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(54) **MEDICAL DEVICE**

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G10L 11/00	(2006.01)

(52) **U.S. Cl.** **600/500**; 600/300; 600/595; 704/270; 704/E11.001

(57) **ABSTRACT**

A medical device in accordance with the present invention comprises a connection device adapted to be wrapped around and securely attached to a patient, a data storage device attached to or integral with the connection device, wherein the data storage device comprises an input port adapted to receive medical data pertaining to the patient, a memory adapted to store the medical data, and an output port adapted to produce the medical data. A medical device in accordance with the present invention may also comprise a connection device adapted to be wrapped around and securely attached to a patient, a data storage device attached to or integral with the connection device, wherein the data storage device comprises a memory adapted to receive medial data pertinent to a patient, and a transceiver adapted to transmit and receive the medical data.

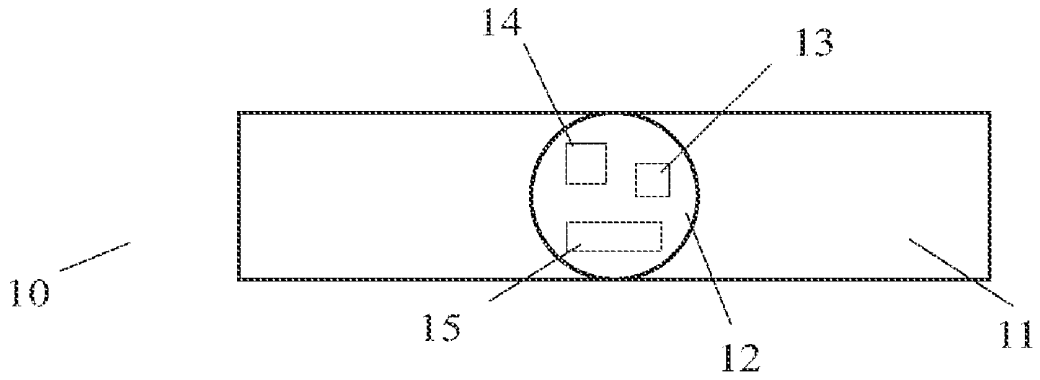


FIG. 1(a)

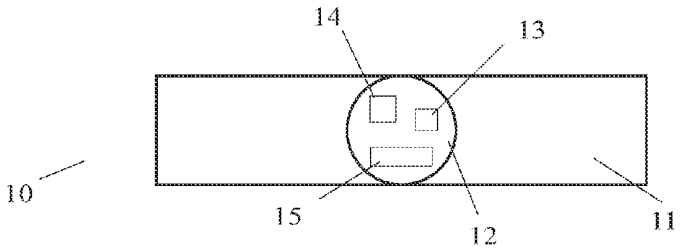


FIG. 1(b)

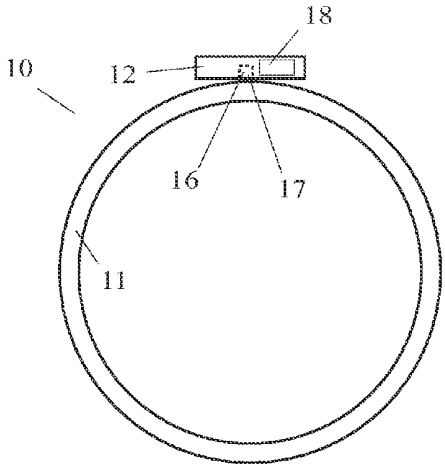


FIG. 1(c)

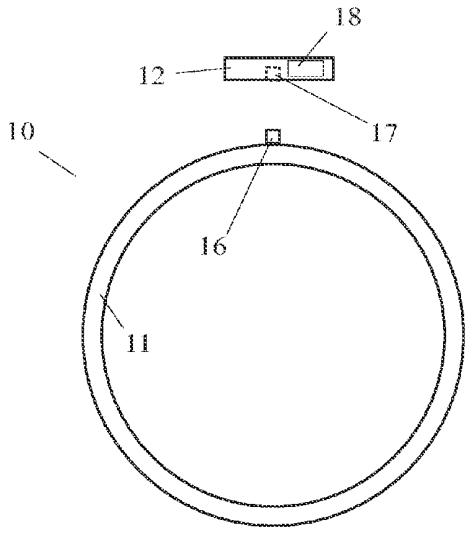


FIG. 2(a)

