprises a switch configured to convert the ophthalmoscope to the add-on diagnostic module. In some embodiments, the switch is a biased switch, a toggle switch, a reed switch, a key switch, a microswitch, a relay switch, a pushbutton switch, a slide switch, a proximity switch, or a rocker switch.

[0063] In some embodiments, the switch has an ophthalmoscope position and an add-on diagnostic module position. Further, in some embodiments, the switch is configured to be toggled between the ophthalmoscope position and the add-on diagnostic module position either by a user or automatically.

[0064] In some embodiments, the transformable medical device further comprises a first feature that is not necessary to ophthalmoscopic evaluation, wherein upon or after coupling of the add-on diagnostic module, the first feature is deactivated or disabled.

[0065] In some embodiments, the transformable medical device further comprises a first feature necessary to evaluation using the add-on diagnostic module, wherein upon or after coupling of the add-on diagnostic module, the first feature is activated or enabled.

[0066] In some embodiments, the first feature comprises at least one of: an aperture dial further comprising at least one of: a micro aperture setting, a small aperture setting, a large aperture setting, a fixation star setting, and a semi-circle setting; a filter dial further comprising at least one of: a red-free filter, a blue filter, and a neutral filter; a multi-colored lens; a magnifying lens; an adjustable magnifying lens; a condensing lens; and a slit.
[0067] In some embodiments, the transformable medical device further comprises an energy storage element charged by a dynamo. In some embodiments, the dynamo is a twist-operated generator, crank-operated generator, shake-operated generator, pulling trigger generator, or pulling string generator.

[0068] In some embodiments, the transformable medical device further comprises an energy storage element charged by a solar cell.

[0069] In some embodiments, the transformable medical device further comprises an energy storage element charged by a wind powered element.

[0070] In some embodiments, the energy storage element comprises a charge sufficient to conduct a complete otoscopic examination, a complete ophthalmoscopic examination, a complete rhinoscopic examination, a complete laryngoscopic examination, a complete dermatoscopic examination, a complete anascopic examination, a complete ocular tonometer examination or a combination thereof.

[0071] In some embodiments, the energy storage element comprises a charge that can power the device for at least 1.5 hours, more than 1.5 hours, 1 hour to 1.5 hours, at least 1 hour, more than 1 hour, at least 45 minutes, more than 45 minutes, 45 minutes to 1 hour, 45 minutes to 1.5 hours, at least 30 minutes, more than 30 minutes, 30 minutes to 45 minutes, 30 minutes to an hour, 30 minutes to 1.5 hours, at least 20 minutes, more than 20 minutes, 20 minutes to 30 minutes, 20 minutes to 45 minutes, 20 minutes to an hour, 20 minutes to 1.5 hours, at least 15 minutes, more than 15 minutes, 15 minutes to 20 minutes, 15 minutes to 30 minutes, 15 minutes to 45 minutes, 15 minutes to an hour, 15 minutes to 1.5 hours, at least 10 minutes, more than 10 minutes, 10 to 15 minutes, 5 minutes to 10 minutes, at least 5 minutes, more than 5 minutes, 3 minutes to 5 minutes, 3 minutes to 10 minutes, at least 3 minutes, more than 3 minutes, at least 2 minutes, more than 2 minutes, 2 minutes to 5 minutes, 2 minutes to 3 minutes, 2 minutes to 10 minutes, at least 90 seconds, more than 90 seconds, 90 seconds to 10 minutes, 90 seconds to 5 minutes, 90 seconds to 3 minutes, 90 seconds to 2 minutes, at least 1 minute, more than 1 minute, 1 to 10 minutes, 1 minutes to 5 minutes, 1 minutes to 3 minutes, 1 minutes to 2 minutes, 1 minute to 90 seconds, at least 30 seconds, more than 30 seconds, 30 seconds to 10 minutes, 30 seconds to 5 minutes, 30 seconds to 3 minutes, 30 seconds to 2 minutes, 30 seconds to 90 seconds, 30 seconds to 1 minute, 30 seconds to 45 seconds, at least 20 seconds, more than 20 seconds, 20 seconds to 10 minutes, 20 seconds to 5 minutes, 20 seconds to 3 minutes, 20 seconds to 2 minutes, 20 seconds to 90 seconds, 20 seconds to 1 minute, 20 seconds to 30 seconds, 20 seconds to 45 seconds, at least 10 seconds, more than 10 seconds, 10 seconds to 5 minutes, 10 seconds to 3 minutes, 10 seconds to 2 minutes, 10 seconds to 90
seconds, 10 seconds to 1 minute, 10 seconds to 20 seconds, 10 seconds to 30 seconds, 10 seconds to 45 seconds, at least 5 seconds, more than 5 seconds, 5 seconds to 10 minutes, 5 seconds to 5 minutes, 5 seconds to 3 minutes, 5 seconds to 2 minutes, 5 seconds to 90 seconds, 5 seconds to 1 minute, 5 seconds to 10 seconds, 5 seconds to 20 seconds, 5 seconds to 30 seconds, 5 seconds to 45 seconds, about 5 seconds, about 10 seconds, about 20 seconds, about 30 seconds, about 45 seconds, about 1 minute, about 5 minutes, about 2 minutes, about 3 minutes, about 90 seconds, about 10 minutes, about 15 minutes, about 20 minutes, about 30 minutes, about 45 minutes, about an hour, or about 1.5 hours.

[0072] In some embodiments, the energy storage element comprises a charge that can power the device for more than 1.26 seconds.

[0073] In some embodiments, the energy storage element is a super capacitor.

[0074] In some embodiments, the transformable medical device further comprises a light source in the ophthalmoscopic head. In some embodiments, the light source is a LED, a Halogen bulb, an Incandescent bulb, or a Xenon bulb.

[0075] In some embodiments, the LED emits light at a color temperature from 3500 Kelvin to 15,000 Kelvin, or a wavelength from 193 nanometers to 828 nanometers. In some embodiments, the LED emits light at a color temperature of about 3500 Kelvin, or a wavelength of about 828 nanometers. In some embodiments, the LED emits light at a color temperature of about 4000 Kelvin, or a wavelength of about 724 nanometers. In some embodiments, the LED emits light at a color temperature of about 5500 Kelvin, or a wavelength of about 527 nanometers. In some embodiments, the LED emits light at a color temperature below 3500 Kelvin, or at a wavelength below 828 nanometers.

[0076] In some embodiments, the Halogen bulb emits light at a color temperature from 2800 Kelvin to 3200 Kelvin, or a wavelength from 905 nanometers to 1035 nanometers. In some embodiments, the Halogen bulb emits light at a color temperature of about 3000 Kelvin, or a wavelength of about 966 nanometers. In some embodiments, the Halogen bulb emits light at a color temperature of about 3250 Kelvin, or a wavelength of about 892 nanometers.

[0077] In some embodiments, the Incandescent bulb emits light at a color temperature from 2000 Kelvin to 3000 Kelvin, or a wavelength from 966 nanometers to 1449 nanometers. In some embodiments, the Incandescent bulb emits light at a color temperature of about 2500 Kelvin, or a wavelength of about 1159 nanometers.

[0078] In some embodiments, the Xenon bulb emits light at a color temperature of about 3200 Kelvin, or a wavelength of about 905 nanometers.
In some embodiments, the transformable medical device further comprises a network connection to a network. In some embodiments, the network connection is wired or wireless.

In some embodiments, the transformable medical device further comprises a processor configured to transmit data, images, video, audio, or a combination thereof to cloud storage, a computer, a portable device, a smartphone, a television, or a diagnostic device through the network connection.

In some embodiments, the transmission of data, images, video, audio, or a combination thereof to the network is in real time.

In some embodiments, the transformable medical device further comprises a memory storage device configured to store data, images, video, audio, or a combination thereof in the medical device.

In some embodiments, the transformable medical device further comprises a processor configured to transmit data, images, video, audio, or a combination thereof stored in the memory storage device to cloud storage, a computer, a portable device, a smartphone, a television, or a diagnostic device through the network connection.

In some embodiments, the data, images, video, audio, or a combination thereof is used in telemedicine.

In some embodiments, the transformable medical device further comprises a first media module coupled to thereto. In some embodiments, the first media module comprises a camera, an audio recorder, a video recorder, a video display, a Bluetooth connection, an internet connection, a WI-FI connection, a USB connection, a touch screen, a touch display, a control panel, or a control screen. In some embodiments, the first media module comprises a camera, an audio recorder, a video recorder, a video display, a Bluetooth connection, a USB connection, a Bluetooth device, an internet connection, a WI-FI connection, a WI-FI device, a memory storage device, a touch screen, a touch display, a control panel, or a control screen. In some embodiments, the memory storage device comprises one or more of a USB flash drive, a portable memory storage device, a flash memory card, and an optical storage device.

In some embodiments, the first media module is removable.

In some embodiments, the first media module can replace controls or other features of the ophthalmoscopic head or of the add-on diagnostic module. In some embodiments, one or more controls or features of the ophthalmoscope, the otoscope, or an add-on diagnostic module are removed from the device and replaced by the first media module.

In some embodiments, the first media module comprises a network connection, as described elsewhere herein.
In some embodiments, the first media module comprises the processor, as described elsewhere herein.

In some embodiments, the first media module comprises the memory storage device, as described elsewhere herein.

In some embodiments, the transformable medical device further comprises a second media module coupled to the medical device, wherein the second media module comprises a camera, an audio recorder, a video recorder, a video display, a Bluetooth connection, an internet connection, a WI-FI connection, a USB connection, a touch screen, a touch display, a control panel, or a control screen. In some embodiments, the second media module comprises a camera, an audio recorder, a video recorder, a video display, a Bluetooth connection, a USB connection, a Bluetooth device, an internet connection, a WI-FI connection, a WI-FI device, a memory storage device, a touch screen, a touch display, a control panel, or a control screen. In some embodiments, the memory storage device comprises one or more of a USB flash drive, a portable memory storage device, a flash memory card, and an optical storage device.

In some embodiments, the transformable medical device further comprises an ergonomic feature. In some embodiments, the ergonomic features comprise at least one of: a thumb rest, a comfortable grip, and ergonomic controls.

In some embodiments, the transformable medical device further comprises a connection for an AC source of energy. In some embodiments, the AC source of energy is a wall source of energy.

In some embodiments, the transformable medical device further comprises a connection for a DC source of energy. In some embodiments, the DC source of energy comprises a battery.

In some embodiments, the transformable medical device further comprises a connection for a DC source of energy and a dynamo. In some embodiments, the DC source of energy is a backup power source. In some embodiments, the dynamo is a backup power source. In some embodiments, the dynamo is the primary power source.

In some embodiments, the transformable medical device further comprises an internal shock mounting.

In some embodiments, the transformable medical device further comprises a hermetic seal.

In some embodiments, the transformable medical device further comprises a bumper on an exterior of the device configured to absorb shock.

In some embodiments, the transformable medical device further comprises a first safety device that reduces the light brightness or intensity if the otoscopic cone is not coupled to the
ophthalmoscopic head. In some embodiments, the first safety device detects whether or not the otoscopic cone is coupled to the head.

In some embodiments, the transformable medical device further comprises a second safety device that blocks or reduces the light brightness or intensity emitted from the ophthalmoscopic head if the otoscopic cone is not coupled to the ophthalmoscopic head when the switch is in an otoscope position.

Provided herein is a method comprising providing a device as described herein.

INCORPORATION BY REFERENCE

All publications, patents, and patent applications mentioned in this specification are herein incorporated by reference to the same extent as if each individual publication, patent, or patent application was specifically and individually indicated to be incorporated by reference.

BRIEF DESCRIPTION OF THE DRAWINGS

The novel features of the invention are set forth with particularity in the appended claims. A better understanding of the features and advantages of the present invention will be obtained by reference to the following detailed description that sets forth illustrative embodiments, in which the principles of the invention are utilized.

Figure 1 illustrates a schematic block diagram of an exemplary embodiment of a conceptual self-powering portable medical device.

Figure 2 illustrates a schematic block diagram of an embodiment of a conceptual system including the self-powering portable medical device of Figure 1.

Figure 3 illustrates a front view of a conceptual baton device of some embodiments of a transformable device.

Figure 4 illustrates a front view of a conceptual handheld device of some embodiments of a transformable device.

Figure 5 illustrates a front view of a storage, transportation, and charging unit of some embodiments of a transformable medical device.

Figure 6 illustrates a front view of a sphygmomanometer of some embodiments of a transformable medical device.

Figure 7 illustrates a front view of a medical device handle of some embodiments of a transformable medical device.

Figure 8 conceptually illustrates a schematic block diagram of a computer system 800 with which some embodiments may be implemented.
[0012] **Figure 9** illustrates an exploded view of an embodiment of a transformable medical device.

[0013] **Figure 10** depicts an isometric view of an embodiment of a transformable medical device according to an embodiment of the invention.

[0014] **Figure 11** depicts an isometric view of an embodiment of a transformable medical device according to an embodiment of the invention.

[0015] **Figure 12** depicts a side view of some components of an embodiment of a transformable medical device.

[0016] **Figure 13** depicts an isometric view of an embodiment of a transformable medical device.

**DETAILED DESCRIPTION OF THE INVENTION**

[0017] In the following detailed description, numerous details, examples, and embodiments are set forth and described. However, it will be clear and apparent to one skilled in the art that the invention is not limited to the embodiments set forth and that the invention may be practiced without some of the specific details and examples discussed.

[0018] Provided herein is a transformable medical device comprising an ophthalmoscopic head, a handle permanently attached to or integral with at least a portion of the ophthalmoscopic head, and an otoscopic cone receiver configured to couple an otoscopic cone to the ophthalmoscopic head. In some embodiments, the transformable medical device converts from an ophthalmoscope to an otoscope upon or after coupling of the otoscopic cone. A portion of the ophthalmoscopic head can be replaced by a media module such as a control panel or a video display module. This replaceable portion can contain some controls or functionality such as the aperture wheel, magnifying wheel, brightness wheel, or optical viewfinder.

[0019] In some embodiments, the otoscopic cone receiver comprises a snap-fit guide, sliding rail guide, magnetic guide, a winding thread, an elastic guide, a twist-lock guide, or a push-fitting guide.

[0020] In some embodiments, the otoscopic cone receiver is compatible with a universal disposable specula tip, including but not limited to, the 52434 KleenSpec Universal Disposable Specula Tips, the Dr. Mom Disposable Otoscope Specula, the Medline Piccolight Otoscope Ear Specula, the Veridian KaWe Piccolight Disposable Ear Specula, or the American Diagnostic Corporation 5182 Disposable Ear Specula. The otoscopic cone receiver is also compatible with specula tips of various sizes, including but limited to, 2.5mm, 2.75mm, 4mm, or 4.25mm specula cones. The otoscopic cone receiver is also compatible with a tip designed for the Welch Allyn MacroView Otoscope.
In some embodiments, the transformable medical device further comprises a switch configured to convert the ophthalmoscope to an otoscope. Further, in some embodiments, the switch is a biased switch, a toggle switch, a reed switch, a key switch, a microswitch, a relay switch, a pushbutton switch, a slide switch, a proximity switch, or a rocker switch. In certain embodiments the switch can be toggled between an ophthalmoscope position and an otoscope position. In other embodiments, the switch can be toggled between an ophthalmoscope position and a position dedicated to another type of diagnostic module (i.e. another add-on diagnostic module noted herein). The toggling can be done either by manual command by the user, or automatically by the device. Automatic toggling can occur by activating a sensor that toggles the switch upon or after the otoscopic cone coupling to the otoscopic cone receiver. For example, the switch can be automatically activated by coupling the cone to the cone receiver.

In embodiments with the switch, the transformable medical device further comprises a first feature that is not necessary to otoscopic evaluation, wherein upon or after moving the switch to an otoscope position, the first feature is either deactivated or disabled. This first feature comprises at least one of: an aperture dial further comprising at least one of: a micro aperture setting, a small aperture setting, a large aperture setting, a fixation star setting, and a semi-circle setting; a filter dial further comprising at least one of: a red-free filter, a blue filter, and a neutral filter; a multi-colored lens; a magnifying lens; an adjustable magnifying lens; a condensing lens; and a slit. In some embodiments, this first feature is activated or enabled upon or after moving the switch to an ophthalmoscopic position. Further, in both embodiments listed above, the first feature can be deactivated by a sensor, trigger, button, or a controller. A guard can also be configured to only allow the otoscopic cone to deactivate or disable the first feature. This guard can be a secondary switch or sensor activated by proper coupling of the otoscopic cone.

In embodiments without the switch, the first feature can be deactivated or disabled upon or after coupling of the otoscopic cone to the otoscopic cone receiver. In further embodiments, the first feature is controlled by a first feature controller on the ophthalmoscopic head which can be deactivated or disabled by being covered by the otoscopic cone.

In some embodiments, the switch of the transformable medical device comprises an off position.

In some embodiments, the transformable medical device further comprises a second feature that is deactivated or disabled upon or after coupling the otoscopic cone to the ophthalmoscopic head, deactivated or disabled upon or after moving the switch to an otoscope
position, or activated or enabled upon or after moving the switch to an ophthalmoscopic position. The second feature comprises at least one of: an aperture dial further comprising at least one of: a micro aperture setting, a small aperture setting, a large aperture setting, a fixation star setting, and a semi-circle setting; a filter dial further comprising at least one of: a red-free filter, a blue filter, and a neutral filter; a multi-colored lens; a magnifying lens; an adjustable magnifying lens; a condensing lens; and a slit.