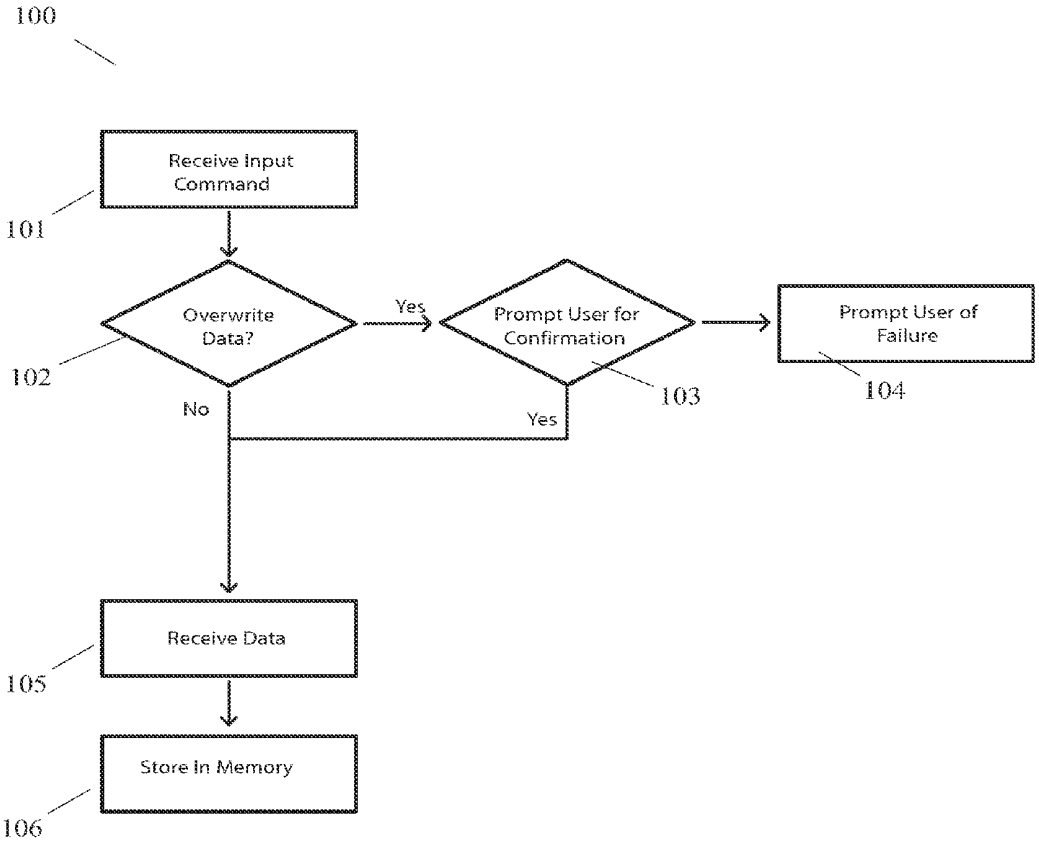

100
Receive Input Command
101
Overwrite Data?
102
Yes
Prompt User for Confirmation
103
Prompt User of Failure
104
No
Yes
Receive Data
105
Store In Memory
106

FIG. 2(b)

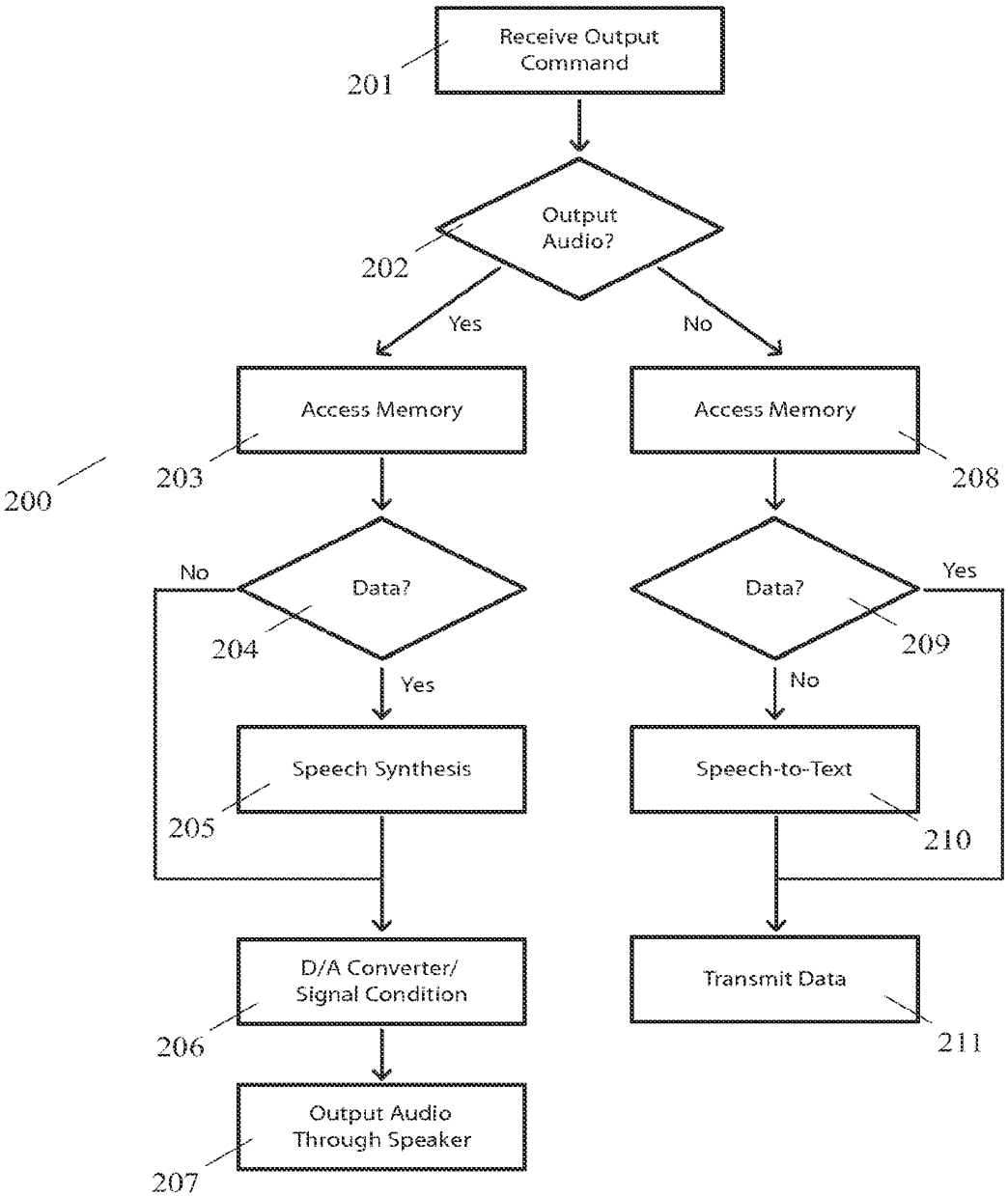

Receive Output Command
201
Output Audio?
202
Yes
No
Access Memory
203
Access Memory
208
200
No
Data?
204
Yes
Data?
209
Yes
No
Speech Synthesis
205
Speech-to-Text
210
D/A Converter/ Signal Condition
206
Transmit Data
211
Output Audio Through Speaker
207

FIG. 3(a)

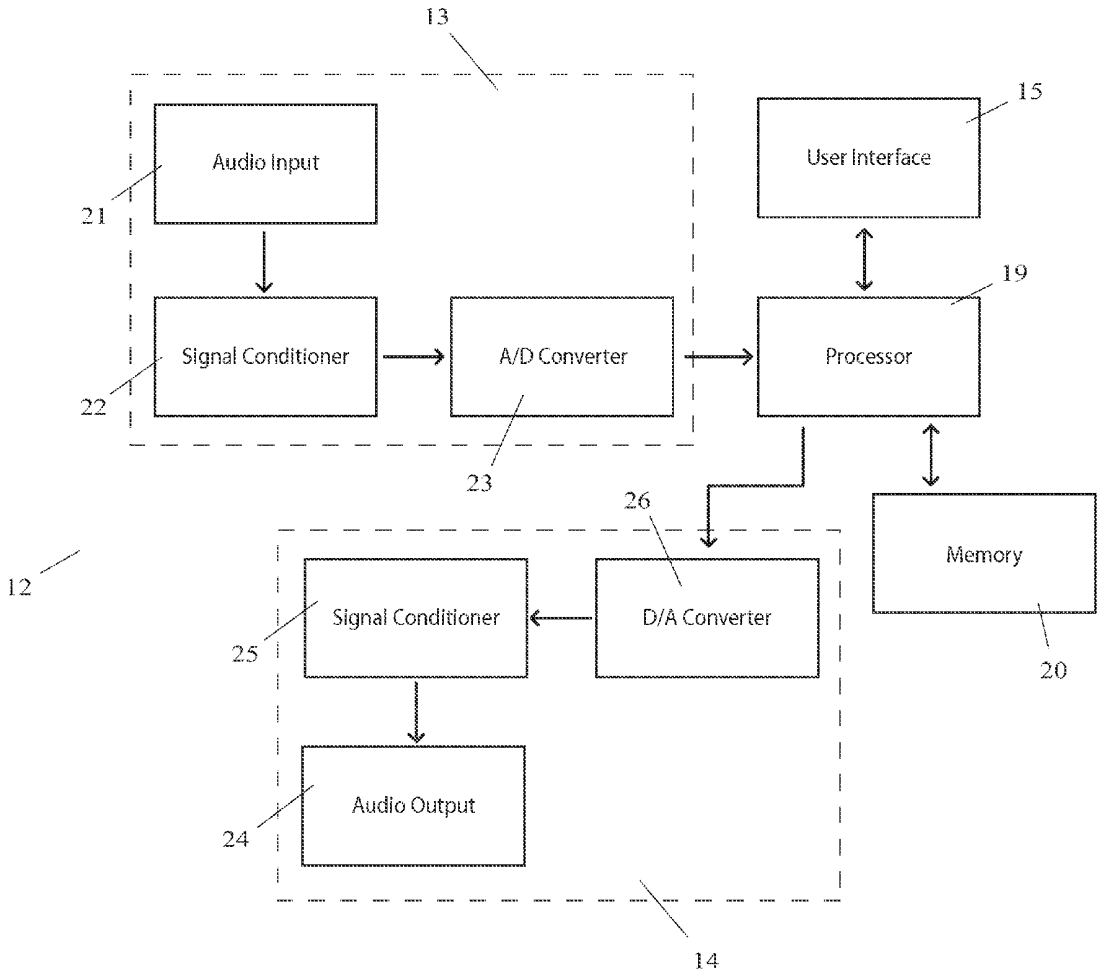

13
15
Audio Input
User Interface
21
19
Signal Conditioner
A/D Converter
Processor
22
23
26
12
Memory
Signal Conditioner
D/A Converter
25
20
Audio Output
24
14