[00126] In some embodiments, the transformable medical device further comprises an energy storage element charged by a dynamo. In some embodiments, the dynamo is a twist-operated generator, crank-operated generator, shake-operated generator, pulling trigger generator, or pulling string generator. In other embodiments, the energy storage element is charged by a solar cell or a wind powered element. In the above energy storage element embodiments, the charge is sufficient to conduct a complete otoscopic examination, a complete ophthalmoscopic examination, a complete rhinoscopic examination, a complete laryngoscopic examination, a complete dermatoscopic examination, a complete anascopic examination, or a combination thereof. Alternatively, the charge can be sufficient to power the device for at least 1.5 hours, more than 1.5 hours, 1 hour to 1.5 hours, at least 1 hour, more than 1 hour, at least 45 minutes, more than 45 minutes, 45 minutes to 1 hour, 45 minutes to 1.5 hours, at least 30 minutes, more than 30 minutes, 30 minutes to 45 minutes, 30 minutes to an hour, 30 minutes to 1.5 hours, at least 20 minutes, more than 20 minutes, 20 minutes to 30 minutes, 20 minutes to 45 minutes, 20 minutes to an hour, 20 minutes to 1.5 hours, at least 15 minutes, more than 15 minutes, 15 minutes to 20 minutes, 15 minutes to 30 minutes, 15 minutes to 45 minutes, 15 minutes to an hour, 15 minutes to 1.5 hours, at least 10 minutes, more than 10 minutes, 10 to 15 minutes, 5 minutes to 10 minutes, at least 5 minutes, more than 5 minutes, 3 minutes to 5 minutes, 3 minutes to 10 minutes, at least 3 minutes, more than 3 minutes, at least 2 minutes, more than 2 minutes, 2 minutes to 5 minutes, 2 minutes to 3 minutes, 2 minutes to 10 minutes, at least 90 seconds, more than 90 seconds, 90 seconds to 10 minutes, 90 seconds to 5 minutes, 90 seconds to 3 minutes, 90 seconds to 2 minutes, at least 1 minute, more than 1 minute, 1 to 10 minutes, 1 minutes to 5 minutes, 1 minutes to 3 minutes, 1 minutes to 2 minutes, 1 minute to 90 seconds, at least 30 seconds, more than 30 seconds, 30 seconds to 10 minutes, 30 seconds to 5 minutes, 30 seconds to 3 minutes, 30 seconds to 2 minutes, 30 seconds to 90 seconds, 30 seconds to 1 minute, 30 seconds to 45 seconds, at least 20 seconds, more than 20 seconds, 20 seconds to 10 minutes, 20 seconds to 5 minutes, 20 seconds to 3 minutes, 20 seconds to 2 minutes, 20 seconds to 90 seconds, 20 seconds to 1 minute, 20 seconds to 30 seconds, 20 seconds to 45 seconds, at least 10 seconds, more than 10 seconds, 10 seconds to 10 minutes, 10
seconds to 5 minutes, 10 seconds to 3 minutes, 10 seconds to 2 minutes, 10 seconds to 90 seconds, 10 seconds to 1 minute, 10 seconds to 20 seconds, 10 seconds to 30 seconds, 10 seconds to 45 seconds, at least 5 seconds, more than 5 seconds, 5 seconds to 10 minutes, 5 seconds to 5 minutes, 5 seconds to 3 minutes, 5 seconds to 2 minutes, 5 seconds to 90 seconds, 5 seconds to 1 minute, 5 seconds to 10 seconds, 5 seconds to 20 seconds, 5 seconds to 30 seconds, 5 seconds to 45 seconds, about 5 seconds, about 10 seconds, about 20 seconds, about 30 seconds, about 45 seconds, about 1 minute, about 5 minutes, about 2 minutes, about 3 minutes, about 90 seconds, about 10 minutes, about 15 minutes, about 20 minutes, about 30 minutes, about 45 minutes, about an hour, or about 1.5 hours. Alternatively, the charge can be sufficient to power the device for more than 1.26 seconds.

[00127] In some embodiments, the energy storage element is a super capacitor. The super capacitor can store a large amount of electrical energy and can have high capacitance, high energy density, and high power density. In some embodiments, the super capacitor has a capacitance of greater than about 100 F. Some embodiments have a power density of greater than 1,000 W/kg. Some embodiments have an energy density in a range from about 1 Wh/kg to about 10 Wh/kg. In some embodiments, the capacitor 124 is an electric double layer capacitor (EDLC). In some embodiments, the super capacitor is a pseudo electrochemical double layer capacitor. This super capacitor can have a power density of about 2.65 kW/kg and an energy density of about 6.47 Wh/kg, or a power density of about 1.82 kW/kg and an energy density of about 6.46 Wh/kg, or a power density of about 1.57 kW/kg and an energy density of about 6.12 Wh/kg. In some embodiments, the super capacitor is the pseudo electrochemical double layer capacitor distributed by Ioxus, Inc. of Oneonta, N.Y., including the 220 F. Model (Part No.RHE2R3227SR), the 800 F. model (Part No. RHE2R3807SR), and the 1000 F. model (Part No. RHE2R3108SR). In some embodiments, two or more capacitors are combined to store the requisite energy. The super capacitor, in some embodiments, has quick charging capabilities, in which the capacitor can be fully charged within 5 seconds, 10 seconds, 15 seconds, 20 seconds, 30 seconds, 1 minute, 2 minutes, 5 minutes, 10 minutes, or 15 minutes. The super capacitor, in some embodiments, has quick charging capabilities, in which the capacitor can be fully charged (to be fully functional for the times noted elsewhere herein) within 5 seconds, 10 seconds, 15 seconds, 20 seconds, 30 seconds, 1 minute, 2 minutes, 5 minutes, 10 minutes, 15 minutes, 20 minutes, 30 minutes, 40 minutes, 45 minutes, 1 hour, 90 minutes, 2 hours, 2.5 hours, 3 hours, 3.5 hours, 4 hours, 5 seconds to 4 hours, 5 seconds to 3.5 hours, 5 seconds to 3 hours, 5 seconds to 2 hours, 5 seconds to 1 hour, at least 10 minutes, at least 30 seconds, at least 1 minute, at least 5 minutes, at least 30 minutes, at least 15 minutes, at least 30 minutes, 30 seconds to 10 minutes,
30 seconds to 1 hour, 1 minute to 1 hour, 1 minute to 30 minutes, 5 minutes to 15 minutes, 10 minutes to 3 hours, 10 minutes to 2 hours, 10 minutes to 90 minutes, 10 minutes to 30 minutes, 10 minutes to 20 minutes, and about 15 minutes. As used herein the term "about" when used with respect to time means variations of 10%, 25%, or 50%.

[00128] In some embodiments, the transformable medical device further comprises a light source in the ophthalmoscopic head. In some embodiments, the light source is a LED, a Halogen bulb, an Incandescent bulb, or a Xenon bulb. In some embodiments, the LED emits light at a color temperature from 3500 Kelvin to 15,000 Kelvin, or a wavelength from 193 nanometers to 828 nanometers. In some embodiments, the LED emits light at a color temperature of about 3500 Kelvin, or a wavelength of about 828 nanometers. In some embodiments, the LED emits light at a color temperature of about 4000 Kelvin, or a wavelength of about 724 nanometers. In some embodiments, the LED emits light at a color temperature of about 5500 Kelvin, or a wavelength of about 527 nanometers. In some embodiments, the LED emits light at a color temperature below 3500 Kelvin, or at a wavelength below 828 nanometers.

[00129] In some embodiments, the Halogen bulb emits light at a color temperature from 2800 Kelvin to 3200 Kelvin, or a wavelength from 905 nanometers to 1035 nanometers. In some embodiments, the Halogen bulb emits light at a color temperature of about 3000 Kelvin, or a wavelength of about 966 nanometers. In some embodiments, the Halogen bulb emits light at a color temperature of about 3250 Kelvin, or a wavelength of about 892 nanometers.

[00130] In some embodiments, the Incandescent bulb emits light at a color temperature from 2000 Kelvin to 3000 Kelvin, or a wavelength from 966 nanometers to 1449 nanometers. In some embodiments, the Incandescent bulb emits light at a color temperature of about 2500 Kelvin, or a wavelength of about 1159 nanometers.

[00131] In some embodiments, the Xenon bulb emits light at a color temperature of about 3200 Kelvin, or a wavelength of about 905 nanometers.

[00132] In some embodiments, the transformable medical device further comprises a network connection to a network. In some embodiments, the network connection is wired or wireless.

[00133] In some embodiments, the transformable medical device further comprises a processor configured to transmit data, images, video, audio, or a combination thereof to cloud storage, a computer, a portable device, a smartphone, a television, or a diagnostic device through the network connection.

[00134] In some embodiments, the transmission of data, images, video, audio, or a combination thereof to the network is in real time. During an examination using the device, real
time transmission allows the user to instantaneously transmit the data, images, video, audio, or a combination thereof to the network. The instantaneous transmission allows the user to communicate instantaneously with an external party who is viewing the transmission.

[00135] In some embodiments, the transformable medical device further comprises a memory storage device configured to store data, images, video, audio, or a combination thereof in the medical device.

[00136] In some embodiments, the transformable medical device further comprises a processor configured to transmit data, images, video, audio, or a combination thereof stored in the memory storage device to cloud storage, a computer, a portable device, a smartphone, a television, or a diagnostic device through a network connection.

[00137] In some embodiments, the data, images, video, audio, or a combination thereof is used in telemedicine. Telemedicine is the use of telecommunication and information technologies in order to provide clinical health care at a distance. In some embodiments, a technician in a third world country uses the device and a doctor from an outside location supervises the technician by viewing the examination from the outside location. Doctors are not always available to examine the patient in person. The doctor can give instantaneous instructions to the technician on how to use the device, perform the examination, and/or treat the patient. This is also known as interactive telemedicine. In some embodiments, the technician or the doctor performs the examination using the device, and the device stores the data into the memory storage device or the media module. The data can then be used to diagnose the patient at a later time. This is also known as store and forward telemedicine.

[00138] In some embodiments, the transformable medical device further comprises a first media module coupled thereto. In some embodiments, the first media module comprises a camera, an audio recorder, a video recorder, a video display, a Bluetooth connection, an internet connection, a WI-FI connection, a GPS tracking device, a USB connection, a touch screen, a touch display, a control panel, or a control screen. In some embodiments, the first media module comprises a camera, an audio recorder, a video recorder, a video display, a Bluetooth connection, a USB connection, a Bluetooth device, an internet connection, a WI-FI connection, a WI-FI device, a memory storage device, a touch screen, a touch display, a control panel, or a control screen. In some embodiments of the first media module with a Bluetooth connection, the device can be connected via the Bluetooth connection to another device such as a computer, cloud storage, or smartphone. In some embodiments, the memory storage device comprises one or more of a USB flash drive, a portable memory storage device, a flash memory card, and an optical storage device.
In some embodiments of the first media module with a GPS tracking device, the device can be located if lost or stolen by using a GPS locator. In some embodiments of the first media module with a video display, the video display replaces the viewfinder of the ophthalmoscopic head. In some embodiments of the first media module with a touch screen, the touch screen replaces at least one of the ophthalmoscopic controls of the ophthalmoscopic head. In some embodiments of the first media module with a control panel or control screen, the control panel or control screen replaces at least one of the ophthalmoscopic controls of the ophthalmoscopic head. In some embodiments of the first media module with a USB connection, the USB connection is used to transfer data to or from another device, and/or charge the transformable medical device. In some embodiments, the first media module comprises a camera, an audio recorder, a video recorder, a video display, a Bluetooth connection, a USB connection, a Bluetooth device, an internet connection, a WI-FI connection, a WI-FI device, a data storage device, a touch screen, a touch display, a control panel, or a control screen. In some embodiments, the memory storage device comprises one or more of a USB flash drive, a portable memory storage device, a flash memory card, and an optical storage device.

A memory storage device could include a USB device. A USB flash drive (USB device) is a memory storage device that includes flash memory with an integrated Universal Serial Bus (USB) interface. USB flash drives are typically removable and rewritable, and physically much smaller than a floppy disk. Drives of up to 256 gigabytes (GB) are available, although larger or smaller drives are contemplated herein, such as a one-terabyte (TB) or larger drive (2 TB, 3 TB, 4 TB). Some allow up to 100,000 write/erase cycles, depending on the exact type of memory chip used, and a 10-year shelf storage time.

USB flash drives are often used for the same purposes for which floppy disks or CD-ROMs were used, i.e., for storage, back-up and transfer of computer files. They are smaller, faster, have thousands of times more capacity, and are more durable and reliable because they have no moving parts. USB flash drives use the USB mass storage standard, supported natively by modern operating systems such as Linux, Mac OS X, Windows, and other Unix-like systems, as well as many BIOS boot ROMs. USB drives with USB 2.0 support can store more data and transfer faster than much larger optical disc drives like CD-RW or DVD-RW drives and can be read by many other systems such as the Xbox 360, PlayStation 3, DVD players and in newer mobile smartphones.

A flash drive does not contain any moving parts; the term drive persists because computers read and write flash drive data using the same system commands as for a mechanical
disk drive, with the storage appearing to the computer operating system and user interface as just another drive. Flash drives are very robust mechanically.

A flash drive consists of a small printed circuit board carrying the circuit elements and a USB connector, insulated electrically and protected inside a plastic, metal, or rubberized case which can be carried in a pocket or on a key chain, for example. The USB connector may be protected by a removable cap or by retracting into the body of the drive, although it is not likely to be damaged if unprotected. Most flash drives use a standard type-A USB connection allowing connection with a port on a personal computer, but drives for other interfaces also exist.

USB flash drives draw power from the computer via the USB connection. Some devices combine the functionality of a digital audio player with USB flash storage; they require a battery only when used to play music.

There are typically four parts to a flash drive: 1) a standard-A USB plug provides a physical interface to the host computer; 2) a USB mass storage controller is a small microcontroller with a small amount of on-chip ROM and RAM; 3) one or more NAND flash memory chip(s) stores data (NAND flash is typically also used in digital cameras); and 4) a crystal oscillator - produces the device's main 12 MHz clock signal and controls the device's data output through a phase-locked loop. Additional components of a typical USB memory storage device may also include: Jumpers and test pins for testing during the flash drive's manufacturing or loading code into the microprocessor; LEDs to indicate data transfers or data reads and writes; Write-protect switches to enable or disable writing of data into memory; unpopulated space to provide space to include a second memory chip (having this second space allows the manufacturer to use a single printed circuit board for more than one storage size device); a USB connector cover or cap reduces the risk of damage, prevents the entry of dirt or other contaminants, and improves overall device appearance. Some flash drives use retractable USB connectors instead. Others have a swivel arrangement so that the connector can be protected without removing anything. Further additional components of a typical USB memory storage device may also include: a transport aid, where the cap or the body contains a hole suitable for connection to a key chain or lanyard (connecting the cap, rather than the body, can allow the drive itself to be lost); and some drives offer expandable storage via an internal memory card slot, much like a memory card reader.

Another memory storage device may be a tape drive. On tape, cost per gigabyte is very low for large volumes, but the individual drives and media are expensive. Media has a very high capacity and very fast transfer speeds, but store data sequentially and is very slow for
random access of data. While disk-based backup is now the primary medium of choice for most companies, tape backup is still popular for taking data off-site for worst-case scenarios and for very large volumes (more than a few hundreds of TB). See LTO tapes.

Another memory storage device may be a Floppy disk: Floppy disk drives are rarely fitted to modern computers and are obsolete for normal purposes, although internal and external drives can be fitted if required. Floppy disks may be the method of choice for transferring data to and from very old computers without USB or booting from floppy disks, and so they are sometimes used to change the firmware on, for example, BIOS chips. Devices with removable storage like older Yamaha music keyboards are also dependent on floppy disks, which require computers to process them. Newer devices are built with USB flash drive support.

Another memory storage device may be a Optical media: The various writable and rewritable forms of CD and DVD are portable storage media supported by the vast majority of computers as of 2008. CD-R, DVD-R, and DVD+R can be written to only once, RW varieties up to about 1,000 erase/write cycles, while modern NAND-based flash drives often last for 500,000 or more erase/write cycles. DVD-RAM discs are the most suitable optical discs for data storage involving much rewriting.

Optical storage devices are among the cheapest methods of mass data storage after the hard drive. They are slower than their flash-based counterparts. Standard 12 cm optical discs are larger than flash drives and more subject to damage. Smaller optical media do exist, such as business card CD-Rs which have the same dimensions as a credit card, and the slightly less convenient but higher capacity 8 cm recordable MiniCD and MiniDVD. The small discs are more expensive than the standard size, and do not work in all drives.

Universal Disk Format (UDF) version 1.50 and above has facilities to support rewritable discs like sparing tables and virtual allocation tables, spreading usage over the entire surface of a disc and maximizing life, but many older operating systems do not support this format. Packet-writing utilities such as DirectCD and InCD are available but produce discs that are not universally readable (although based on the UDF standard). The Mount Rainier standard addresses this shortcoming in CD-RW media by running the older file systems on top of it and performing defect management for those standards, but it requires support from both the CD/DVD burner and the operating system. Many drives made today do not support Mount Rainier, and many older operating systems such as Windows XP and below, and Linux kernels older than 2.6.2, do not support it (later versions do). Essentially CDs/DVDs are a good way to record a great deal of information cheaply and have the advantage of being readable by most
standalone players, but they are poor at making ongoing small changes to a large collection of information. Flash drives' ability to do this is their major advantage over optical media.

Another memory storage device may be a Flash memory card: Flash memory cards, e.g., Secure Digital cards, are available in various formats and capacities, and are used by many consumer devices. However, while virtually all PCs have USB ports, allowing the use of USB flash drives, memory card readers are not commonly supplied as standard equipment (particularly with desktop computers). Although inexpensive card readers are available that read many common formats, this results in two pieces of portable equipment (card plus reader) rather than one.

Some manufacturers, aiming at a "best of both worlds" solution, have produced card readers that approach the size and form of USB flash drives. These readers are limited to a specific subset of memory card formats (such as SD, microSD, or Memory Stick), and often completely enclose the card, offering durability and portability approaching, if not quite equal to, that of a flash drive. Although the combined cost of a mini-reader and a memory card is usually slightly higher than a USB flash drive of comparable capacity, the reader + card solution offers additional flexibility of use, and virtually "unlimited" capacity.

An additional advantage of memory cards is that many consumer devices (e.g., digital cameras, portable music players) cannot make use of USB flash drives (even if the device has a USB port), whereas the memory cards used by the devices can be read by PCs with a card reader.

In some embodiments, the first media module is removable.

In some embodiments, the first media module is configured to replace controls or other features of the ophthalmoscopic head or of an otoscope. In some embodiments, one or more controls or features of the ophthalmoscope, the otoscope, or an add-on diagnostic module are removed from the transformable medical device and replaced by the first media module.

In some embodiments, the first media module comprises a network connection, as described elsewhere herein.

In some embodiments, the first media module comprises the processor, as described elsewhere herein.

In some embodiments, the first media module comprises the memory storage device, as described elsewhere herein.

In some embodiments, the transformable medical device further comprises a second media module coupled to the medical device, wherein the second media module comprises a camera, an audio recorder, a video recorder, a video display, a Bluetooth
connection, an internet connection, a WI-FI connection, a GPS tracking device, a USB connection, a touch screen, a control panel, or a control screen. In some embodiments, the second media module comprises a camera, an audio recorder, a video recorder, a video display, a Bluetooth connection, a USB connection, a Bluetooth device, an internet connection, a WI-FI connection, a WI-FI device, a memory storage device, a touch screen, a control panel, or a control screen. In some embodiments, the memory storage device comprises one or more of a USB flash drive, a portable memory storage device, a touch screen, a flash memory card, and an optical storage device.

[00160] In some embodiments the transformable medical device comprises yet another form of data storage commonly referred to as remote cloud storage accessible via a Bluetooth connection, a Bluetooth device, an internet connection (wired or wireless), a WI-FI connection, or a WI-FI device. Cloud storage is a model of networked enterprise storage where data is stored in virtualized pools of storage which are generally hosted by third parties. Hosting companies operate large data centers, and people who require their data to be hosted buy or lease storage capacity from them. The data center operators, in the background, virtualize the resources according to the requirements of the customer and expose them as storage pools, which the customers can themselves use to store files or data objects. Physically, the resource may span across multiple servers and multiple locations. The safety of the files depends upon the hosting companies, and on the applications that leverage the cloud storage. Cloud storage services may be accessed through a web service application programming interface (API) or by applications that utilize the API, such as cloud desktop storage, a cloud storage gateway or Web-based content management systems.

[00161] In some embodiments, the transformable medical device further comprises an ergonomic feature. In some embodiments, the ergonomic feature comprises at least one of: a thumb rest, a comfortable grip, and ergonomic controls. The ergonomic feature allows for comfortable, long term use of the device without strain on the user's hand or wrist.

[00162] In some embodiments, the transformable medical device further comprises a connection for an AC source of energy. In some embodiments, the AC source of energy is from a wall source. While charging from an AC source of energy, the device is able to be used for medical examination at the same time. In some embodiments, the AC source of energy can be converted to DC. In further embodiments, the AC source of energy is converted by a USB adapter to be used to charge the device.