FIG. 3(b)

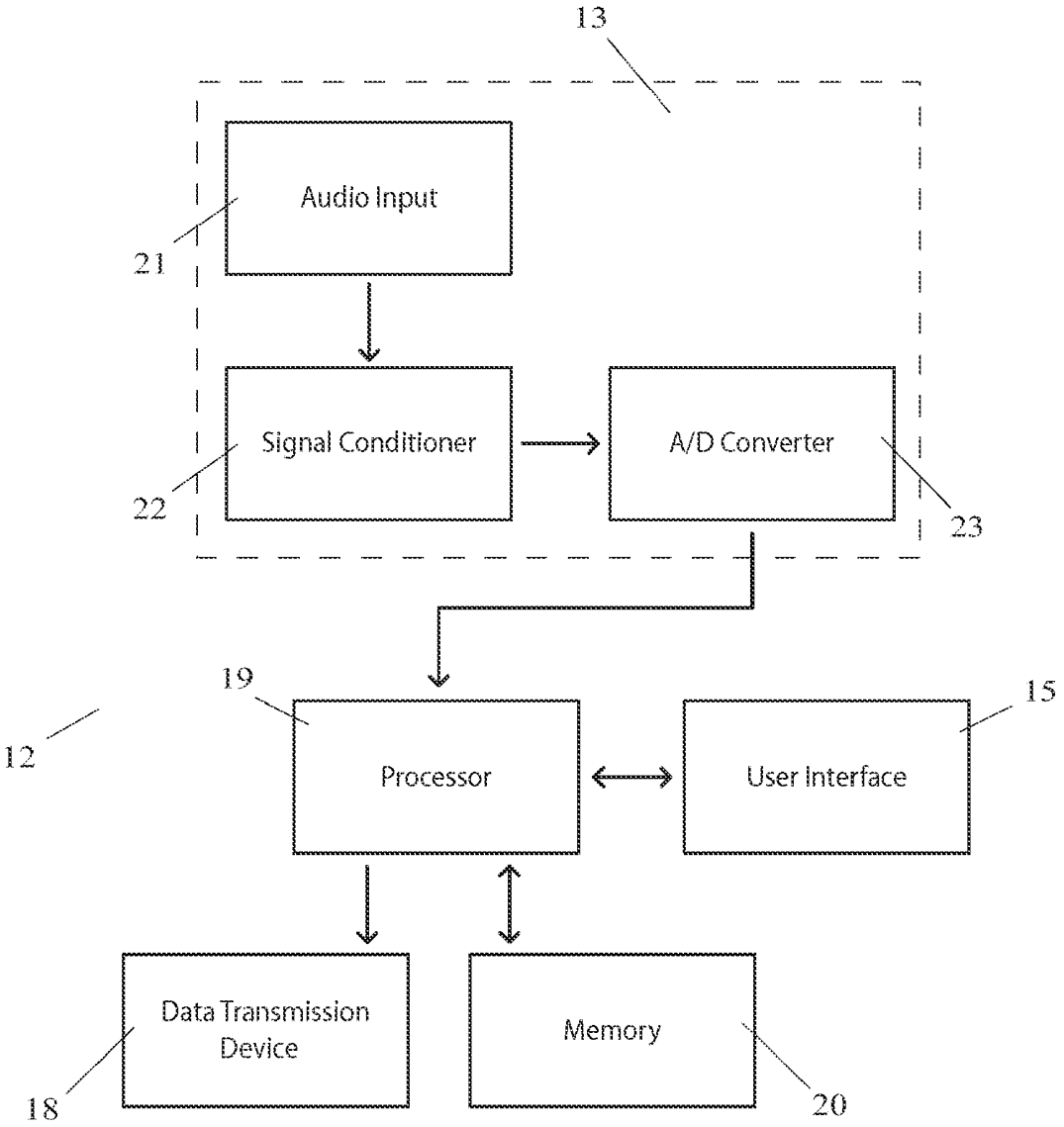

13
Audio Input
21
Signal Conditioner
22
A/D Converter
23
19
Processor
User Interface
15
12
Data Transmission Device
18
Memory
20

FIG. 4(a)

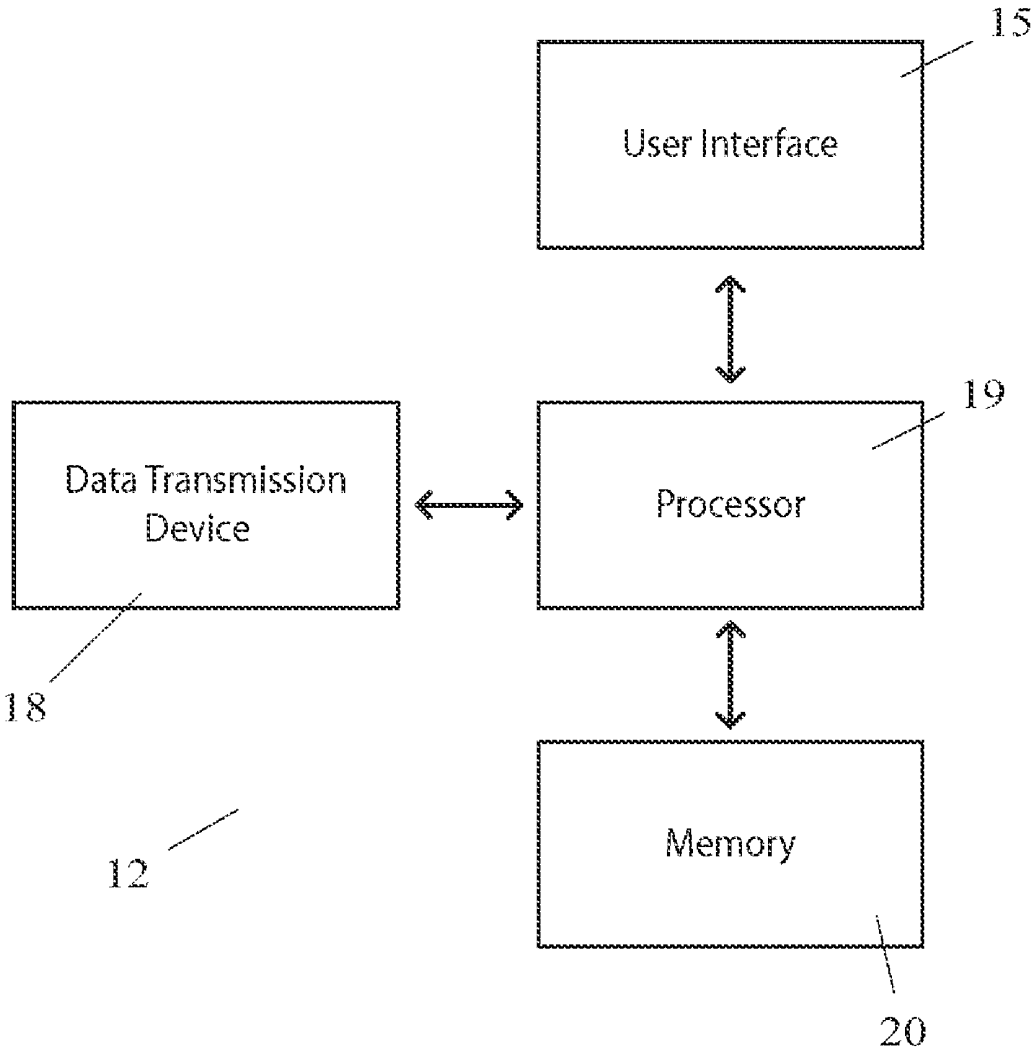

15
User Interface
19
Data Transmission Device
Processor
18
12
Memory
20

FIG. 4(b)