[00163] In some embodiments, the transformable medical device further comprises a connection for a DC source of energy. In some embodiments, the DC source of energy
comprises a battery. Direct current is produced by sources such as batteries, thermocouples, solar cells, and commutator-type electric machines of the dynamo type. In some embodiments, the DC source of energy is an automobile cigarette lighter receptacle.

[00164] In some embodiments, the transformable medical device further comprises a connection for a DC source of energy and a dynamo. In some embodiments, the DC source of energy is a backup power source. In some embodiments, the dynamo is a backup power source. In some embodiments, the dynamo is the primary power source.

[00165] In a rural environment, there is large potential to drop or break the device. Further, it is difficult to replace components of the device, to keep contaminants out of the device, and to clean the device. In some embodiments, the transformable medical device further comprises an internal shock mounting. In some embodiments, the transformable medical device further comprises a hermetic seal. In some embodiments, the transformable medical device further comprises a bumper on an exterior of the device configured to absorb shock.

[00166] In some embodiments, the transformable medical device further comprises an ocular tonometer or features of an ocular tonometer permanently attached to or integral with the handle or with the ophthalmoscopic head. The ocular tonometer is used to determine the intraocular pressure (IOP) or the fluid pressure inside the eye. In some embodiments, the transformable medical device further comprises an ocular tonometer or features of an ocular tonometer removably coupled to the handle or to the ophthalmoscopic head.

[00167] In some embodiments, the transformable medical device further comprises a first safety device that reduces the light brightness or intensity if the otoscopic cone is not coupled to the ophthalmoscopic head. In some embodiments, the first safety device detects whether or not the otoscopic cone is coupled to the head.

[00168] In some embodiments, the transformable medical device further comprises a second safety device that blocks or reduces the light brightness or intensity emitted from the ophthalmoscopic head if the otoscopic cone is not coupled to the ophthalmoscopic head when the switch is in an otoscope position.

[00169] Some embodiments may provide a medical device that includes at least one power source and at least one energy storage element. Some embodiments may provide weather, water, and/or shock resistance. Some embodiments may include global positioning system (GPS) location capability via, for instance, an app running on a user device (e.g., a smartphone, tablet, personal computer (PC), etc.).

[00170] Such medical devices may include, for example, otoscopes, ophthalmoscopes, dermatoscopes (i.e., a magnifying glass with a light source), anoscopes, nasoscopes,
thermometers, pulse oximeters or other oxygen saturation measuring devices, laryngoscopes, pelvic speculums and exam apparatuses, sphygmomanometers and blood pressure measuring devices, portable blood or body fluid assay or measuring devices (e.g., glucometers, INR meters, portable coulter counters to measure blood serum chemistries and blood counts, etc.), portable inhaled/breathing medicine delivery devices (e.g., handheld nebulizers, atomizers, etc.), electronic stethoscopes, portable EKGs, portable ultrasound medical devices, electronic reflex hammers, medical grade electronic tuning forks, lab and clinic articles of clothing with integrated electronic circuitry (e.g., radio frequency circuitry, GPS circuitry, Bluetooth or wifi circuitry, integrated lighting or lab coat warming devices, etc.), medical grade penlights, medical grade handheld hair shaving devices, medical grade portable clocks/watches/timers, medical grade portable lamps, portable medical tool/water sterilizers that operate via UV light or heat, portable medical device/tool warmers, etc.

[00171] Provided herein is a transformable medical device comprising an ophthalmoscopic head, a handle permanently attached to or integral with at least a portion of the ophthalmoscopic head, and an add-on diagnostic module receiver configured to couple an add-on diagnostic module to the ophthalmoscopic head. A portion of the ophthalmoscopic head can be replaced by a media module such as a control panel or a video display module. This replaceable portion can contain some controls or functionality such as the aperture wheel, magnifying wheel, brightness wheel, or optical viewfinder.

The add-on diagnostic module may be coupled to the ophthalmoscopic head in any number of ways, similar to those noted with respect to the coupling of the ophthalmoscopic head and the otoscopic cone, or in some other manner which removable secures the add-on diagnostic module to the ophthalmoscopic head or to the handle or to the device in general.

[00172] In some embodiments, the transformable medical device further comprises a first feature that is not necessary to evaluation using the add-on diagnostic module, wherein upon or after coupling of the add-on diagnostic module to the ophthalmoscopic head, the first feature is deactivated or disabled. In some embodiments, the add-on diagnostic module comprises one or more features of a laryngoscope, one or more features of a rhinoscope, one or more features of a dermatoscope, one or more features of an ocular tonometer, or one or more features of an anoscope. The features of a laryngoscope may include a curved blade, straight blade, mirrors, and oxygen ports. The features of a rhinoscope may include a long flexible scope, and a scope with a forceps attachment. The features of a dermatoscope may include a magnifier (usually 10x), a non-polarized light source, a transparent plate, and a liquid medium between the instrument and the skin. The features of a ocular tonometer may include a probe, an induction
coil, a pulse generator, a free floating transducer, a rapid air generator, a pneumatic sensor, and a small plunger. The features of an anoscope may include a rigid tube, a speculum, and a fiber optic head. In some embodiments, the add-on diagnostic module comprises a laryngoscope, a rhinoscope, a dermatoscope, an ocular tonometer, or an anoscope.

In some embodiments, the transformable medical device further comprises a switch configured to convert the ophthalmoscope to the add-on diagnostic module. In some embodiments, the switch is a biased switch, a toggle switch, a reed switch, a key switch, a microswitch, a relay switch, a pushbutton switch, a slide switch, a proximity switch, or a rocker switch. In some embodiments, the switch has an ophthalmoscope position and an add-on diagnostic module position. Further, in some embodiments, the switch is configured to be toggled between the ophthalmoscope position and the add-on diagnostic module position either by a user or automatically. Automatic toggling can occur by activating a sensor that toggles the switch upon or after the otoscopic cone coupling to the otoscopic cone receiver.

In some embodiments, the transformable medical device further comprises a first feature that is not necessary to ophthalmoscopic evaluation, wherein upon or after coupling of the add-on diagnostic module, the first feature is deactivated or disabled. The first feature comprises at least one of: an aperture dial further comprising at least one of: a micro aperture setting, a small aperture setting, a large aperture setting, a fixation star setting, and a semi-circle setting; a filter dial further comprising at least one of: a red-free filter, a blue filter, and a neutral filter; a multi-colored lens; a magnifying lens; an adjustable magnifying lens; a condensing lens; and a slit.

In some embodiments, the transformable medical device further comprises a first feature necessary to evaluation using the add-on diagnostic module, wherein upon or after coupling of the add-on diagnostic module, the first feature is activated or enabled.

In some embodiments, the transformable medical device further comprises an energy storage element charged by a dynamo. In some embodiments, the dynamo is a twist-operated generator, crank-operated generator, shake-operated generator, pulling trigger generator, or pulling string generator.

In some embodiments, the transformable medical device further comprises an energy storage element charged by a solar cell.

In some embodiments, the transformable medical device further comprises an energy storage element charged by a wind powered element.

In some embodiments, the energy storage element comprises a charge sufficient to conduct a complete otoscopic examination, a complete ophthalmoscopic examination, a
complete rhinoscopic examination, a complete laryngoscopic examination, a complete
dermatoscopic examination, a complete anascopic examination, a complete ocular tonometer
examination or a combination thereof.

[00180] In some embodiments, the energy storage element comprises a charge that can
power the device for at least 1.5 hours, more than 1.5 hours, 1 hour to 1.5 hours, at least 1 hour,
more than 1 hour, at least 45 minutes, more than 45 minutes, 45 minutes to 1 hour, 45 minutes to
1.5 hours, at least 30 minutes, more than 30 minutes, 30 minutes to 45 minutes, 30 minutes to an
hour, 30 minutes to 1.5 hours, at least 20 minutes, more than 20 minutes, 20 minutes to 30
minutes, 20 minutes to 45 minutes, 20 minutes to an hour, 20 minutes to 1.5 hours, at least 15
minutes, more than 15 minutes, 15 minutes to 20 minutes, 15 minutes to 30 minutes, 15 minutes
to 45 minutes, 15 minutes to an hour, 15 minutes to 1.5 hours, at least 10 minutes, more than 10
minutes, 10 to 15 minutes, 5 minutes to 10 minutes, at least 5 minutes, more than 5 minutes,
3 minutes to 5 minutes, 3 minutes to 10 minutes, at least 3 minutes, more than 3 minutes, at least 2
minutes, more than 2 minutes, 2 minutes to 5 minutes, 2 minutes to 3 minutes, 2 minutes to 10
minutes, at least 90 seconds, more than 90 seconds, 90 seconds to 10 minutes, 90 seconds to 5
minutes, 90 seconds to 3 minutes, 90 seconds to 2 minutes, at least 1 minutes, more than 1
minute, 1 to 10 minutes, 1 minutes to 5 minutes, 1 minutes to 3 minutes, 1 minutes to 2 minutes,
1 minute to 90 seconds, at least 30 seconds, more than 30 seconds, 30 seconds to 10 minutes, 30
seconds to 5 minutes, 30 seconds to 3 minutes, 30 seconds to 2 minutes, 30 seconds to 90
seconds, 30 seconds to 1 minute, 30 seconds to 45 seconds, at least 20 seconds, more than 20
seconds, 20 seconds to 10 minutes, 20 seconds to 5 minutes, 20 seconds to 3 minutes, 20
seconds to 2 minutes, 20 seconds to 90 seconds, 20 seconds to 1 minute, 20 seconds to 30
seconds, 20 seconds to 45 seconds, at least 10 seconds, more than 10 seconds, 10 seconds to 10
minutes, 10 seconds to 5 minutes, 10 seconds to 3 minutes, 10 seconds to 2 minutes, 10 seconds
to 90 seconds, 10 seconds to 1 minute, 10 seconds to 20 seconds, 10 seconds to 30 seconds, 10
seconds to 45 seconds, at least 5 seconds, more than 5 seconds, 5 seconds to 10 minutes, 5
seconds to 5 minutes, 5 seconds to 3 minutes, 5 seconds to 2 minutes, 5 seconds to 90 seconds, 5
seconds to 1 minute, 5 seconds to 10 seconds, 5 seconds to 20 seconds, 5 seconds to 30 seconds,
5 seconds to 45 seconds, about 5 seconds, about 10 seconds, about 20 seconds, about 30
seconds, about 45 seconds, about 1 minute, about 5 minutes, about 2 minutes, about 3 minutes,
about 90 seconds, about 10 minutes, about 15 minutes, about 20 minutes, about 30 minutes,
about 45 minutes, about an hour, or about 1.5 hours.

[00181] In some embodiments, the energy storage element comprises a charge that can
power the device for more than 1.26 seconds.
In some embodiments, the energy storage element is a super capacitor.

In some embodiments, the transformable medical device further comprises a light source in the ophthalmoscopic head. In some embodiments, the light source is a LED, a Halogen bulb, an Incandescent bulb, or a Xenon bulb.

In some embodiments, the LED emits light at a color temperature from 3500 Kelvin to 15,000 Kelvin, or a wavelength from 193 nanometers to 828 nanometers. In some embodiments, the LED emits light at a color temperature of about 3500 Kelvin, or a wavelength of about 828 nanometers. In some embodiments, the LED emits light at a color temperature of about 4000 Kelvin, or a wavelength of about 724 nanometers. In some embodiments, the LED emits light at a color temperature of about 5500 Kelvin, or a wavelength of about 527 nanometers. In some embodiments, the LED emits light at a color temperature below 3500 Kelvin, or at a wavelength below 828 nanometers.

In some embodiments, the Halogen bulb emits light at a color temperature from 2800 Kelvin to 3200 Kelvin, or a wavelength from 905 nanometers to 1035 nanometers. In some embodiments, the Halogen bulb emits light at a color temperature of about 3000 Kelvin, or a wavelength of about 966 nanometers. In some embodiments, the Halogen bulb emits light at a color temperature of about 3250 Kelvin, or a wavelength of about 892 nanometers.

In some embodiments, the Incandescent bulb emits light at a color temperature from 2000 Kelvin to 3000 Kelvin, or a wavelength from 966 nanometers to 1449 nanometers. In some embodiments, the Incandescent bulb emits light at a color temperature of about 2500 Kelvin, or a wavelength of about 1159 nanometers.

In some embodiments, the Xenon bulb emits light at a color temperature of about 3200 Kelvin, or a wavelength of about 905 nanometers.

In some embodiments, the transformable medical device further comprises a network connection to a network. In some embodiments, the network connection is wired or wireless.

In some embodiments, the transformable medical device further comprises a processor configured to transmit data, images, video, audio, or a combination thereof to cloud storage, a computer, a portable device, a smartphone, a television, or a diagnostic device through the network connection.

In some embodiments, the transmission of data, images, video, audio, or a combination thereof to the network is in real time.
In some embodiments, the transformable medical device further comprises a memory storage device configured to store data, images, video, audio, or a combination thereof in the medical device.

In some embodiments, the transformable medical device further comprises a processor configured to transmit data, images, video, audio, or a combination thereof stored in the memory storage device to cloud storage, a computer, a portable device, a smartphone, a television, or a diagnostic device through the network connection.

In some embodiments, the data, images, video, audio, or a combination thereof is used in telemedicine.

In some embodiments, the transformable medical device further comprises a first media module coupled thereto. In some embodiments, the first media module comprises a camera, an audio recorder, a video recorder, a video display, a Bluetooth connection, an internet connection, a WI-FI connection, a USB connection, a touch screen, a touch display, a control panel, or a control screen. In some embodiments, the first media module comprises a camera, an audio recorder, a video recorder, a video display, a Bluetooth connection, a USB connection, a Bluetooth device, an internet connection, a WI-FI connection, a WI-FI device, a memory storage device, a touch screen, a touch display, a control panel, or a control screen. In some embodiments, the memory storage device comprises one or more of a USB flash drive, a portable memory storage device, a flash memory card, and an optical storage device.

In some embodiments the transformable medical device comprises remote cloud storage capability via a Bluetooth connection, a Bluetooth device, an internet connection (wired or wireless), a WI-FI connection, or a WI-FI device, as described elsewhere herein. In some embodiments the first media module comprises remote cloud storage capability, as described previously.

In some embodiments, the first media module is removable.

In some embodiments, the first media module can replace controls or other features of the ophthalmoscopic head or of the add-on diagnostic module. In some embodiments, one or more controls or features of the ophthalmoscope, the otoscope, or an add-on diagnostic module are removed from the device and replaced by the first media module.

In some embodiments, the first media module comprises a network connection, as described elsewhere herein.

In some embodiments, the first media module comprises the processor, as described elsewhere herein.
In some embodiments, the first media module comprises the memory storage device, as described elsewhere herein.

In some embodiments, the transformable medical device further comprises a second media module coupled to the medical device, wherein the second media module comprises a camera, an audio recorder, a video recorder, a video display, a Bluetooth connection, an internet connection, a WI-FI connection, a USB connection, a touch screen, a touch display, a control panel, or a control screen. In some embodiments, the second media module comprises a camera, an audio recorder, a video recorder, a video display, a Bluetooth connection, a USB connection, a Bluetooth device, an internet connection, a WI-FI connection, a WI-FI device, a memory storage device, a touch screen, a touch display, a control panel, or a control screen. In some embodiments, the memory storage device comprises one or more of a USB flash drive, a portable memory storage device, a flash memory card, and an optical storage device.

In some embodiments the transformable medical device comprises remote cloud storage capability via a Bluetooth connection, a Bluetooth device, an internet connection (wired or wireless), a WI-FI connection, or a WI-FI device, as described elsewhere herein. In some embodiments the second media module comprises remote cloud storage capability, as described previously.

In some embodiments, the transformable medical device further comprises an ergonomic feature. In some embodiments, the ergonomic features comprise at least one of: a thumb rest, a comfortable grip, and ergonomic controls.

In some embodiments, the transformable medical device further comprises a connection for an AC source of energy. In some embodiments, the AC source of energy is a wall source of energy.

In some embodiments, the transformable medical device further comprises a connection for a DC source of energy. In some embodiments, the DC source of energy comprises a battery.

In some embodiments, the transformable medical device further comprises a connection for a DC source of energy and a dynamo. In some embodiments, the DC source of energy is a backup power source. In some embodiments, the dynamo is a backup power source. In some embodiments, the dynamo is the primary power source.

In some embodiments, the transformable medical device further comprises an internal shock mounting.
In some embodiments, the transformable medical device further comprises a hermetic seal.

In some embodiments, the transformable medical device further comprises a bumper on an exterior of the device configured to absorb shock.

In some embodiments, the transformable medical device further comprises a first safety device that reduces the light brightness or intensity if the otoscopic cone is not coupled to the ophthalmoscopic head. In some embodiments, the first safety device detects whether or not the otoscopic cone is coupled to the head.

In some embodiments, the transformable medical device further comprises a second safety device that blocks or reduces the light brightness or intensity emitted from the ophthalmoscopic head if the otoscopic cone is not coupled to the ophthalmoscopic head when the switch is in an otoscope position.

Provided herein is a method comprising: receiving a transformable medical device comprising: an ophthalmoscopic head, a handle permanently attached to or integral with at least a first portion of the ophthalmoscopic head, and an add-on diagnostic module receiver configured to couple an add-on diagnostic module to the first portion of the ophthalmoscopic head; receiving the add-on diagnostic module; coupling the add-on diagnostic module to the first portion of the ophthalmoscopic head.

In some embodiments, the method comprises removing a second portion of the ophthalmoscopic head from the ophthalmoscopic head in order to accommodate the coupling of the add-on diagnostic module to the first portion of the ophthalmoscopic head. In some embodiments, the method comprises swapping a second portion of the ophthalmoscopic head with the add-on diagnostic module.

In some embodiments, the add-on diagnostic module comprises one or more features of an otoscope, one or more features of a laryngoscope, one or more features of a rhinoscope, one or more features of a dermatoscope, one or more features of an ocular tonometer, or one or more features of an anoscope. In some embodiments, the add-on diagnostic module converts the transformable medical device to an otoscope, a laryngoscope, a rhinoscope, a dermatoscope, an ocular tonometer, or an anoscope.

In some embodiments, the method comprises activating or moving a switch from an ophthalmoscopic mode to an add-on diagnostic mode. In some embodiments, the switch is configured to be toggled between the ophthalmoscope position and the add-on diagnostic module position by a user. In some embodiments, the switch is configured to be toggled between...
the ophthalmoscope position and the add-on diagnostic module position automatically when the add-on diagnostic module is attached.

[00216] In some embodiments, the transformable medical device comprises a first feature that is not necessary to ophthalmoscopic evaluation, wherein upon or after coupling of the add-on diagnostic module, the first feature is deactivated or disabled. In some embodiments, the transformable medical device comprises a first feature necessary to evaluation using the add-on diagnostic module, wherein upon or after coupling of the add-on diagnostic module, the first feature is activated or enabled. In some embodiments, the first feature comprises at least one of: an aperture dial further comprising at least one of: a micro aperture setting, a small aperture setting, a large aperture setting, a fixation star setting, and a semi-circle setting; a filter dial further comprising at least one of: a red-free filter, a blue filter, and a neutral filter; a multi-colored lens; a magnifying lens; an adjustable magnifying lens; a condensing lens; and a slit.