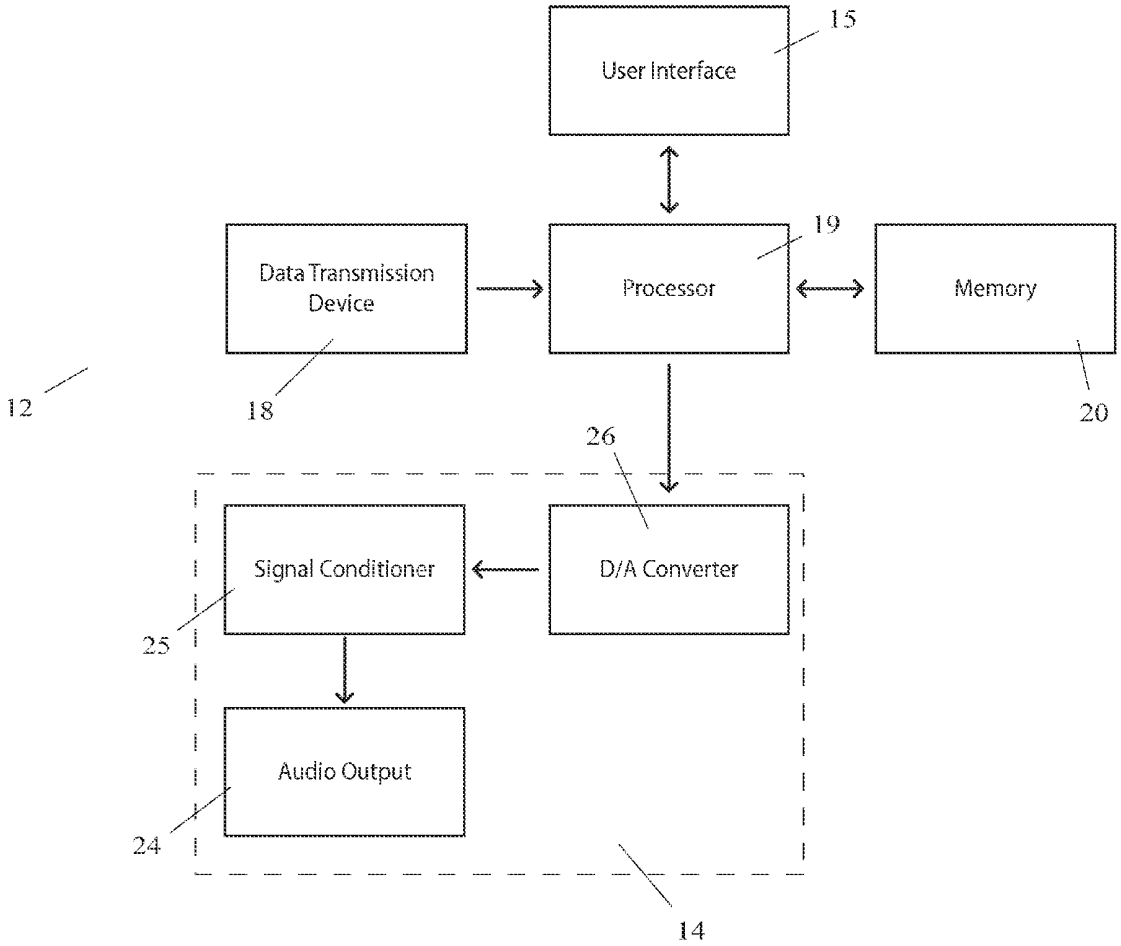

User Interface
15
Data Transmission Device
Processor
19
Memory
12
18
20
26
Signal Conditioner
D/A Converter
25
Audio Output
24
14

FIG. 5(a)

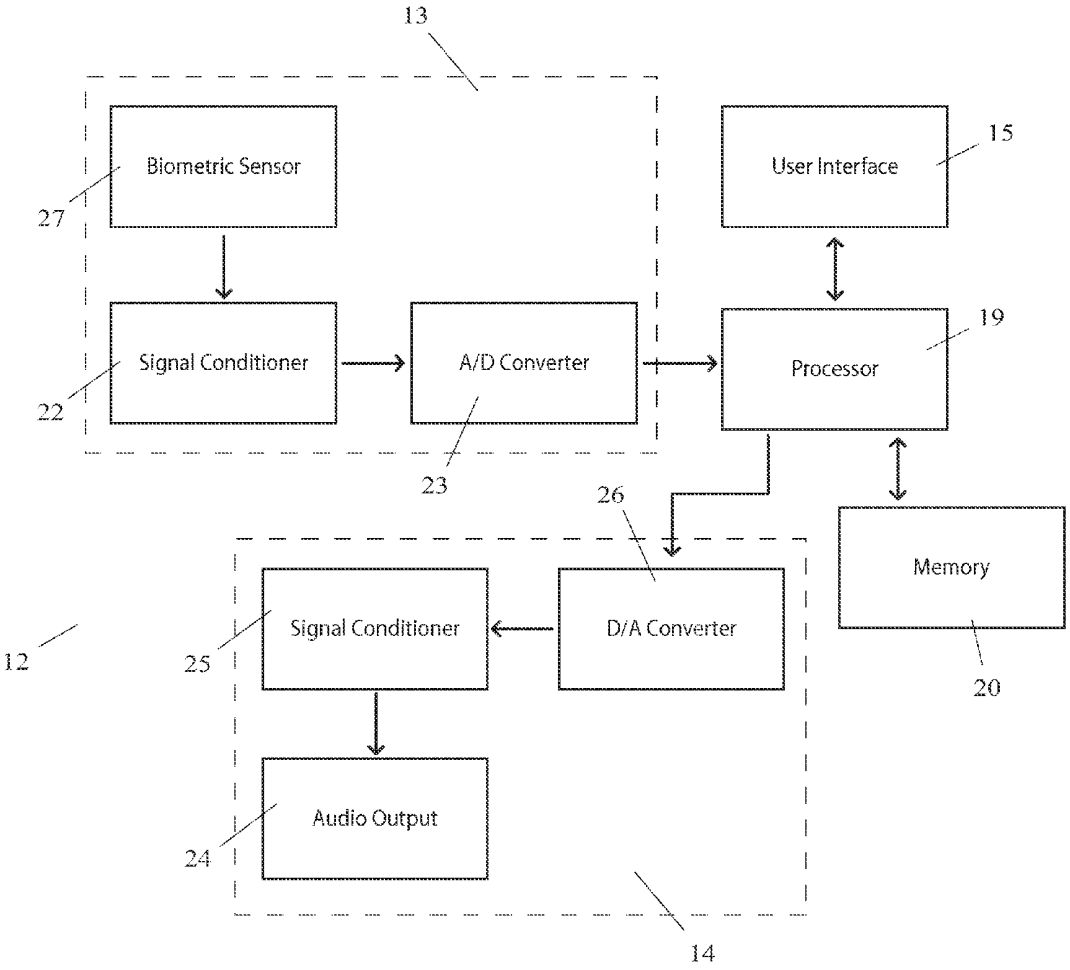
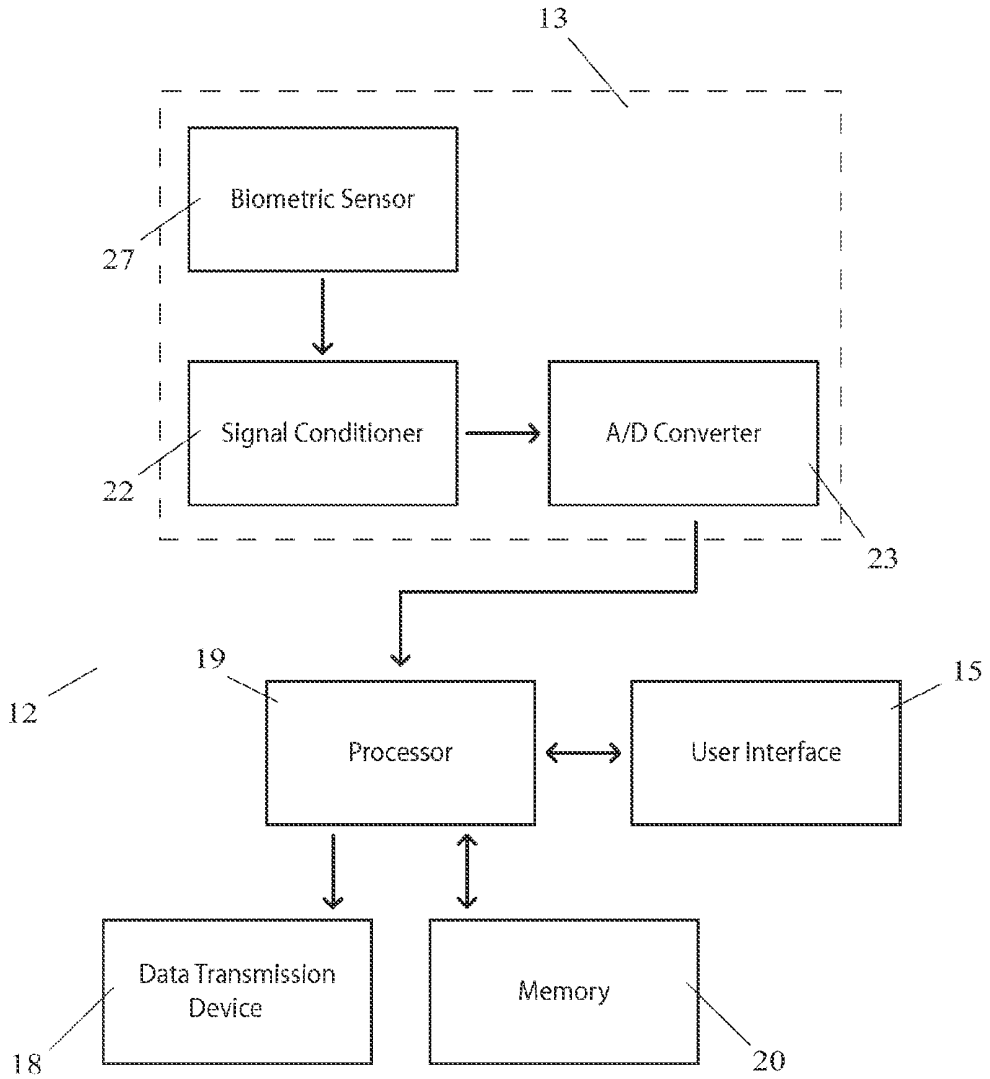