[00217] In some embodiments, the method comprises charging the transformable medical device using a dynamo. In some embodiments, the dynamo is a twist-operated generator, a crank-operated generator, a shake-operated generator, a pulling trigger generator, or a pulling string generator. In some embodiments, the method comprises charging the transformable medical device using a solar cell. In some embodiments, the method comprises charging the transformable medical device using a wind powered element.

[00218] In some embodiments, the method comprises coupling a media module to the transformable medical device. In some embodiments, the method comprises removing a second portion of the ophthalmoscopic head from the ophthalmoscopic head in order to accommodate the coupling of the media module to the transformable medical device. In some embodiments, the method comprises swapping a second portion of the ophthalmoscopic head with the media module. In some embodiments, the method comprises removing a first portion of the handle in order to couple the media module to the transformable medical device. In some embodiments, the method comprises activating or deactivating a media module of the transformable medical device.

[00219] In some embodiments, the media module comprises a camera, an audio recorder, a video recorder, a video display, a Bluetooth connection, a Bluetooth device, an internet connection, a WI-FI connection, a WI-FI device, a memory storage device, a USB connection, a touch screen, a touch display, a control panel, or a control screen. In some embodiments, the media module can replace controls or other features of the ophthalmoscopic head or of the add-on diagnostic module.
In some embodiments, one or more controls or features of the ophthalmoscope, the otoscope, or an add-on diagnostic module are removed from the device and replaced by the media module.

In some embodiments, the media module comprises a network connection to a network. In some embodiments, the network connection is wired or wireless.

In some embodiments, the media module comprises a processor configured to transmit data, images, video, audio, or a combination thereof to cloud storage, a computer, a portable device, a smartphone, a television, or a diagnostic device through a network connection.

In some embodiments, the method comprises transmitting data, images, video, audio, or a combination thereof to the network in real time. In some embodiments, the method comprises transmitting data, images, video, audio, or a combination thereof to the network after an examination or procedure is completed.

In some embodiments, the transformable medical device comprises a memory storage device configured to store data, images, video, audio, or a combination thereof in the transformable medical device. In some embodiments, the media module comprises a memory storage device configured to store data, images, video, audio, or a combination thereof.

In some embodiments, the method comprises saving data, images, video, audio, or a combination thereof to the memory storage device of the media module.

In some embodiments, the transformable medical device comprises a processor configured to transmit data, images, video, audio, or a combination thereof stored in the memory storage device to cloud storage, a computer, a portable device, a smartphone, a television, or a diagnostic device.

In some embodiments, the method comprises transmitting data, images, video, audio, or a combination thereof stored in the memory storage device to a computer, a portable device, a smartphone, a television, or a diagnostic device.

In some embodiments, the transformable medical device comprises a processor configured to transmit data, images, video, audio, or a combination thereof stored in the memory storage device to cloud storage, a computer, a portable device, a smartphone, a television, or a diagnostic device through a wired or wireless network connection.

In some embodiments, the method comprises transmitting data, images, video, audio, or a combination thereof stored in the memory storage device to a computer, a portable device, a smartphone, a television, or a diagnostic device through a wired or wireless network connection.
In some embodiments, the method comprises receiving a diagnosis, instruction, or other treatment regimen from a remote practitioner based on the data, images, video, audio, or a combination thereof. In some embodiments, the data, images, video, audio, or a combination thereof is used in telemedicine. In some embodiments, the method comprises saving data, images, video, audio, or a combination thereof in the transformable medical device. In some embodiments, the method comprises sending said data, images, video, audio, or combination thereof to a portable smart phone or other device having an internet connection.

Provided herein is a method comprising providing a device as described herein. Provided herein is a method comprising providing a kit as described herein. Provided herein is a device as described herein for use in any method or process described herein. Provided herein is a kit as described herein for use in any method or process described herein.

Some embodiments may provide portable medical device storage units. Each unit may be a handheld portable unit (about the size of a small briefcase or portable stereo radio) that may be able to house, store, and protect a set of handheld medical devices. The portable unit may allow the devices to clip on and/or otherwise be appropriately stored (e.g., using customized placeholders). The storage unit may also serve as a power source and may include a dynamo, solar cell, wind power element, AC connector, battery, and/or other appropriate elements.

Some embodiments may provide in-wall or attached or stationary to a wall (or other appropriate surface) vital sign and examination units that traditionally include an otoscope, ophthalmoscope, sphygmomanometer, thermometer, and pulse oximeter.

Each medical device (or tool, apparatus, article, etc.) may include specific design elements that facilitate ease of use, proper use, and/or safe use, and/or offer improved user-clinician and/or patient interfaces. Several examples of such design elements as applied to various specific devices are described below.

Some embodiments may provide an otoscope. Such a device may include features such as an area for placement of the thumb that provides stabilization of the device, a comfortable grip, and ergonomic, functional use. The thumb placement area may also serve as a console and may include one or more buttons, and circular and diagonal dials that may be used as to control various functions of the device (e.g., rheostat, dimmer, interchanging between modes/types of light, intensity of light, pulsations of light, mode of function, etc.). Such a device may also include an LED and/or LCD screen and/or other display indicators to reveal readiness state for use, charge of battery or capacitor, modes/types of light, intensity of light, pulsations of light, mode of function, etc. Some such devices may include image capture via an included...
digital camera, and/or allow transfer of image, sound, and/or numerical data (e.g., vital signs, status, etc.). Such data transfer may occur using various appropriate communication protocols, systems, networks, etc. (e.g., the Internet, wifi, Bluetooth, etc.). The otoscope of some embodiments may include a specialized silicon or plastic cushion or bumper on the insertion end or probe for patient comfort and safety.

[00236] Some embodiments may provide an ophthalmoscope. Such a device may include features such as an area for placement of the thumb that provides stabilization of the device, a comfortable grip, and ergonomic, functional use. The thumb placement area may also serve as a console and may include one or more buttons, and circular and diagonal dials that may be used as to control various functions of the device (e.g., rheostat, dimmer, interchanging between modes/types of light, intensity of light, pulsations of light, mode of function, etc.). Such a device may also include an LED and/or LCD screen and/or other display indicators to reveal readiness state for use, charge of battery or capacitor, modes/types of light, intensity of light, pulsations of light, mode of function, etc. Some such devices may include image capture via an included digital camera, and/or allow transfer of image, sound, and/or numerical data (e.g., vital signs, status, etc.). Such data transfer may occur using various appropriate communication protocols, systems, networks, etc. (e.g., the Internet, wifi, Bluetooth, etc.). The ophthalmoscope of some embodiments may include a specialized silicon or plastic cushion or bumper on the insertion end or probe for patient comfort and safety.

[00237] Some embodiments may provide a dermatoscope (i.e., a magnifying glass with a light source). Such a device may include features such as an area for placement of the thumb that provides stabilization of the device, a comfortable grip, and ergonomic, functional use. The thumb placement area may also serve as a console and may include one or more buttons, and circular and diagonal dials that may be used as to control various functions of the device (e.g., rheostat, dimmer, interchanging between modes/types of light, intensity of light, pulsations of light, mode of function, etc.). Such a device may also include an LED and/or LCD screen and/or other display indicators to reveal readiness state for use, charge of battery or capacitor, modes/types of light, intensity of light, pulsations of light, mode of function, etc. Some such devices may include image capture via an included digital camera, and/or allow transfer of image, sound, and/or numerical data (e.g., vital signs, status, etc.). Such data transfer may occur using various appropriate communication protocols, systems, networks, etc. (e.g., the Internet, wifi, Bluetooth, etc.).

[00238] Some embodiments may provide an anoscope. Such a device may include features such as an area for placement of the thumb that provides stabilization of the device, a
comfortable grip, and ergonomic, functional use. The thumb placement area may also serve as a
console and may include one or more buttons, and circular and diagonal dials that may be used
as to control various functions of the device (e.g., rheostat, dimmer, interchanging between
modes/types of light, intensity of light, pulsations of light, mode of function, etc.). Such a device
may also include an LED and/or LCD screen and/or other display indicators to reveal readiness
state for use, charge of battery or capacitor, modes/types of light, intensity of light, pulsations of
light, mode of function, etc. Some such devices may include image capture via an included
digital camera, and/or allow transfer of image, sound, and/or numerical data (e.g., vital signs,
status, etc.). Such data transfer may occur using various appropriate communication protocols,
systems, networks, etc. (e.g., the Internet, wifi, Bluetooth, etc.).

Some embodiments may provide a nasoscope. Such a device may include
features such as an area for placement of the thumb that provides stabilization of the device, a
comfortable grip, and ergonomic, functional use. The thumb placement area may also serve as a
console and may include one or more buttons, and circular and diagonal dials that may be used
as to control various functions of the device (e.g., rheostat, dimmer, interchanging between
modes/types of light, intensity of light, pulsations of light, mode of function, etc.). Such a device
may also include an LED and/or LCD screen and/or other display indicators to reveal readiness
state for use, charge of battery or capacitor, modes/types of light, intensity of light, pulsations of
light, mode of function, etc. Some such devices may include image capture via an included
digital camera, and/or allow transfer of image, sound, and/or numerical data (e.g., vital signs,
status, etc.). Such data transfer may occur using various appropriate communication protocols,
systems, networks, etc. (e.g., the Internet, wifi, Bluetooth, etc.).

Some embodiments may provide a thermometer. Such a device may include
features such as an area for placement of the thumb that provides stabilization of the device, a
comfortable grip, and ergonomic, functional use. The thumb placement area may also serve as a
console and may include one or more buttons, and circular and diagonal dials that may be used
as to control various functions of the device (e.g., rheostat, dimmer, interchanging between
modes/types of light, intensity of light, pulsations of light, mode of function, etc.). Such a device
may also include an LED and/or LCD screen and/or other display indicators to reveal readiness
state for use, charge of battery or capacitor, modes/types of light, intensity of light, pulsations of
light, mode of function, etc. Some such devices may include image capture via an included
digital camera, and/or allow transfer of image, sound, and/or numerical data (e.g., vital signs,
status, etc.). Such data transfer may occur using various appropriate communication protocols,
systems, networks, etc. (e.g., the Internet, wifi, Bluetooth, etc.).
Some embodiments may provide a pulse oximeter or other oxygen saturation measuring device. Such a device may include features such as an area for placement of the thumb that provides stabilization of the device, a comfortable grip, and ergonomic, functional use. The thumb placement area may also serve as a console and may include one or more buttons, and circular and diagonal dials that may be used as to control various functions of the device (e.g., rheostat, dimmer, interchanging between modes/types of light, intensity of light, pulsations of light, mode of function, etc.). Such a device may also include an LED and/or LCD screen and/or other display indicators to reveal readiness state for use, charge of battery or capacitor, modes/types of light, intensity of light, pulsations of light, mode of function, etc.

Some such devices may include image capture via an included digital camera, and/or allow transfer of image, sound, and/or numerical data (e.g., vital signs, status, etc.). Such data transfer may occur using various appropriate communication protocols, systems, networks, etc. (e.g., the Internet, wifi, Bluetooth, etc.).

Some embodiments may provide a laryngoscope. Such a device may include features such as an area for placement of the thumb that provides stabilization of the device, a comfortable grip, and ergonomic, functional use. The thumb placement area may also serve as a console and may include one or more buttons, and circular and diagonal dials that may be used as to control various functions of the device (e.g., rheostat, dimmer, interchanging between modes/types of light, intensity of light, pulsations of light, mode of function, etc.). Such a device may also include an LED and/or LCD screen and/or other display indicators to reveal readiness state for use, charge of battery or capacitor, modes/types of light, intensity of light, pulsations of light, mode of function, etc. Some such devices may include image capture via an included digital camera, and/or allow transfer of image, sound, and/or numerical data (e.g., vital signs, status, etc.). Such data transfer may occur using various appropriate communication protocols, systems, networks, etc. (e.g., the Internet, wifi, Bluetooth, etc.).

Some embodiments may provide a pelvic speculum and exam apparatus. Such a device may include features such as an area for placement of the thumb that provides stabilization of the device, a comfortable grip, and ergonomic, functional use. The thumb placement area may also serve as a console and may include one or more buttons, and circular and diagonal dials that may be used as to control various functions of the device (e.g., rheostat, dimmer, interchanging between modes/types of light, intensity of light, pulsations of light, mode of function, etc.). Such a device may also include an LED and/or LCD screen and/or other display indicators to reveal readiness state for use, charge of battery or capacitor, modes/types of light, intensity of light, pulsations of light, mode of function, etc. Some such devices may
include image capture via an included digital camera (which may include a fail-safe so as to not capture external body images or video, only internal pathology), and/or allow transfer of image, sound, and/or numerical data (e.g., vital signs, status, etc.). Such data transfer may occur using various appropriate communication protocols, systems, networks, etc. (e.g., the Internet, wifi, Bluetooth, etc.).

[00244] Some embodiments may provide a pelvic speculum portion that is inserted into the vaginal cavity for viewing the mucosal tissue and access to get a brush sample from the cervix. In some embodiments, the insertable portion may include a clear plastic tube that lights up and has an opening at the end to allow for cervix tissue access. Some embodiments may provide an insertable portion that includes a two part "duck bill", where four duck bills open in both an up/down direction and a side-to-side direction with clear plastic bills that light up.

[00245] Some embodiments may provide a sphygmomanometer and blood pressure measuring device. Such a device may include features such as an area for placement of the thumb that provides stabilization of the device, a comfortable grip, and ergonomic, functional use. The thumb placement area may also serve as a console and may include one or more buttons, and circular and diagonal dials that may be used as to control various functions of the device (e.g., rheostat, dimmer, interchanging between modes/types of light, intensity of light, pulsations of light, mode of function, etc.). Such a device may also include an LED and/or LCD screen and/or other display indicators to reveal readiness state for use, charge of battery or capacitor, modes/types of light, intensity of light, pulsations of light, mode of function, etc. Some such devices may include image capture via an included digital camera, and/or allow transfer of image, sound, and/or numerical data (e.g., vital signs, status, etc.). Such data transfer may occur using various appropriate communication protocols, systems, networks, etc. (e.g., the Internet, wifi, Bluetooth, etc.). Some devices may include a button or dial built ergonomically for thumb to be used for pressure release that may be built into the retractable vinyl BP cuff.

[00246] Some embodiments may provide a portable blood or body fluid assay or measuring device (e.g., a glucometer, INR meter, etc.). Such a device may include features such as an area for placement of the thumb that provides stabilization of the device, a comfortable grip, and ergonomic, functional use. The thumb placement area may also serve as a console and may include one or more buttons, and circular and diagonal dials that may be used as to control various functions of the device (e.g., rheostat, dimmer, interchanging between modes/types of light, intensity of light, pulsations of light, mode of function, etc.). Such a device may also include an LED and/or LCD screen and/or other display indicators to reveal readiness state for use, charge of battery or capacitor, modes/types of light, intensity of light, pulsations of light,
mode of function, etc. Some such devices may include image capture via an included digital camera, and/or allow transfer of image, sound, and/or numerical data (e.g., vital signs, status, etc.). Such data transfer may occur using various appropriate communication protocols, systems, networks, etc. (e.g., the Internet, wifi, Bluetooth, etc.).

Some embodiments may provide a portable coulter counter to measure blood serum chemistries and blood counts. Such a device may include features such as an area for placement of the thumb that provides stabilization of the device, a comfortable grip, and ergonomic, functional use. The thumb placement area may also serve as a console and may include one or more buttons, and circular and diagonal dials that may be used as to control various functions of the device (e.g., rheostat, dimmer, interchanging between modes/types of light, intensity of light, pulsations of light, mode of function, etc.). Such a device may also include an LED and/or LCD screen and/or other display indicators to reveal readiness state for use, charge of battery or capacitor, modes/types of light, intensity of light, pulsations of light, mode of function, etc. Some such devices may include image capture via an included digital camera, and/or allow transfer of image, sound, and/or numerical data (e.g., vital signs, status, etc.). Such data transfer may occur using various appropriate communication protocols, systems, networks, etc. (e.g., the Internet, wifi, Bluetooth, etc.).

Some embodiments may provide a portable inhaled/breathing medicine delivery device such as handheld nebulizer or atomizer. Such a device may include features such as an area for placement of the thumb that provides stabilization of the device, a comfortable grip, and ergonomic, functional use. The thumb placement area may also serve as a console and may include one or more buttons, and circular and diagonal dials that may be used as to control various functions of the device (e.g., rheostat, dimmer, interchanging between modes/types of light, intensity of light, pulsations of light, mode of function, etc.). Such a device may also include an LED and/or LCD screen and/or other display indicators to reveal readiness state for use, charge of battery or capacitor, modes/types of light, intensity of light, pulsations of light, mode of function, etc. Some such devices may include image capture via an included digital camera, and/or allow transfer of image, sound, and/or numerical data (e.g., vital signs, status, etc.). Such data transfer may occur using various appropriate communication protocols, systems, networks, etc. (e.g., the Internet, wifi, Bluetooth, etc.).

Some embodiments may provide an electronic stethoscope. Such a device may include features such as an area for placement of the thumb that provides stabilization of the device, a comfortable grip, and ergonomic, functional use. The thumb placement area may also serve as a console and may include one or more buttons, and circular and diagonal dials that
may be used as to control various functions of the device (e.g., rheostat, dimmer, interchanging between modes/types of light, intensity of light, pulsations of light, mode of function, etc.). Such a device may also include an LED and/or LCD screen and/or other display indicators to reveal readiness state for use, charge of battery or capacitor, modes/types of light, intensity of light, pulsations of light, mode of function, etc. Some such devices may include image capture via an included digital camera, and/or allow transfer of image, sound, and/or numerical data (e.g., vital signs, status, etc.). Such data transfer may occur using various appropriate communication protocols, systems, networks, etc. (e.g., the Internet, wifi, Bluetooth, etc.).

Some embodiments may provide a portable EKG. Such a device may include features such as an area for placement of the thumb that provides stabilization of the device, a comfortable grip, and ergonomic, functional use. The thumb placement area may also serve as a console and may include one or more buttons, and circular and diagonal dials that may be used as to control various functions of the device (e.g., rheostat, dimmer, interchanging between modes/types of light, intensity of light, pulsations of light, mode of function, etc.). Such a device may also include an LED and/or LCD screen and/or other display indicators to reveal readiness state for use, charge of battery or capacitor, modes/types of light, intensity of light, pulsations of light, mode of function, etc. Some such devices may include image capture via an included digital camera, and/or allow transfer of image, sound, and/or numerical data (e.g., vital signs, status, etc.). Such data transfer may occur using various appropriate communication protocols, systems, networks, etc. (e.g., the Internet, wifi, Bluetooth, etc.).

Some embodiments may provide a portable ultrasound medical device. Such a device may include features such as an area for placement of the thumb that provides stabilization of the device, a comfortable grip, and ergonomic, functional use. The thumb placement area may also serve as a console and may include one or more buttons, and circular and diagonal dials that may be used as to control various functions of the device (e.g., rheostat, dimmer, interchanging between modes/types of light, intensity of light, pulsations of light, mode of function, etc.). Such a device may also include an LED and/or LCD screen and/or other display indicators to reveal readiness state for use, charge of battery or capacitor, modes/types of light, intensity of light, pulsations of light, mode of function, etc. Some such devices may include image capture via an included digital camera, and/or allow transfer of image, sound, and/or numerical data (e.g., vital signs, status, etc.). Such data transfer may occur using various appropriate communication protocols, systems, networks, etc. (e.g., the Internet, wifi, Bluetooth, etc.).
Some embodiments may provide an electronic reflex hammer. Such a device may include features such as an area for placement of the thumb that provides stabilization of the device, a comfortable grip, and ergonomic, functional use. Such a device may also include an LED and/or LCD screen and/or other display indicators to reveal readiness state for use, charge of battery or capacitor, modes/types of light, intensity of light, pulsations of light, mode of function, etc. Some such devices may include image capture via an included digital camera, and/or allow transfer of image, sound, and/or numerical data (e.g., vital signs, status, etc.). Such data transfer may occur using various appropriate communication protocols, systems, networks, etc. (e.g., the Internet, wifi, Bluetooth, etc.).