13
Biometric Sensor
27
User Interface
15
Signal Conditioner
22
A/D Converter
23
Processor
19
26
Memory
20
12
Signal Conditioner
25
D/A Converter
Audio Output
24
14

FIG. 5(b)


13
Biometric Sensor
27
Signal Conditioner
A/D Converter
22
23
12
19
Processor
User Interface
15
Data Transmission Device
Memory
18
20

MEDICAL DEVICE

TECHNICAL FIELD OF THE INVENTION

[0001] The present invention relates in general to a medical device, and more specifically, to a medical device utilized for the communication of medical data and the reduction of the likelihood of misidentification of medical patients.

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BACKGROUND OF THE INVENTION

[0004] It is common procedure at medical facilities for patients to wear identification bands. One of the main purposes of the identification band is to help reduce the chance of misidentification of a patient. Only if a patient is properly identified can medical personnel provide the necessary medical treatment. Should a patient be misidentified, the patient may be given the treatment intended for another and may not receive the care they need or require.

[0005] In order to properly utilize an identification band typically used in today's medical facilities, one must carefully read the information contained on the band. For medical personnel in a rush, or medical personnel with poor vision, it may be difficult to properly read the information contained on the identification band. Further, medical personnel must make sure the information contained on the identification band corresponds with the information contained in the patient's medical chart. Additionally, the patient may be incapacitated or unable to speak, and thus unable to notify the medical personnel should a misidentification arise.

[0006] The misidentification of patients in a hospital can often lead to improper and unnecessary medical procedures, in addition to expensive litigation and malpractice claims. Should a patient be misidentified, they may not receive urgent care that may be required. Further, should the patient have any allergies or other important medical concerns, conflicts or complications in treatment may arise, creating potential harm to the health and care of the patient.

[0007] Inventions, systems and methods have been developed for the proper identification of patients. These systems and methods, however, do not guarantee that mistakes will not be made. Current systems and methods for patient identification require the consultation of multiple sources of information, thereby increasing the workload required for medical personnel and increasing the likelihood of mistake.