Some embodiments may provide a medical grade electronic tuning fork. Such a device may include features such as an area for placement of the thumb that provides stabilization of the device, a comfortable grip, and ergonomic, functional use. Such a device may also include an LED and/or LCD screen and/or other display indicators to reveal readiness state for use, charge of battery or capacitor, modes/types of light, intensity of light, pulsations of light, mode of function, etc. Some such devices may include image capture via an included digital camera, and/or allow transfer of image, sound, and/or numerical data (e.g., vital signs, status, etc.). Such data transfer may occur using various appropriate communication protocols, systems, networks, etc. (e.g., the Internet, wifi, Bluetooth, etc.).

Some embodiments may provide lab and/or clinic articles of clothing with integrated electronic circuitry (e.g., for providing radio frequency functionality, GPS location, integrated Bluetooth or wifi, integrated lighting, warming device (e.g., for a lab coat), etc.).

Some embodiments may provide a medical grade penlight. Such a device may include features such as an area for placement of the thumb that provides stabilization of the device, a comfortable grip, and ergonomic, functional use. Such a device may also include an LED and/or LCD screen and/or other display indicators to reveal readiness state for use, charge of battery or capacitor, modes/types of light, intensity of light, pulsations of light, mode of function, etc. Some such devices may include image capture via an included digital camera, and/or allow transfer of image, sound, and/or numerical data (e.g., vital signs, status, etc.). Such data transfer may occur using various appropriate communication protocols, systems, networks, etc. (e.g., the Internet, wifi, Bluetooth, etc.).

Some embodiments may provide a medical grade handheld hair shaving device. Such a device may include features such as an area for placement of the thumb that provides stabilization of the device, a comfortable grip, and ergonomic, functional use. Such a device may also include an LED and/or LCD screen and/or other display indicators to reveal readiness
state for use, charge of battery or capacitor, modes/types of light, intensity of light, pulsations of light, mode of function, etc. Some such devices may include image capture via an included digital camera, and/or allow transfer of image, sound, and/or numerical data (e.g., vital signs, status, etc.). Such data transfer may occur using various appropriate communication protocols, systems, networks, etc. (e.g., the Internet, wifi, Bluetooth, etc.).

[00257] Some embodiments may provide a medical grade portable clock, watch, or timer. Such a device may include features such as an area for placement of the thumb that provides stabilization of the device, a comfortable grip, and ergonomic, functional use. Such a device may also include an LED and/or LCD screen and/or other display indicators to reveal readiness state for use, charge of battery or capacitor, modes/types of light, intensity of light, pulsations of light, mode of function, etc. Some such devices may include image capture via an included digital camera, and/or allow transfer of image, sound, and/or numerical data (e.g., vital signs, status, etc.). Such data transfer may occur using various appropriate communication protocols, systems, networks, etc. (e.g., the Internet, wifi, Bluetooth, etc.).

[00258] Some embodiments may provide a medical grade portable lamp. Such a device may include features such as an area for placement of the thumb that provides stabilization of the device, a comfortable grip, and ergonomic, functional use. Such a device may also include an LED and/or LCD screen and/or other display indicators to reveal readiness state for use, charge of battery or capacitor, modes/types of light, intensity of light, pulsations of light, mode of function, etc. Some such devices may include image capture via an included digital camera, and/or allow transfer of image, sound, and/or numerical data (e.g., vital signs, status, etc.). Such data transfer may occur using various appropriate communication protocols, systems, networks, etc. (e.g., the Internet, wifi, Bluetooth, etc.).

[00259] Some embodiments may provide a portable medical device storage unit. A typical handheld portable unit may be about the size of a small briefcase or portable stereo radio and may house, store, and protect handheld medical devices (e.g., the various devices described above) that may be clipped on and/or otherwise secured to the body of the unit. The various devices may be stored in customized placeholders. The storage unit may also serve as a power source and may include a dynamo, solar cell, wind power element, AC connector, battery, and/or other appropriate elements. The unit may allow for keyless ready operation via, for instance, an RF modulator or infrared device (e.g., a keyfob-like device that is able to be attached to an article of clothing, or another medical device such as a stethoscope). As a user carrying (or wearing) such devices enters within a proximity threshold and/or otherwise interacts
with the devices as specified, the unit may automatically unlock or otherwise make the devices and/or features included with the unit accessible.

[00260] Such a unit may include features such as an area for placement of the thumb that provides stabilization of the device, a comfortable grip, and ergonomic, functional use. Such a unit may also include an LED and/or LCD screen and/or other display indicators to reveal readiness state for use, charge of battery or capacitor, modes/types of light, intensity of light, pulsations of light, mode of function, etc. Some such units may include image capture via an included digital camera, and/or allow transfer of image, sound, and/or numerical data (e.g., vital signs, status, etc.). Such data transfer may occur using various appropriate communication protocols, systems, networks, etc. (e.g., the Internet, wifi, Bluetooth, etc.).

[00261] Some embodiments may provide an in-wall (or attached or stationary to wall vital sign and examination unit). Such a unit may include an otoscope, ophthalmoscope, sphygmomanometer, thermometer, and pulse oximeter. The unit may allow for keyless ready operation via, for instance, an RF modulator or infrared device (e.g., a keyfob-like device that is able to be attached to an article of clothing, or another medical device such as a stethoscope). As a user carrying (or wearing) such devices enters within a proximity threshold and/or otherwise interacts with the devices as specified, the unit may automatically unlock or otherwise make the devices and/or features included with the unit accessible. The infrared detector or device may be used for detecting motion (e.g., the wave of a hand) to cause the in-wall unit to expose the included devices for access prior to (and/or during) an exam. The infrared detector may also be used for closing and/or locking the in-wall unit such that the included devices are not exposed.

[00262] Some embodiments may provide a portable medical tool/water sterilizer that may operate using UV light or heat. Such a device may include features such as an area for placement of the thumb that provides stabilization of the device, a comfortable grip, and ergonomic, functional use. Such a device may also include an LED and/or LCD screen and/or other display indicators to reveal readiness state for use, charge of battery or capacitor, modes/types of light, intensity of light, pulsations of light, mode of function, etc. Some such devices may include image capture via an included digital camera, and/or allow transfer of image, sound, and/or numerical data (e.g., vital signs, status, etc.). Such data transfer may occur using various appropriate communication protocols, systems, networks, etc. (e.g., the Internet, wifi, Bluetooth, etc.).

[00263] Some embodiments may provide a portable medical device or tool warmer. Such a device may include features such as an area for placement of the thumb that provides stabilization of the device, a comfortable grip, and ergonomic, functional use. Such a device
may also include an LED and/or LCD screen and/or other display indicators to reveal readiness state for use, charge of battery or capacitor, modes/types of light, intensity of light, pulsations of light, mode of function, etc. Some such devices may include image capture via an included digital camera, and/or allow transfer of image, sound, and/or numerical data (e.g., vital signs, status, etc.). Such data transfer may occur using various appropriate communication protocols, systems, networks, etc. (e.g., the Internet, wifi, Bluetooth, etc.).

[00264] Some embodiments may provide a "head only" (or handle-less) medical device. Such a device may be square, round, "aerodynamically" designed and curved, and/or otherwise appropriately-shaped device. The device may be sized appropriately for handheld use (e.g., three inches by three inches by a half inch) and may include grip points (e.g., at the twelve o'clock and six o'clock sites to be held by the index finger and the thumb. Such devices may be able to be attached to the binaural portion of a stethoscope or a utility belt device or onto lab coats or scrubs.

[00265] Some embodiments may provide a software application that may interface with various medical devices (e.g., those described above) which in turn interact and integrate with smartphones, tablets, PCs, servers, and/or other appropriate devices, websites, and/or other resources that may measure, store, analyze, and/or otherwise utilize, for example, health vital signs, weights, body habitus, BMI, exercise times, caloric intake, and/or other health related data. Such data may, in turn, be used for health informatics, measuring rate of change or improvement, "healthiness" or lifestyle of a person or patient, and/or other appropriate applications. The data may be translated as a health commodity or may be used to allow consumers to get coupons, serve as a health-points rewards program, and/or other appropriate ways.

[00266] Some embodiments may provide one or more handheld and/or portable devices for measuring body fat percentage and total body water percentage (TBW); such as electrodes for Bioelectric Impedance Analysis (BIA). TBW can be used to estimate fat-free body mass and, by difference with body weight, body fat.

[00267] Some embodiments may provide one or more handheld and/or portable devices for measuring body or object weights. These devices may include portable light-weight body scales for measuring people or animals, or light-weight digital scales for measuring objects.

[00268] Some embodiments may provide for one or more handheld and/or portable devices for measuring body fat percentage and total body water percentage (TBW); such as electrodes for Bioelectric Impedance Analysis (BIA), combined with portable light-weight body scales.
Some embodiments may provide one or more handheld and/or portable dental devices (e.g., lights, burr tools, injectables, drill, enamel brush/tooth brush, water injecting/projecting, vibrating pain/sensation-dulling tools, etc.)

Figure 1 illustrates a schematic block diagram of an embodiment of a conceptual self-powering portable medical device 100. As shown, the device may include one or more power sources, energy storage elements, processors, communication elements, storages, controllers, status display elements, input elements, display elements (and/or other types of output elements), a communication bus, and/or a power bus (not shown).

Each power source may include one or more dynamos (e.g., a twist, crank, shake, pulling trigger, pulling string, and/or other appropriate configurations), one or more solar cells, one or more wind power elements, one or more AC connectors (e.g., a plug for a wall outlet), one or more DC connectors (e.g., a USB connector), and/or other appropriate power sources.

Each energy storage element may include various devices (e.g., one or more super-capacitors and/or ultra-capacitors, one or more batteries (e.g., rechargeable batteries), etc.). The storage element may be capable of receiving and storing energy from each power source (when available). For instance, a rechargeable battery may be charged by shaking a device with a shake dynamo.

Each processor may be able to execute various sets of instructions and/or perform various appropriate operations to transform sets of data. The processor of some embodiments may be able to communicate with various other system elements. Such communication may allow the processor to retrieve data from one or more other elements and/or send commands to one or more elements. In this way, the processor may be able to monitor and control the operation of various device components, as appropriate.

Each communication element may allow the device to communicate with other devices, systems, and/or other appropriate components. Such a communication element may include various appropriate features (e.g., Bluetooth connectivity, wifi communication capability, cellular network communication capability, etc.).

Each storage may be able to send, receive, and/or store data and/or instructions. Such data may be accessible to various other device components, as appropriate.

Each controller may include features and components that may allow a user of the device to control functionality, features, status, and/or other characteristics of the device. For instance, the controller may include one or more buttons, circular and/or diagonal dials, and/or other appropriate control elements.
Each status display element may include various visual elements and/or indicators (e.g., an LCD screen, various indication lights, etc.). The status display may provide a visual indication of various settings of the device. Some embodiments may include other types of indication elements (e.g., audio elements such as sounds indicating a device state that requires attention, tactile elements such as a vibration that may be associated with some aspect of device performance or measurement status, etc.).

Each input element may include various appropriate components that may allow the device to operate in the intended way. For instance, some embodiments may include a viewing element and/or magnifying element as an input element. As another example, some embodiments may include a digital input (e.g., a camera) as an input element.

Each display element may provide a viewable component (e.g., a display screen, an eyepiece, etc.). Such a display element may, for example, display a reading, provide a view of a patient's anatomy, etc., as appropriate for the type or use of the device.

One of ordinary skill in the art will recognize that the device of Figure 1 may be implemented in various different ways without departing from the spirit of the invention. For instance, some device may include only a sub-set of components described above (e.g., a dynamo and an energy storage element). As another example, some devices may combine various elements into a single element and/or device a single element into multiple elements. As yet another example, some device may provide various alternative communication pathways than those described above.

Figure 2 illustrates a schematic block diagram of a conceptual system 200 including the self-powering portable medical device of Figure 1. As shown, the system 200 may include one or more medical devices, practitioner devices, servers, storages, third-party devices, and/or recording devices. The system may utilize one or more networks (e.g., wireless networks, wired networks, the Internet, etc.), communications pathways (e.g., Bluetooth, wifi, direct connection, etc.), data formats (e.g., electronic medical record (EMR) format), and/or interfaces, as appropriate.

Each medical device (e.g., medical device 100 described above) may be able to collect data and provide the data to one or more other components. Each practitioner device (e.g., a smartphone, tablet device, laptop, etc.) may be able to communicate across one or more networks and may allow a practitioner or other appropriate party to access various system elements. In some embodiments, the practitioner device may execute an application (or app) that may provide various features, described in more detail below. Each server may be able to send and/or receive data and/or instructions among the other system components. Each storage may
be able to store data and/or instructions and receive and/or provide the data and/or instructions from and/or to other system components. Each third-party device (e.g., a PC, a mobile device, etc.) may allow a third party (e.g., a patient, an insurance company representative, etc.) to access various system components. Such a third party device may execute an app that may provide various features, as described in more detail below.

[00283] Each recording device may be an electronic device that may receive data from one or more medical devices. For instance, a single recording device may be associated with multiple medical devices that are associated with a particular entity (e.g., a patient, a ward, a hospital, etc.). Such a recording device may be able to communicate with the medical devices in various appropriate ways (e.g., over a Bluetooth connection, wireless network, etc.). The recording device may receive measurement data (e.g., readings, digital images, etc.) and may store the received data (and/or pass the data to a server, storage, or other appropriate element). The data may be received and stored in various appropriate ways (e.g., at discrete intervals, when some criteria is met, etc.).

[00284] Some embodiments may provide one or more applications by execution for one or more system components, as described above. Such applications may be executed directly by a device (e.g., using an installed application) and/or indirectly (e.g., using a web browser). Different devices (and/or different device users) may have different options and/or levels of access to the system. For instance, a doctor-practitioner may be able to access any data associated with a patient that is also associated with the doctor. As another example, a hospital administrator may be able to access any data that is associated with the hospital. Such applications may include various user interface elements (e.g., selection boxes, pop-up or drop-down menus, graphs, tables, etc.) as appropriate to allow the user to access the system.

[00285] Although system 200 has been described with various details, one of ordinary skill in the art will recognize that such details are for illustrative purposes and the system may be implemented in various different ways and are contemplated to be included by such description. For instance, some embodiments may include a sub-set of elements (e.g., a medical device coupled to a practitioner device using a Bluetooth connection). As another example, various sub-sets of components may be able to communicate across a first network (e.g., components associated with a hospital, clinic, lab, ward, etc., that communicate across a wireless local area network) while other sub-sets of components may be able to communicate across a second network (e.g., components associated with a second hospital, clinic, lab, ward, etc., that communicate across another wireless local area network). In some embodiments, the various sub-sets of components may be accessible by a server or other remote device.
Figures 3-7 illustrate various example devices provided by some embodiments. One of ordinary skill in the art will recognize that these examples are provided for illustrative purposes only and that various embodiments may include various different features, configurations, elements, and/or differ in various other ways and are contemplated to be included by such description.

Figure 3 illustrates a front view of a conceptual baton device 300 of some embodiments. As shown, this example device includes a retractable cuff, an optional digital screen, a manometer, a thumb rest, pressure release element, an air bladder, a compressor bulb, and a trigger-type dynamo (with an associated storage element).

Figure 4 illustrates a front view of a conceptual handheld device 400 of some embodiments. Such a device may perform the functionality of, for instance, an otoscope, ophthalmoscope, nasoscope, or dermatoscope. As shown, the handheld device may include a power button, a finger grip, a thumb grip, a display element, and control panel, a dynamo (with associated crank in this example) and storage element, and/or a medical device probe.

Figure 5 illustrates a front view of a storage, transportation, and charging unit 500 of some embodiments. Such a unit may be associated with a set of medical devices (including, e.g., medical device 100). As shown, the unit 500 may include a solar power cell, a carrying handle, a retractable wind power attachment, a dynamo (e.g., a crank-type dynamo), a display element, and various medical devices (e.g., a sphygmomanometer, a pulse oximeter, a thermometer, an otoscope, and an ophthalmoscope). Each medical device may be able to be clipped on to the unit and/or be placed in a customized holster. Unit 500 may facilitate use of a set of medical devices under various conditions (e.g., when an AC charging source is not available) and may allow a user to conveniently carry and store a set of commonly used devices.

Figure 6 illustrates a front view of a sphygmomanometer 600 of some embodiments. As shown, the sphygmomanometer may include a blood pressure cuff, an aneroid or digital display element, an air bladder or bulb with an ergonomic thumb rest and a dial or button for pressure release.

Figure 7 illustrates a front view of a medical device handle 700 of some embodiments. Such a handle may be used with various different device heads (e.g., an otoscope head, an ophthalmoscope head, etc.). As shown, the handle may include an attachment area, a display screen (which may indicate mode, lighting, image capture, power, etc.), a thumb resting stage, an opposable thumb control panel (which may include circular and vertical dials for controlling dimmer and rheostat function), an ergonomic medical handle body, and a twist dynamo with associated storage element (not shown).
Many of the processes and modules described above may be implemented as software processes that are specified as at least one set of instructions recorded on a non-transitory storage medium. When these instructions are executed by one or more computational element(s) (e.g., microprocessors, microcontrollers, Digital Signal Processors ("DSP"), Application-Specific ICs ("ASIC"), Field Programmable Gate Arrays ("FPGA"), etc.) the instructions cause the computational element(s) to perform actions specified in the instructions.

Figure 8 conceptually illustrates a schematic block diagram of a computer system 800 with which some embodiments may be implemented. For example, the system described above in reference to Figure 2 may be at least partially implemented using computer system 800. As another example, various processes described above may be at least partially implemented using sets of instructions that are executed using computer system 800.

Computer system 800 may be implemented using various appropriate devices. For instance, the computer system may be implemented using one or more personal computers ("PC"), servers, mobile devices (e.g., a Smartphone), tablet devices, and/or any other appropriate devices. The various devices may work alone (e.g., the computer system may be implemented as a single PC) or in conjunction (e.g., some components of the computer system may be provided by a mobile device while other components are provided by a tablet device).

Computer system 800 may include a bus 805, at least one processing element 810, a system memory 815, a read-only memory ("ROM") 820, other components (e.g., a graphics processing unit) 825, input devices 830, output devices 835, permanent storage devices 840, and/or network interfaces 845. The components of computer system 800 may be electronic devices that automatically perform operations based on digital and/or analog input signals.

Bus 805 represents all communication pathways among the elements of computer system 800. Such pathways may include wired, wireless, optical, and/or other appropriate communication pathways. For example, input devices 830 and/or output devices 835 may be coupled to the system 800 using a wireless connection protocol or system. The processor 810 may, in order to execute the processes of some embodiments, retrieve instructions to execute and data to process from components such as system memory 815, ROM 820, and permanent storage device 840. Such instructions and data may be passed over bus 805.

ROM 820 may store static data and instructions that may be used by processor 810 and/or other elements of the computer system. Permanent storage device 840 may be a read-and-write memory device. This device may be a non-volatile memory unit that stores instructions and data even when computer system 800 is off or unpowered. Permanent storage
device 840 may include a mass-storage device (such as a magnetic or optical disk and its corresponding disk drive).

[00298] Computer system 800 may use a removable storage device and/or a remote storage device as the permanent storage device. System memory 815 may be a volatile read-and-write memory, such as a random access memory ("RAM"). The system memory may store some of the instructions and data that the processor uses at runtime. The sets of instructions and/or data used to implement some embodiments may be stored in the system memory 815, the permanent storage device 840, and/or the read-only memory 820. Other components 825 may perform various other functions.

[00299] Input devices 830 may enable a user to communicate information to the computer system and/or manipulate various operations of the system. The input devices may include keyboards, cursor control devices, audio input devices and/or video input devices. Output devices 835 may include printers, displays, and/or audio devices. Some or all of the input and/or output devices may be wirelessly or optically connected to the computer system.

[00300] As shown in Figure 8, computer system 800 may be coupled to a network 850 through a network interface 845. For example, computer system 800 may be coupled to a web server on the Internet such that a web browser executing on computer system 800 may interact with the web server as a user interacts with an interface that operates in the web browser.

[00301] Finally, as shown in Figure 8, computer system 800 may be coupled to a network 850 through a network interface 845. For example, computer system 800 may be coupled via internet to remote cloud storage 860, or another external component 865.

[00302] As used in this specification and any claims of this application, the terms "computer", "server", "processor", and "memory" all refer to electronic devices. These terms exclude people or groups of people. As used in this specification and any claims of this application, the term "non-transitory storage medium" is entirely restricted to tangible, physical objects that store information in a form that is readable by electronic devices. These terms exclude any wireless or other ephemeral signals.

[00303] It should be recognized by one of ordinary skill in the art that any or all of the components of computer system 800 may be used in conjunction with or within the devices, methods, or kits described herein. Moreover, one of ordinary skill in the art will appreciate that many other system configurations may also be used and are contemplated to be included by such description.

[00304] Figure 9 illustrates an exploded view of an embodiment of a transformable medical device including a media module 32. In this embodiment, a first portion 28 of the
ophthalmoscopic head is integral with the handle 40, and a second portion 22 of the ophthalmoscopic head is detachable from the first portion 28. The second portion 22 of the ophthalmoscopic head in this embodiment is swappable with a media module such as an OLED screen 20. The OLED screen 20, in some embodiments, is a touch screen which a user can adjust features of the ophthalmoscopic head. The otoscopic cone receiver 34 is configured to couple the otoscopic cone 30 to the device. In some embodiments, the otoscopic cone 30 covers some of the ophthalmoscopic controls 24, however, this feature is not shown in the embodiment of FIG. 9. In some embodiments, the otoscopic cone 30 may trigger a switch that deactivates some of the ophthalmoscopic controls 24, or other features of the ophthalmoscope such as the aperture filter, color filter, or magnifying wheel, for non-limiting example. The embodiment of FIG. 9 includes a crank 42 is retractable from the handle 40 and is used to charge an energy storage element 44 by spinning the crank 42. A second media module 32, including but not limited to a USB port, USB device, memory storage, WI-FI device, or Bluetooth device, is shown as being coupled to the handle 40 in the embodiment of FIG. 9. Other locations for this or other media modules may be chosen, such as in a slot in the handle, or by removing the power source or portions thereof (crank). In some embodiments a different add-on diagnostic module may replace the second portion 22 of the ophthalmoscopic head, or be added in another manner to the transformable medical device, as described elsewhere herein.

The OLED screen 20, in some embodiments, is a touch screen which a user can adjust features of the add-on diagnostic tool or add-on diagnostic module. In some embodiments, it is a simple visualization device (screen), and has little or no touch screen capability, and instead works as a screen on a digital camera or digital video recorder works. It may be used to record a video or take an image picture digitally or record audio. It may be used to adjust any function of the add-on diagnostic module when it has sensors or dials or touch controls built in. In FIG. 9, the add-on diagnostic module is the otoscopic cone, and the media module may be used to take an image of an abnormality or other feature being examined using the otoscopic cone, or using the ophthalmoscopic head, or both. The user could use this information for diagnosis, treatment, or in telemedicine, or to be sent for further analysis or documentation purposes, such as in a clinical trial to be evaluated separately.

Figure 10 depicts an isometric view of an embodiment of a transformable medical device. In this embodiment, the viewfinder 26 is depicted in the ophthalmoscopic head. The viewfinder 26 is used to examine the patient for numerous diagnostic examinations. In some embodiments, a second portion of the ophthalmoscopic head, which includes the viewfinder 26, can be replaced by a media module such as shown in FIG. 9. In other
embodiments, an add-on diagnostic module may be coupled to the ophthalmoscopic head, or a portion thereof (such as the first portion). Coupling the add-on diagnostic module may transform the device from an ophthalmoscope to another device, such as an otoscope, a laryngoscope, a rhinoscope, a dermatoscope, an ocular tonometer, or an anoscope, for non-limiting example. In some embodiments, a media module replaces the second portion, or is otherwise added to the device to add connectivity to a computer, the internet, or for another media documentation or storage purpose.

[00307] Figure 11 depicts an isometric view of an alternative embodiment of a transformable medical device. In this embodiment, the transformable medical device comprises a longer ophthalmoscopic head that increases the distance from the patient to the user. Ophthalmoscopic controls 24 are located on the front of the device which are used to control features such as aperture, magnifying scope, and color filters, for non-limiting example.

[00308] Figure 12 depicts a side view of some components of an embodiment of a transformable medical device. In this embodiment, the trigger generator 46 is used to charge an energy storage element by repetitiously pulling the trigger. In other embodiments, the energy storage element is charged by a twist-operated generator, crank-operated generator, shake-operated generator, or pulling string generator, for non-limiting example.

[00309] Figure 13 depicts an isometric view of an embodiment of a transformable medical device. In this embodiment, the shake generator 48 is used to charge an energy storage element by shaking the device up and down. Also depicted in FIG. 13 is an embodiment wherein the OLED screen 20 can be removed by sliding it off the handle. The OLED screen 20 can be replaced by a second portion of the ophthalmoscopic head. As depicted in FIG. 13, the transformable medical device may comprise ergonomic features for comfortable use, including, but not limited to, an angled thumb rest and sleek outer contours.

[00310] Some embodiments of the transformable medical device comprise a wireless connection. Some embodiments of the transformable medical device are configured to store and transfer data wirelessly or by wired connection. The transformable medical device may comprise the ability to be integrated with both the EHR (Electronic Health Record) platform and the EMR (Electronic Medical Record) platforms, as well as (or alternatively) to iPhone, Android, or any smart phone platform, as well as (or alternatively) to tablet, handheld diagnostic or communication equipment via wifi, Bluetooth, wireless connection platform, or App on such devices.

[00311] Some embodiments of the transformable medical device comprise data capture capabilities and devices or modules therefor. This may include onboard operating system or
software that allows for capture/collection of images via a CCD/digital camera, audio, quantitative data and values digitally.

[00312] Some embodiments of the transformable medical device comprise virtual and/or digital display using LED Screen, OLED Screen, LCD screen, or other visualization elements, for non-limiting example.

[00313] Some embodiments of the transformable medical device comprise device-specific programming with an operating system (OS) or App for routine operation of device. It may include voice recognition to order device to change modes or perform wireless connection to a EMR platform, a EHR platform, a smartphone, a tablet, or another diagnostic device. The OS or application can allows for image recognition or stabilization software that assists in identifying structures and pathology and aiding in diagnosis and in viewing difficult to detect body structures

[00314] Some embodiments of the transformable medical device comprise modular construction that makes service cost effective and fast. Various modules (media and/or add-on diagnostic) can be swapped out in the field to restore function or upgrade the product from its baseline to more advanced imaging and communication capabilities. This allows for dual design and features of multiple devices in a single device. It also allows for upgradeable options such as wireless communication added via a module. The onboard software can be implemented to allow remote unattended upgrades to the instrument to allow it to more seamlessly fit into today's evolving a EMR platform, a EHR platform, and remote diagnostic IT environment.

[00315] Some embodiments of the transformable medical device comprise Kinetic Powered (Dynamo generator with capacitor) and Battery-Less Option. Some embodiments of the transformable medical device comprise weather and Shock Proof Design including: rugged design for portability in nearly any environment, shock and impact proof (from drops or forceful impact), water/weather proof, generous in size allows more rugged internal shock mounting, thicker wall sections to withstand a tough working environment, lighter weight due to no batteries and mostly polymer construction - therefore when it is dropped the shock forces generated are lower, lighter weight also make it less fatiguing to use for extended periods and make it more likely to be pocketed and always handy to use. Certain features on the product can be further protected by the use of thermoplastic elastomers on the outside that create a kind of "bumper".

[00316] Some embodiments of the transformable medical device comprise aesthetic design aspects such as finishes on the product are chosen to be durable over a long life period. All the materials used may be self colored, without coatings, paints or plating to wear off, look
scruffy, or present infection control challenge. The surface geometries may make them more friendly to cleaning, with no large rough knurled surfaces or overly tight pockets or corners that would present cleaning challenges.

Some embodiments of the transformable medical device comprise ergonomic and/or functional design. This could include a thumb rest or area that allows for ergonomic placement of thumb or stabilization of device, which also allows for comfort, and can prevent fatigue of practitioner with repeated daily use. Thumb controls can be included such as dials, buttons, touch-screen in easy reach for practitioner for seamless exam without interruptions to the exam and saves time and creates a better patient experience. Surface geometries also allow for future modules that allow the device to be incorporated into a special and customized carrying case or wall mounted unit.

Some embodiments of the transformable medical device comprise customization such as of Color schemes, Unisex-conscious design (for female/male providers), Medical School Alma Mater Logo added to device, Name personalization on device and in the programming screen.

Some embodiments of the transformable medical device comprise Device Recognition of Individual User or "Keyless" Recognition as a theft deterrent. This can be implemented in a variety of ways, including via recognition or voice, fingerprint, location, and in conjunction with a fob (on the user when in vicinity).

Some embodiments of the transformable medical device comprise GPS capability and integration for theft deterrent and/or as a locating option.

Some embodiments of the transformable medical device comprise a device status indicator, such as a power indicator in capacitor or rechargeable battery option, a power source indicator, light source or mode indicator, a mode indicator, a total use time indicator, and/or any other device function or issue can be displayed.

Some embodiments of the transformable medical device comprise use of any type of LED, OLED and/or LEP (light-emitting plasma) for the otoscope or ophthalmoscope functions, for example.

Moreover, while the examples shown may illustrate many individual modules as separate elements, one of ordinary skill in the art would recognize that these modules may be combined into a single functional block or element. One of ordinary skill in the art would also recognize that a single module may be divided into multiple modules.

While the devices, methods, and kits have been described with reference to numerous specific details, one of ordinary skill in the art will recognize that these can be
embodied in other specific forms and are contemplated to be included by such description. For example, several embodiments were described above by reference to particular features and/or components. However, one of ordinary skill in the art will realize that other embodiments might be implemented with other types of features and components. One of ordinary skill in the art would understand that the invention is not to be limited by the foregoing illustrative details, but rather is to be informed additionally by the appended claims.

While preferred embodiments of the present invention have been shown and described herein, it will be obvious to those skilled in the art that such embodiments are provided by way of example only. Numerous variations, changes, and substitutions will now occur to those skilled in the art without departing from the invention. It should be understood that various alternatives to the embodiments of the invention described herein may be employed in practicing the invention. It is intended that the following claims define the scope of the invention and that methods and structures within the scope of these claims and their equivalents be covered thereby.
CLAIMS

WHAT I CLAIMED IS:

1. A transformable medical device comprising:
   - an ophthalmoscopic head,
   - a handle permanently attached to or integral with at least a portion of the
     ophthalmoscopic head,
   - an otoscopic cone receiver configured to couple an otoscopic cone to the
     ophthalmoscopic head.

2. The medical device of Claim 1, wherein upon or after coupling of the otoscopic
   cone, the medical device converts from an ophthalmoscope to an otoscope.

3. The medical device of Claim 1 or 2, wherein the otoscopic cone receiver
   comprises a snap-fit guide, sliding rail guide, magnetic guide, a winding thread, an elastic
   guide, a twist-lock guide, or a push-fitting guide.

4. The medical device as in any one of Claims 1 - 3, wherein the otoscopic cone
   receiver is compatible with a universal disposable specula tip.

5. The medical device as in any one of Claims 1 - 4, wherein the otoscopic cone is a
   disposable specula tip.

6. The medical device as in any one of Claims 1 - 5, wherein the otoscopic cone is
   disposable.

7. The medical device as in any one of Claims 1 - 6, wherein the otoscopic cone
   receiver is compatible with a tip designed for the Welch Allyn MacroView Otoscope.

8. The medical device as in any one of Claims 1 - 7, wherein the otoscopic cone
   receiver is compatible with multiple sizes of otoscopic cones.

9. The medical device as in any one of Claims 1 - 8, comprising a switch configured
   to convert the ophthalmoscope to an otoscope.

10. The medical device of Claim 9, wherein the switch is a biased switch, a toggle
    switch, a reed switch, a key switch, a microswitch, a relay switch, a pushbutton switch, a
    slide switch, a proximity switch, or a rocker switch.

11. The medical device of Claim 9 or 10, wherein the switch comprises an
    ophthalmoscope position and an otoscope position.

12. The medical device as in any one of Claims 9 - 11, wherein the switch is
    configured to be toggled between the ophthalmoscope position and the otoscope position by
    a user.
13. The medical device as in any one of Claims 9 - 12, wherein the switch is configured to be toggled between the ophthalmoscope position and the otoscope position automatically.

14. The medical device as in any one of Claims 9 - 13, comprising a first feature that is not necessary to otoscopic evaluation, wherein upon or after moving the switch to an otoscope position, the first feature is deactivated or disabled.

15. The medical device as in any one of Claims 9 - 13, comprising a first feature that is not necessary to otoscopic evaluation, wherein upon or after moving the switch to an ophthalmoscope position, the first feature is activated or enabled.

16. The medical device as in any one of Claims 1 - 13, comprising a first feature that is not necessary to otoscopic evaluation, wherein upon or after coupling of the otoscopic cone, the first feature is deactivated or disabled.

17. The medical device as in any one of Claims 9 - 12, wherein the switch comprises an off position.

18. The medical device of Claim 14, 15, or 16, comprising one or more of a sensor, a trigger, a button, or a first feature controller that is configured to deactivate or disable the first feature.

19. The medical device of Claim 14, 15, or 16, comprising a guard configured to allow only the otoscopic cone to deactivate or disable the first feature.

20. The medical device of Claim 14, 15, or 16, comprising a first feature controller on the ophthalmoscopic head, wherein the first feature is deactivated or disabled by being covered by the otoscopic cone.

21. The medical device of Claim 14, 15, or 16, wherein the first feature comprises at least one of:
   - an aperture dial further comprising at least one of: a micro aperture setting, a small aperture setting, a large aperture setting, a fixation star setting, and a semi-circle setting;
   - a filter dial further comprising at least one of: a red-free filter, a blue filter, and a neutral filter;
   - a multi-colored lens;
   - a magnifying lens;
   - an adjustable magnifying lens;
   - a condensing lens; and
   - a slit.
22. The medical device of Claim 14, 15, or 16, further comprising a second feature that is

- deactivated or disabled upon or after coupling the otoscopic cone to the ophthalmoscopic head,
- deactivated or disabled upon or after moving the switch to an otoscope position, or
- activated or enabled upon or after moving the switch to an ophthalmoscopic position.

23. The medical device of claim 22, wherein the second feature comprises at least one of:

- an aperture dial further comprising at least one of: a micro aperture setting, a small aperture setting, a large aperture setting, a fixation star setting, and a semi-circle setting;
- a filter dial further comprising at least one of: a red-free filter, a blue filter, and a neutral filter;
- a multi-colored lens;
- a magnifying lens;
- an adjustable magnifying lens;
- a condensing lens; and
- a slit.

24. The medical device as in any one of Claims 1 - 23, further comprising an energy storage element charged by a dynamo.

25. The medical device of Claim 24, wherein the dynamo is a twist-operated generator, crank-operated generator, shake-operated generator, pulling trigger generator, or pulling string generator.

26. The medical device as in any one of Claims 1 - 23, further comprising an energy storage element charged by a solar cell.

27. The medical device as in any one of Claims 1 - 23, further comprising an energy storage element charged by a wind powered element.

28. The medical device of Claim 24, 26, or 27, wherein the energy storage element comprises a charge sufficient to conduct a complete otoscopic examination, a complete ophthalmoscopic examination, a complete rhinoscopic examination, a complete laryngoscopic examination, a complete dermatoscopic examination, a complete anascopic examination, or a combination thereof.
29. The medical device of Claim 24, 26, or 27, wherein the energy storage element comprises a charge that can power the device for at least 1.5 hours, more than 1.5 hours, 1 hour to 1.5 hours, at least 1 hour, more than 1 hour, at least 45 minutes, more than 45 minutes, 45 minutes to 1 hour, 45 minutes to 1.5 hours, at least 30 minutes, more than 30 minutes, 30 minutes to 45 minutes, 30 minutes to an hour, 30 minutes to 1.5 hours, at least 20 minutes, more than 20 minutes, 20 minutes to 30 minutes, 20 minutes to 45 minutes, 20 minutes to an hour, 20 minutes to 1.5 hours, at least 15 minutes, more than 15 minutes, 15 minutes to 20 minutes, 15 minutes to 30 minutes, 15 minutes to 45 minutes, 15 minutes to an hour, 15 minutes to 1.5 hours, at least 10 minutes, more than 10 minutes, 10 to 15 minutes, 5 minutes to 10 minutes, at least 5 minutes, more than 5 minutes, 3 minutes to 5 minutes, 3 minutes to 10 minutes, at least 3 minutes, more than 3 minutes, at least 2 minutes, more than 2 minutes, 2 minutes to 5 minutes, 2 minutes to 3 minutes, 2 minutes to 10 minutes, at least 90 seconds, more than 90 seconds, 90 seconds to 10 minutes, 90 seconds to 5 minutes, 90 seconds to 3 minutes, 90 seconds to 2 minutes, at least 1 minute, more than 1 minute, 1 to 10 minutes, 1 minutes to 5 minutes, 1 minutes to 3 minutes, 1 minutes to 2 minutes, 1 minute to 90 seconds, at least 30 seconds, more than 30 seconds, 30 seconds to 10 minutes, 30 seconds to 5 minutes, 30 seconds to 3 minutes, 30 seconds to 2 minutes, 30 seconds to 90 seconds, 30 seconds to 1 minute, 30 seconds to 45 seconds, at least 20 seconds, more than 20 seconds, 20 seconds to 10 minutes, 20 seconds to 5 minutes, 20 seconds to 3 minutes, 20 seconds to 2 minutes, 20 seconds to 90 seconds, 20 seconds to 1 minute, 20 seconds to 30 seconds, 20 seconds to 45 seconds, at least 10 seconds, more than 10 seconds, 10 seconds to 10 minutes, 10 seconds to 5 minutes, 10 seconds to 3 minutes, 10 seconds to 2 minutes, 10 seconds to 90 seconds, 10 seconds to 1 minute, 10 seconds to 20 seconds, 10 seconds to 30 seconds, 10 seconds to 45 seconds, at least 5 seconds, more than 5 seconds, 5 seconds to 10 minutes, 5 seconds to 5 minutes, 5 seconds to 3 minutes, 5 seconds to 2 minutes, 5 seconds to 90 seconds, 5 seconds to 1 minute, 5 seconds to 10 seconds, 5 seconds to 20 seconds, 5 seconds to 30 seconds, 5 seconds to 45 seconds, about 5 seconds, about 10 seconds, about 20 seconds, about 30 seconds, about 45 seconds, about 1 minute, about 5 minutes, about 2 minutes, about 3 minutes, about 90 seconds, about 10 minutes, about 15 minutes, about 20 minutes, about 30 minutes, about 45 minutes, about an hour, or about 1.5 hours.

30. The medical device of Claim 24, 26, or 27, wherein the energy storage element comprises a charge that can power the device for more than 1.26 seconds.

31. The medical device of Claim 24, 26, or 27, wherein the energy storage element is a super capacitor.
32. The medical device of any one of Claim 1 - 31 further comprising a light source in the ophthalmoscopic head.

33. The medical device of Claim 32, wherein the light source is a LED, a Halogen bulb, an Incandescent bulb, or a Xenon bulb.

34. The medical device of Claim 33, wherein the LED emits light at a color temperature from 3500 Kelvin to 15,000 Kelvin, or a wavelength from 193 nanometers to 828 nanometers.

35. The medical device of Claim 33, wherein the LED emits light at a color temperature of about 3500 Kelvin, or a wavelength of about 828 nanometers.

36. The medical device of Claim 33, wherein the LED emits light at a color temperature of about 4000 Kelvin, or a wavelength of about 724 nanometers.

37. The medical device of Claim 33, wherein the LED emits light at a color temperature of about 5500 Kelvin, or a wavelength of about 527 nanometers.

38. The medical device of Claim 33, wherein the LED emits light at a color temperature below 3500 Kelvin, or at a wavelength below 828 nanometers.

39. The medical device of Claim 33, wherein the Halogen bulb emits light at a color temperature from 2800 Kelvin to 3200 Kelvin, or a wavelength from 905 nanometers to 1035 nanometers.

40. The medical device of Claim 33, wherein the Halogen bulb emits light at a color temperature of about 3000 Kelvin, or a wavelength of about 966 nanometers.

41. The medical device of Claim 33, wherein the Halogen bulb emits light at a color temperature of about 3250 Kelvin, or a wavelength of about 892 nanometers.

42. The medical device of Claim 33, wherein the Incandescent bulb emits light at a color temperature from 2000 Kelvin to 3000 Kelvin, or a wavelength from 966 nanometers to 1449 nanometers.

43. The medical device of Claim 33, wherein the Incandescent bulb emits light at a color temperature of about 2500 Kelvin, or a wavelength of about 1159 nanometers.

44. The medical device of Claim 33, wherein the Xenon bulb emits light at a color temperature of about 3200 Kelvin, or a wavelength of about 905 nanometers.

45. The medical device of any one of Claims 1 - 44, further comprising a network connection to a network.

46. The medical device of Claim 45, wherein the network connection is wired or wireless.
47. The medical device as in any one of Claims 1 - 45, comprising a processor configured to transmit data, images, video, audio, or a combination thereof to cloud storage, a computer, a portable device, a smartphone, a television, or a diagnostic device through the network connection.

48. The medical device of Claims 45, 46 or 47, wherein the transmission of data, images, video, audio, or a combination thereof to the network is in real time.

49. The medical device as in any one of Claims 1 - 48, comprising a memory storage device configured to store data, images, video, audio, or a combination thereof in the medical device.

50. The medical device of Claim 49, comprising a processor configured to transmit data, images, video, audio, or a combination thereof stored in the memory storage device to cloud storage, a computer, a portable device, a smartphone, a television, or a diagnostic device through a network connection.

51. The medical device of any one of Claims 47 - 50, wherein the data, images, video, audio, or a combination thereof is used in telemedicine.

52. The medical device as in any one of Claims 1 - 51, further comprising a first media module coupled thereto.

53. The medical device of Claim 52, wherein the first media module comprises a camera, an audio recorder, a video recorder, a video display, a Bluetooth connection, a Bluetooth device, an internet connection, a WI-FI connection, a WI-FI device, a memory storage device, a USB connection, a touch screen, a touch display, a control panel, or a control screen.

54. The medical device of Claim 52 or 53, wherein the first media module is removable.

55. The medical device of Claim 52, 53, or 54 wherein the first media module is configured to replace controls or other features of the ophthalmoscopic head or of an otoscope.

56. The medical device of Claim 52, wherein one or more controls or features of the ophthalmoscope, the otoscope, or an add-on diagnostic module are removed from the device and replaced by the first media module.

57. The medical device of Claim 52, wherein the first media module comprises the network connection of Claim 45.

58. The medical device of Claim 52, wherein the first media module comprises the processor of Claim 47 or Claim 50.
59. The medical device of Claim 52, wherein the first media module comprises the memory storage device of Claim 49.

60. The medical device of Claim 52, comprising a second media module coupled to the medical device, wherein the second media module comprises a camera, an audio recorder, a video recorder, a video display, a Bluetooth connection, a Bluetooth device, an internet connection, a WI-FI connection, a WI-FI device, a memory storage device, a USB connection, a touch screen, a touch display, a control panel, or a control screen.

61. The medical device as in any one of Claims 1 - 60, further comprising an ergonomic feature.

62. The medical device of Claim 61, wherein the ergonomic feature comprises at least one of: a thumb rest, a comfortable grip, and ergonomic controls.

63. The medical device as in any one of Claims 1 - 62, further comprising a connection for an AC source of energy.

64. The medical device of Claim 63, wherein the AC source of energy is a wall source of energy.

65. The medical device as in any one of Claims 1 - 64, further comprising a connection for a DC source of energy.

66. The medical device of Claim 65, wherein the DC source of energy comprises a battery.

67. The medical device as in any one of Claims 1 - 66, wherein the device comprises a connection for a DC source of energy and a dynamo.

68. The medical device of Claim 67, wherein the DC source of energy is a backup power source.

69. The medical device of Claim 67, wherein the dynamo is a backup power source.

70. The medical device of Claim 67, wherein the dynamo is the primary power source.

71. The medical device as in any one of Claims 1 - 70, further comprising an internal shock mounting.

72. The medical device as in any one of Claims 1 - 70, further comprising a hermetic seal.

73. The medical device as in any one of Claims 1 - 70, further comprising a bumper on an exterior of the device configured to absorb shock.
74. The medical device as in any one of Claims 1 - 73, comprising an ocular
tonometer or features of an ocular tonometer permanently attached to or integral with the
handle or with the ophthalmoscopic head.

75. The medical device as in any one of Claims 1 - 73, comprising an ocular
tonometer or features of an ocular tonometer removably coupled to the handle or to the
ophthalmoscopic head.

76. The medical device as in any one of Claims 1 - 75, comprising a first safety
device that reduces the light brightness or intensity if the otoscopic cone is not coupled to the
ophthalmoscopic head.

77. The medical device of Claim 76, wherein the first safety device detects whether
or not the otoscopic cone is coupled to the head.

78. The medical device of Claim 76, comprising a second safety device that blocks or
reduces the light brightness or intensity emitted from the ophthalmoscopic head if the
otoscopic cone is not coupled to the ophthalmoscopic head when the switch is in an otoscope
position.

79. A transformable medical device comprising:
   - an ophthalmoscopic head,
   - a handle permanently attached to or integral with at least a portion of the
     ophthalmoscopic head,
   - an add-on diagnostic module receiver configured to couple an add-on diagnostic
     module to the ophthalmoscopic head.

80. The medical device of Claim 79, further comprising a first feature that is not
necessary to evaluation using the add-on diagnostic module, wherein upon or after coupling
of the add-on diagnostic module to the ophthalmoscopic head, the first feature is deactivated
or disabled.

81. The medical device of Claim 79 or 80, wherein the add-on diagnostic module
comprises one or more features of a laryngoscope, one or more features of a rhinoscope, one
or more features of a dermatoscope, one or more features of an ocular tonometer, or one or
more features of an anoscope.

82. The medical device of Claim 79 or 80, wherein the add-on diagnostic module
comprises a laryngoscope, a rhinoscope, a dermatoscope, an ocular tonometer, or an
anoscope.

83. The medical device of any one of Claims 79 - 82, comprising a switch configured
to convert the ophthalmoscope to the add-on diagnostic module.
84. The medical device of Claim 83, wherein the switch is a biased switch, a toggle switch, a reed switch, a key switch, a microswitch, a relay switch, a pushbutton switch, a slide switch, a proximity switch, or a rocker switch.

85. The medical device of Claim 83 or 84, wherein the switch has an ophthalmoscope position and an add-on diagnostic module position.

86. The medical device of Claim 85, wherein the switch is configured to be toggled between the ophthalmoscope position and the add-on diagnostic module position by a user.

87. The medical device of Claim 85, wherein the switch is configured to be toggled between the ophthalmoscope position and the add-on diagnostic module position automatically.

88. The medical device as in any one of Claims 79 - 87, comprising a first feature that is not necessary to ophthalmoscopic evaluation, wherein upon or after coupling of the add-on diagnostic module, the first feature is deactivated or disabled.

89. The medical device as in any one of Claims 79 - 87, comprising a first feature necessary to evaluation using the add-on diagnostic module, wherein upon or after coupling of the add-on diagnostic module, the first feature is activated or enabled.

90. The medical device of Claim 88 or 89, wherein the first feature comprises at least one of:

- an aperture dial further comprising at least one of: a micro aperture setting, a small aperture setting, a large aperture setting, a fixation star setting, and a semi-circle setting;
- a filter dial further comprising at least one of: a red-free filter, a blue filter, and a neutral filter;
- a multi-colored lens;
- a magnifying lens;
- an adjustable magnifying lens;
- a condensing lens; and
- a slit.

91. The medical device of any one of Claims 79 - 90, further comprising an energy storage element charged by a dynamo.

92. The medical device of Claim 91, wherein the dynamo is a twist-operated generator, crank-operated generator, shake-operated generator, pulling trigger generator, or pulling string generator.
93. The medical device of any one of Claims 79 - 90, further comprising an energy storage element charged by a solar cell.

94. The medical device of any one of Claims 79 - 90, further comprising an energy storage element charged by a wind powered element.

95. The medical device of Claim 91, 93, or 94, wherein the energy storage element comprises a charge sufficient to conduct a complete otoscopic examination, a complete ophthalmoscopic examination, a complete rhinoscopic examination, a complete laryngoscopic examination, a complete dermatoscopic examination, a complete anascope examination, a complete ocular tonometer examination or a combination thereof.

96. The medical device of Claim 91, 93, or 94, wherein the energy storage element comprises a charge that can power the device for at least 1.5 hours, more than 1.5 hours, 1 hour to 1.5 hours, at least 1 hour, more than 1 hour, at least 45 minutes, more than 45 minutes, 45 minutes to 1 hour, 45 minutes to 1.5 hours, at least 30 minutes, more than 30 minutes, 30 minutes to 45 minutes, 30 minutes to an hour, 30 minutes to 1.5 hours, at least 20 minutes, more than 20 minutes, 20 minutes to 30 minutes, 20 minutes to 45 minutes, 20 minutes to an hour, 20 minutes to 1.5 hours, at least 15 minutes, more than 15 minutes, 15 minutes to 20 minutes, 15 minutes to 30 minutes, 15 minutes to 45 minutes, 15 minutes to an hour, 15 minutes to 1.5 hours, at least 10 minutes, more than 10 minutes, 10 to 15 minutes, 5 minutes to 10 minutes, at least 5 minutes, more than 5 minutes, 3 minutes to 5 minutes, 3 minutes to 10 minutes, at least 3 minutes, more than 3 minutes, at least 2 minutes, more than 2 minutes, 2 minutes to 5 minutes, 2 minutes to 3 minutes, 2 minutes to 10 minutes, at least 90 seconds, more than 90 seconds, 90 seconds to 10 minutes, 90 seconds to 5 minutes, 90 seconds to 3 minutes, 90 seconds to 2 minutes, at least 1 minute, more than 1 minute, 1 to 10 minutes, 1 minutes to 5 minutes, 1 minutes to 3 minutes, 1 minutes to 2 minutes, 1 minute to 90 seconds, at least 30 seconds, more than 30 seconds, 30 seconds to 10 minutes, 30 seconds to 5 minutes, 30 seconds to 3 minutes, 30 seconds to 2 minutes, 30 seconds to 90 seconds, 30 seconds to 1 minute, 30 seconds to 45 seconds, at least 20 seconds, more than 20 seconds, 20 seconds to 10 minutes, 20 seconds to 5 minutes, 20 seconds to 3 minutes, 20 seconds to 2 minutes, 20 seconds to 90 seconds, 20 seconds to 1 minute, 20 seconds to 30 seconds, 20 seconds to 45 seconds, at least 10 seconds, more than 10 seconds, 10 seconds to 10 minutes, 10 seconds to 5 minutes, 10 seconds to 3 minutes, 10 seconds to 2 minutes, 10 seconds to 90 seconds, 10 seconds to 1 minute, 10 seconds to 20 seconds, 10 seconds to 30 seconds, 10 seconds to 45 seconds, at least 5 seconds, more than 5 seconds, 5 seconds to 10 minutes, 5 seconds to 5 minutes, 5 seconds to 3 minutes, 5 seconds to 2 minutes, 5 seconds
to 90 seconds, 5 seconds to 1 minute, 5 seconds to 10 seconds, 5 seconds to 20 seconds, 5 seconds to 30 seconds, 5 seconds to 45 seconds, about 5 seconds, about 10 seconds, about 20 seconds, about 30 seconds, about 45 seconds, about 1 minute, about 5 minutes, about 2 minutes, about 3 minutes, about 90 seconds, about 10 minutes, about 15 minutes, about 20 minutes, about 30 minutes, about 45 minutes, about an hour, or about 1.5 hours.

97. The medical device of Claim 91, 93, or 94, wherein the charge can power the device for more than 1.26 seconds.

98. The medical device of Claim 91, 93, or 94, wherein the energy storage element is a super capacitor.

99. The medical device of any one of Claims 79 - 98, further comprising a light source in the ophthalmoscopic head.

100. The medical device of Claim 99, wherein the light source is a LED, a Halogen bulb, an Incandescent bulb, or a Xenon bulb.

101. The medical device of Claim 100, wherein the LED emits light at a color temperature from 3500 Kelvin to 15,000 Kelvin, or a wavelength from 193 nanometers to 828 nanometers.

102. The medical device of Claim 100, wherein the LED emits light at a color temperature of about 3500 Kelvin, or a wavelength of about 828 nanometers.

103. The medical device of Claim 100, wherein the LED emits light at a color temperature of about 4000 Kelvin, or a wavelength of about 724 nanometers.

104. The medical device of Claim 100, wherein the LED emits light at a color temperature of about 5500 Kelvin, or a wavelength of about 527 nanometers.

105. The medical device of Claim 100, wherein the LED emits light at a color temperature below 3500 Kelvin, or at a wavelength below 828 nanometers.

106. The medical device of Claim 100, wherein the Halogen bulb emits light at a color temperature from 2800 Kelvin to 3200 Kelvin, or a wavelength from 905 nanometers to 1035 nanometers.

107. The medical device of Claim 100, wherein the Halogen bulb emits light at a color temperature of about 3000 Kelvin, or a wavelength of about 966 nanometers.

108. The medical device of Claim 100, wherein the Halogen bulb emits light at a color temperature of about 3250 Kelvin, or a wavelength of about 892 nanometers.

109. The medical device of Claim 100, wherein the Incandescent bulb emits light at a color temperature from 2000 Kelvin to 3000 Kelvin, or a wavelength from 966 nanometers to 1449 nanometers.
110. The medical device of Claim 100, wherein the Incandescent bulb emits light at a color temperature of about 2500 Kelvin, or a wavelength of about 1159 nanometers.

111. The medical device of Claim 100, wherein the Xenon bulb emits light at a color temperature of about 3200 Kelvin, or a wavelength of about 905 nanometers.

112. The medical device of any one of Claims 79 - 111, further comprising a network connection to a network.

113. The medical device of Claim 112, wherein the network connection is wired or wireless.

114. The medical device of Claim 112, comprising a processor configured to transmit data, images, video, audio, or a combination thereof to cloud storage, a computer, a portable device, a smartphone, a television, or a diagnostic device through the network connection.

115. The medical device of Claim 112, wherein the transmission of data, images, video, audio, or a combination thereof to the network is in real time.

116. The medical device of any one of Claims 79 - 115, comprising a memory storage device configured to store data, images, video, audio, or a combination thereof in the medical device.

117. The medical device of Claim 116, comprising a processor configured to transmit data, images, video, audio, or a combination thereof stored in the memory storage device to cloud storage, a computer, a portable device, a smartphone, a television, or a diagnostic device through the network connection.

118. The medical device as in any one of Claims 79 - 117, wherein the data, images, video, audio, or a combination thereof is used in telemedicine.

119. The medical device of any one of Claims 79 - 118, further comprising a first media module coupled to thereto.

120. The medical device of Claim 119, wherein the first media module comprises a camera, an audio recorder, a video recorder, a video display, a Bluetooth connection, a Bluetooth device, an internet connection, a WI-FI connection, a WI-FI device, a memory storage device, a USB connection, a touch screen, a touch display, a control panel, or a control screen.

121. The medical device of Claim 119, wherein the first media module is removable.
122. The medical device of Claim 119, wherein the first media module can replace controls or other features of the ophthalmoscopic head or of the add-on diagnostic module.

123. The medical device of Claim 119, wherein one or more controls or features of the ophthalmoscope, the otoscope, or an add-on diagnostic module are removed from the device and replaced by the first media module.

124. The medical device of Claim 119, wherein the first media module comprises the network connection of Claim 112.

125. The medical device of Claim 119, wherein the first media module comprises the processor of Claim 114 or Claim 117.

126. The medical device of Claim 119, wherein the first media module comprises the memory storage device of Claim 116.

127. The medical device of Claim 119, comprising a second media module coupled to the medical device, wherein the second media module comprises a camera, an audio recorder, a video recorder, a video display, a Bluetooth connection, a Bluetooth device, an internet connection, a WI-FI connection, a WI-FI device, a memory storage device, a USB connection, a touch screen, a touch display, a control panel, or a control screen.

128. The medical device of any one of Claims 79 - 127, further comprising an ergonomic feature.

129. The medical device of Claim 128, wherein ergonomic feature comprises at least one of: a thumb rest, a comfortable grip, and ergonomic controls.

130. The medical device of any one of Claims 79 - 129, further comprising a connection for an AC source of energy.

131. The medical device of Claim 130, wherein the AC source of energy is a wall source of energy.

132. The medical device of any one of Claims 79 - 131, further comprising a connection for a DC source of energy.

133. The medical device of Claim 132, wherein the DC source of energy comprises a battery.

134. The medical device of any one of Claims 79 - 133, wherein the device comprises a connection for a DC source of energy and a dynamo.

135. The medical device of Claim 134, wherein the DC source of energy is a backup power source.
136. The medical device of Claim 134, wherein the dynamo is a backup power source.

137. The medical device of Claim 134, wherein the dynamo is the primary power source.

138. The medical device of any one of Claims 79 - 137, further comprising an internal shock mounting.

139. The medical device of any one of Claims 79 - 138, further comprising a hermetic seal.

140. The medical device of any one of Claims 79 - 139, further comprising a bumper on an exterior of the device configured to absorb shock.

141. The medical device of any one of Claims 79 - 140, comprising a first safety device that reduces the light brightness or intensity if the otoscopic cone is not coupled to the ophthalmoscopic head.

142. The medical device of Claim 141, wherein the first safety device detects whether or not the otoscopic cone is coupled to the head.

143. The medical device of Claim 141 or 142, comprising a second safety device that blocks or reduces the light brightness or intensity emitted from the ophthalmoscopic head if the otoscopic cone is not coupled to the ophthalmoscopic head when the switch is in an otoscope position.

144. The medical device of any one of Claims 49, 53, 60, 116, 120, and 127, wherein the memory storage device comprises one or more of cloud storage, a USB flash drive, a portable memory storage device, a flash memory card, and an optical storage device.

145. A kit comprising:
- a transformable medical device comprising:
  - an ophthalmoscopic head,
  - a handle permanently attached to or integral with at least a portion of the ophthalmoscopic head, and
  - an add-on diagnostic module receiver configured to couple an add-on diagnostic module; and
  - an add-on diagnostic module configured to couple to the transformable medical device or a portion thereof.

146. The kit of claim 145, wherein the add-on diagnostic module comprises: an otoscopic cone.
147. The kit of claim 145 or 146 wherein the add-on diagnostic module comprises one or more features of a laryngoscope, one or more features of a rhinoscope, one or more features of a dermatoscope, one or more features of an ocular tonometer, or one or more features of an anoscope.

148. The kit of claim 145, 146 or 147 wherein the add-on diagnostic module comprises an otoscope, a laryngoscope, a rhinoscope, a dermatoscope, an ocular tonometer, or an anoscope.

149. The kit of any one of Claims 145 - 148, wherein the transformable medical device comprises a light source and the kit further comprises a spare light source.

150. The kit of any one of Claims 145 - 149, comprising a memory storage device configured to couple to the transformable medical device and configured to store data, images, video, audio, or a combination thereof.

151. The kit of any one of Claims 145 - 150, comprising an energy storage element configured to couple to the transformable medical device and provide power thereto.

152. The kit of any one of Claims 145 - 151, wherein the transformable medical device comprises a power source connection.

153. The kit of claim 152, comprising an AC adapter configured to couple to the power source connection.

154. The kit of Claims 152 or 153, comprising a power connector configured to couple the power source connection of the transformable medical device to a power source.

155. The kit of claim 154, wherein the power connector is a power cord.

156. The kit of any one of claims 152 - 154, wherein the power source connection is a USB port.

157. The kit of any one of claims 152 - 154, wherein the power source is a computer.

158. The kit of any one of claims 152 - 154, wherein the power source is a solar charger.

159. The kit of any one of claims 152 - 154, wherein the power source comprises a dynamo.

160. The kit of claim 159, wherein dynamo comprises a twist-operated generator, crank-operated generator, shake-operated generator, pulling trigger generator, or pulling string generator.
161. The kit of any one of claims 152 - 154, wherein power source comprises a wind power generator.

162. The kit of any one of Claims 145 - 161, wherein the transformable medical device comprises a connection for a power source, wherein the connection couples to the power cord.

163. The kit of any one of claims 154 - 162, wherein the power source comprises a battery.

164. The kit of claim 154 - 163, wherein the power source is rechargeable.

165. The kit of any one of Claims 145 - 164, comprising a housing.

166. The kit of claim 165, wherein the housing comprises the power source of any one of claims 154, 157 - 161.

167. The kit of any one of Claims 145 - 166, further comprising a network connection to a network.

168. The kit of claim 167, wherein the network connection is wired or wireless.

169. The kit of any one of Claims 145 - 168, comprising a media module.

170. The kit of claim 169, wherein the media module comprises a processor configured to transmit data, images, video, audio, or a combination thereof to cloud storage, a computer, a portable device, a smartphone, a television, or a diagnostic device through a network connection.

171. The kit of claim 170, wherein the transmission of data, images, video, audio, or a combination thereof to the network is in real time.

172. The kit of claim 169, wherein the transformable medical device or the media module comprise a memory storage device.

173. The kit of claim 169 or 172, wherein the memory storage device is configured to store data, images, video, audio, or a combination thereof.

174. The kit of claim 173, comprising a processor configured to transmit data, images, video, audio, or a combination thereof stored in the memory storage device.

175. The kit of claim 174, wherein the processor is configured to transmit said data, images, video, audio, or the combination thereof to cloud storage, a computer, a portable device, a smartphone, a television, or a diagnostic device through a network connection.

176. The kit of claim 169, 170, or 172, wherein the media module comprises a camera, an audio recorder, a video recorder, a video display, a Bluetooth connection, a USB
connection, a Bluetooth device, an internet connection, a WI-FI connection, a WI-FI device, a memory storage device, a touch screen, a touch display, a control panel, or a control screen.

177. The kit of claim 176, wherein the memory storage device comprises one or more of cloud storage, a USB flash drive, a portable memory storage device, a flash memory card, and an optical storage device.

178. The kit of claim 169, 170, 172, or 176, wherein the media module can replace controls or other features of the ophthalmoscopic head or of the add-on diagnostic module.

179. The kit of claim 169, 170, 172, 176, or 178, wherein one or more controls or features of the ophthalmoscope, the otoscope, or an add-on diagnostic module are removed from the device and replaced by the media module.

180. A method comprising:
- receiving a transformable medical device comprising: an ophthalmoscopic head, a handle permanently attached to or integral with at least a first portion of the ophthalmoscopic head, and an add-on diagnostic module receiver configured to couple an add-on diagnostic module to the first portion of the ophthalmoscopic head;
- receiving the add-on diagnostic module;
- coupling the add-on diagnostic module to the first portion of the ophthalmoscopic head.

181. The method of claim 180, comprising:
- removing a second portion of the ophthalmoscopic head from the ophthalmoscopic head in order to accommodate the coupling of the add-on diagnostic module to the first portion of the ophthalmoscopic head.

182. The method of claim 180, comprising:
- swapping a second portion of the ophthalmoscopic head with the add-on diagnostic module.

183. The method of one of claims 180 - 182, wherein the add-on diagnostic module comprises one or more features of an otoscope, one or more features of a laryngoscope, one or more features of a rhinoscope, one or more features of a dermatoscope, one or more features of an ocular tonometer, or one or more features of an anoscope.
184. The method of one of claims 180 - 183, wherein the add-on diagnostic module converts the transformable medical device to an otoscope, a laryngoscope, a rhinoscope, a dermatoscope, an ocular tonometer, or an anoscope.

185. The method of one of claims 180 - 184, comprising activating or moving a switch from an ophthalmoscopic mode to an add-on diagnostic mode.

186. The method of claim 185, wherein the switch is configured to be toggled between the ophthalmoscope position and the add-on diagnostic module position by a user.

187. The method of claim 185 or 186, wherein the switch is configured to be toggled between the ophthalmoscope position and the add-on diagnostic module position automatically.

188. The method of one of claims 180 - 187, the transformable medical device comprises a first feature that is not necessary to ophthalmoscopic evaluation, wherein upon or after coupling of the add-on diagnostic module, the first feature is deactivated or disabled.

189. The method of one of claims 180 - 188, the transformable medical device comprises a first feature necessary to evaluation using the add-on diagnostic module, wherein upon or after coupling of the add-on diagnostic module, the first feature is activated or enabled.

190. The method of claim 188 or 189, wherein the first feature comprises at least one of:
- an aperture dial further comprising at least one of: a micro aperture setting, a small aperture setting, a large aperture setting, a fixation star setting, and a semi-circle setting;
- a filter dial further comprising at least one of: a red-free filter, a blue filter, and a neutral filter;
- a multi-colored lens;
- a magnifying lens;
- an adjustable magnifying lens;
- a condensing lens; and
- a slit.

191. The method of one of claims 180 - 190, comprising charging the transformable medical device using a dynamo.

192. The method of claim 191, wherein the dynamo is a twist-operated generator, a crank-operated generator, a shake-operated generator, a pulling trigger generator, or a pulling string generator.
193. The method of one of claims 180 - 190, comprising
- charging the transformable medical device using a solar cell.

194. The method of one of claims 180 - 190, comprising
- charging the transformable medical device using a wind powered element.

195. The method of one of claims 180 - 194, comprising:
- coupling a media module to the transformable medical device.

196. The method of claim 195, comprising:
- removing a second portion of the ophthalmoscopic head from the
  ophthalmoscopic head in order to accommodate the coupling of the media
  module to the transformable medical device.

197. The method of claim 195 or 196, comprising:
- swapping a second portion of the ophthalmoscopic head with the media module.

198. The method of claim 195, 196 or 197, comprising:
- removing a first portion of the handle in order to couple the media module to the
  transformable medical device.

199. The method of any one of claims 195 - 198, comprising:
- activating or deactivating a media module of the transformable medical device.

200. The method of claim 199, wherein the media module comprises a camera,
an audio recorder, a video recorder, a video display, a Bluetooth connection, a Bluetooth
device, an internet connection, a WI-FI connection, a WI-FI device, a memory storage
device, a USB connection, a touch screen, a touch display, a control panel, or a control
screen.

201. The method of any one of claims 195 - 200, wherein the media module
can replace controls or other features of the ophthalmoscopic head or of the add-on
diagnostic module.

202. The method of claim 199, wherein one or more controls or features of the
ophthalmoscope, the otoscope, or an add-on diagnostic module are removed from the device
and replaced by the media module.

203. The method of claim 199, wherein the media module comprises a network
connection to a network.

204. The method of claim 203, wherein the network connection is wired or
wireless.

205. The method of any one of claims 199 - 204, wherein the media module
comprises a processor configured to transmit data, images, video, audio, or a combination
thereof to cloud storage, a computer, a portable device, a smartphone, a television, or a diagnostic device through a network connection.

206. The method of any one of claims 199 - 205, comprising transmitting data, images, video, audio, or a combination thereof to the network in real time.

207. The method of any one of claims 199 - 205, comprising transmitting data, images, video, audio, or a combination thereof to the network after an examination or procedure is completed.

208. The method of any one of claims 199 - 207, the transformable medical device comprises a memory storage device configured to store data, images, video, audio, or a combination thereof in the transformable medical device.

209. The method of one of claims 199 - 208, wherein the media module comprises a memory storage device configured to store data, images, video, audio, or a combination thereof.

210. The method of claim 209, comprising saving data, images, video, audio, or a combination thereof to the memory storage device of the media module.

211. The method of claim 208 or 209, wherein the transformable medical device comprises a processor configured to transmit data, images, video, audio, or a combination thereof stored in the memory storage device to cloud storage, a computer, a portable device, a smartphone, a television, or a diagnostic device.

212. The method of any one of claims 208 - 211, comprising transmitting data, images, video, audio, or a combination thereof stored in the memory storage device to a computer, a portable device, a smartphone, a television, or a diagnostic device.

213. The method of claim 208 or 209, the transformable medical device comprises a processor configured to transmit data, images, video, audio, or a combination thereof stored in the memory storage device to cloud storage, a computer, a portable device, a smartphone, a television, or a diagnostic device through a wired or wireless network connection.

214. The method of any one of claims 208 - 213, comprising transmitting data, images, video, audio, or a combination thereof stored in the memory storage device to a computer, a portable device, a smartphone, a television, or a diagnostic device through a wired or wireless network connection.

215. The method of claim 208 or 209, comprising receiving a diagnosis, instruction, or other treatment regimen from a remote practitioner based on the data, images, video, audio, or a combination thereof.
216. The method of any one of claims 206 - 215, wherein the data, images, video, audio, or a combination thereof is used in telemedicine.

217. The method of any one of claims 206 - 216, comprising saving data, images, video, audio, or a combination thereof in the transformable medical device.

218. The method of any one of claims 206 - 217, comprising sending said data, images, video, audio, or combination thereof to a portable smart phone, cloud storage or other device having an internet connection.

219. A method comprising providing a device of any of claims 1-144.


221. A device of any of claims 1-144 for use in any method of claims 180-218.

FIG. 1
FIG. 2
FIG. 3

LED/LCD Digital Screen
(optional depending on
model)

120/80
AUTOMATIC BLOOD PRESSURE

Retractable Fabric, nylon, or
vinyl cuff (rolls into button)

Thumb resting
piece

Pressure release dial
or button (depending
on model)

Mercury
Manometer
(depending on
model)

Internal or
Exposed Air
Bladder and
Compressor
Bulb

Dynamo Trigger with Capacitor or
Rechargeable Battery (depending on model)
12 O'Clock Ribbed Rubber/Silicon Index Finger Piece

Power On/Off Button

LED/LCD Digital Screen for Image Display Capture or Specialized Magnifying glass (optional depending on model)

Panel of Buttons, Dials for Control of Medical Device

Real or Virtual Image here

Crank Dynamo / Solar Power Source w/ Capacitor or Rechargeable battery

6 O'Clock Ribbed Rubber/Silicon Thumb Piece

Side A

Side B

Medical Device Probe ex: ear insertion piece for otoscope or the glass interface facing the ocular orbit of patient for ophthalmoscope

(Square, Circular, or Rectangle-shaped, approx. 2.25"x2.25" & thickness 1.25" to 1.5")

FIG. 4
FIG. 5

- Solar Power Cell
- Wind Power Attachment Retractable
- LED/LCD Screen Display
- Handle
- Crank Dynamo
- Medical Devices Clip on or there is a Customized Holster
- GOOD MORNING UNITS CHARGING
- 98% O₂
- Pulse Oximeter
- 97°F
- Thermometer
- Otoscope and Ophthalmoscope

Sphymomanometer
Medical Device Head
(ex. Oto- or Ophthalmo-
scope)

Area of attachment

Thumb Resting Stage

LED/LCD Screen Display (mode, lighting, image capture, power)

Opposable Thumb Control Panel (with circular and vertical dials for dimmer and rheostat functions)

Medical Device Handle (ergonomic design)

Dynamo and Internal Capacitor and/or Rechargeable battery

Please see further explanation for WiFi, Bluetooth, SD card slot, USB data transfer capabilities into EMR or App.

FIG. 7
INTERNATIONAL SEARCH REPORT

A. CLASSIFICATION OF SUBJECT MATTER

A61B 3/12(2006.01)i, A61B 1/227(2006.01)i, A61B 5/00(2006.01)i

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)

A61B 3/12; A61B 1/227; A61B 1/00; G06F 17/30; A61B 1/267; A61B 18/20; A61B 1/233; A61B 5/00

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

Korean utility models and applications for utility models

Japanese utility models and applications for utility models

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

eKOMPASS/KIPO internal & Keywords: ophthalmoscopic, head, otoscopic, cone, transform

C. DOCUMENTS CONSIDERED TO BE RELEVANT

<table>
<thead>
<tr>
<th>Category</th>
<th>Citation of document, with indication, where appropriate, of the relevant passages</th>
<th>Relevant to claim No.</th>
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<td>A</td>
<td>JP 11-155815 A (WELCH ALLYN INC.) 15 June 1999 See abst ract, paragraphs [0045]-[0066], claims 1-3 and figures 1-6C.</td>
<td>1-3, 79-82, 145-147 , 180-183</td>
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Further documents are listed in the continuation of Box C. See patent family annex.

# Special categories of cited documents:
"A" document defining the general state of the art which is not considered to be of particular relevance
"E" earlier application or patent but published on or after the international filing date
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed

"I" 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
"R" document member of the same patent family

Date of the actual completion of the international search: 10 April 2014 (10.04.2014)

Date of mailing of the international search report: 11 April 2014 (11.04.2014)

Name and mailing address of the ISA/KR
International Application Division
Korean Intellectual Property Office
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### Box No. II  Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.: Because they relate to subject matter not required to be searched by this Authority, namely:

2. ☒ Claims Nos.: See Extra Page  
   Because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
   See Extra Page

3. ☒ Claims Nos.: See Extra Page  
   Because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

### Box No. III  Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

1. ☒ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.

2. ☒ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fees.

3. ☒ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:

4. ☒ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

#### Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.
- ☒ The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.
- ☒ No protest accompanied the payment of additional search fees.

Form PCT/ISA/210 (continuation of first sheet (2)) (My 2009)
Continuation of: Box No. Π


because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:


because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).
<table>
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<th>Publication date</th>
<th>Patent family member(s)</th>
<th>Publication date</th>
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</thead>
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<tr>
<td>US 6393431 Bl</td>
<td>21/05/2002</td>
<td>AU 1999-28699 Al</td>
<td>06/09/1999</td>
</tr>
<tr>
<td></td>
<td></td>
<td>AU 1999-33040 Al</td>
<td>06/09/1999</td>
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<tr>
<td></td>
<td></td>
<td>AU 2869999 A</td>
<td>06/09/1999</td>
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<td></td>
<td>US 6106457 A</td>
<td>22/08/2000</td>
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<td></td>
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<td>US 6142934 A</td>
<td>07/11/2000</td>
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<td>wO 99-42029 Al</td>
<td>26/08/1999</td>
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<td>wo 99-42030 Al</td>
<td>26/08/1999</td>
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<tr>
<td></td>
<td></td>
<td>wo 99-42760 Al</td>
<td>26/08/1999</td>
</tr>
<tr>
<td>US 2011-0137118 Al</td>
<td>09/06/2011</td>
<td>EP 2289391 A</td>
<td>02/03/2011</td>
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<td></td>
<td>US 2010-0053391 Al</td>
<td>04/03/2010</td>
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<td>us 2011-0087073 Al</td>
<td>14/04/2011</td>
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<td>us 8206290 B2</td>
<td>26/06/2012</td>
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<td>us 8528059 Bl</td>
<td>03/09/2013</td>
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<td></td>
<td>AU 2003-249738 A8</td>
<td>23/01/2004</td>
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<td></td>
<td></td>
<td>EP 1558125 A2</td>
<td>03/08/2005</td>
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<td>US 2004-0039251 Al</td>
<td>26/02/2004</td>
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<td>us 7029439 B2</td>
<td>18/04/2006</td>
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<td>us 7670287 B2</td>
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<td>15/01/2004</td>
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<td>wo 2004-004553 A3</td>
<td>25/03/2004</td>
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<td>AU 2003-282929 A8</td>
<td>04/05/2004</td>
</tr>
<tr>
<td></td>
<td></td>
<td>EP 1558189 A2</td>
<td>03/08/2005</td>
</tr>
<tr>
<td></td>
<td></td>
<td>EP 1558189 A4</td>
<td>23/01/2008</td>
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<td>wo 2004-034878 A2</td>
<td>29/04/2004</td>
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<td></td>
<td>wo 2004-034878 A3</td>
<td>28/04/2005</td>
</tr>
<tr>
<td>JP 11-155815A</td>
<td>15/06/1999</td>
<td>CA 2234141 Al</td>
<td>04/10/1998</td>
</tr>
<tr>
<td></td>
<td></td>
<td>EP 0868878 Al</td>
<td>07/10/1998</td>
</tr>
<tr>
<td></td>
<td></td>
<td>US 06106457 A</td>
<td>22/08/2000</td>
</tr>
</tbody>
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