[0008] Thus, there is a need in the art for a medical device that helps properly identify patients and communicate important medical communication through audible identification and confirmation methods. There is also a need in the art for a medical device that may measure, record and transfer medical data to an external electronic device. Such a device may help prevent the occurrence of errors or mistakes in a hospital or other medical location due to lack of attention, oversight, stress, or negligence. Specifically, there is a need for a medical device that will increase the efficiency and quality of medical care and reduce the likelihood of patient misidentification by medical personnel. It is to these ends that the present invention has been developed.

SUMMARY OF THE INVENTION

[0009] To minimize the limitations in the prior art, and to minimize other limitations that will be apparent upon reading and understanding the present specification, the present invention describes a medical device utilized for the reduction of the likelihood of misidentification of medical patients.

[0010] A medical device in accordance with the present invention comprises a connection device adapted to be wrapped around and securely attached to a patient, a data storage device attached to or integral with the connection device, wherein the data storage device comprises an input port adapted to receive medical data pertaining to the patient, a memory adapted to store the medical data, and an output port adapted to produce the medical data.

[0011] A medical device in accordance with the present invention may also comprise a connection device adapted to be wrapped around and securely attached to a patient, a data storage device attached to or integral with the connection device, wherein the data storage device comprises a memory adapted to receive medial data pertinent to a patient, and a transceiver adapted to transmit and receive the medical data.

[0012] It is an objective of the present invention to reduce the likelihood of the misidentification of a patient.

[0013] It is another objective of the present invention to increase the efficiency of the patient check-in process in a hospital.

[0014] It is still another objective of the present invention to audibly output medical data, biometric data, or a special message from the patient to medical personnel in proximity to a patient.

[0015] It is yet another objective of the present invention to transfer medical data from a medical device to an external electronic device.

[0016] It is yet another objective of the present invention to display transferred medical data from a medical device onto an external display screen or monitor.

[0017] It is yet another objective of the present invention to improve the quality and efficiency of medical data transfer, communication and retrieval in a medical facility.

[0018] Finally, it is an objective of the present invention to increase the quality of medical care received by patients at a medical facility.

[0019] These and other advantages and features of the present invention are described herein with specificity so as to make the present invention understandable to one of ordinary skill in the art.

BRIEF DESCRIPTION OF THE DRAWINGS

[0020] Elements in the figures have not necessarily been drawn to scale in order to enhance their clarity and improve understanding of these various elements and embodiments of the invention. Furthermore, elements that are known to be common and well understood to those in the industry are not depicted in order to provide a clear view of the various embodiments of the invention.

[0021] FIG. **1**(*a*) illustrates a top plan view of an exemplary embodiment of a medical device.

[0022] FIG. **1**(*b*) illustrates a front elevational view of an exemplary embodiment of a medical device.

[0023] FIG. **1**(*c*) illustrates a front elevational view of an exemplary embodiment of a medical device with data storage device detached from wrist band.

[0024] FIG. **2**(*a*) illustrates a flow chart utilized by medical device for the input and storage of medical data.

[0025] FIG. **2**(*b*) illustrates a flow chart utilized by medical device for the output or transmission of medical data.

[0026] FIG. **3**(*a*) illustrates a block diagram of an exemplary embodiment of a data storage device utilizing audio input and audio output ports.

[0027] FIG. **3**(*b*) illustrates a block diagram of an exemplary embodiment of a data storage device utilizing an audio input and a data transmission device.

[0028] FIG. **4**(*a*) illustrates a block diagram of an exemplary embodiment of a data storage device utilizing a data transmission device for both data reception and transmission.

[0029] FIG. **4**(*b*) illustrates a block diagram of an exemplary embodiment of a data storage device utilizing a data transmission device for data reception and an audio output.

[0030] FIG. **5**(*a*) illustrates a block diagram of an exemplary embodiment of a data storage device utilizing a biometric sensor input and an audio output.

[0031] FIG. **5**(*b*) illustrates a block diagram of an exemplary embodiment of a data storage device utilizing a biometric sensor input and a data transmission device for data transmission.

DETAILED DESCRIPTION OF THE DRAWINGS

[0032] In the following discussion that addresses a number of embodiments and applications of the present invention, reference is made to the accompanying drawings that form a part hereof, and in which is shown by way of illustration specific embodiments in which the invention may be practiced. It is to be understood that other embodiments may be utilized and changes may be made without departing from the scope of the present invention.

[0033] In the following discussion of the present invention, the term "medical data" may include, but is not limited to, a patient's name, consent and waiver of liability, list of known allergens, medical history, treatment or surgical instructions, personal messages from the patient, location of patient within medical facility, pulse rate, temperature, body movement, or other medical diagnostic data important to the patient treatment process.

[0034] FIG. **1**(*a*) illustrates a top plan view of an exemplary embodiment of a medical device. FIG. **1**(*b*) illustrates a front elevational view of an exemplary embodiment of a medical device. FIG. **1**(*c*) illustrates a front elevational view of an exemplary embodiment of a medical device with data storage device detached from wrist band.

[0035] FIGS. **1**(*a*)-**1**(*c*) depict medical device **10**, comprising connection device **11** and data storage device **12**. Medical device **10** is designed to assist in the correct identification of a hospital patient and provide for an easy and efficient method of relaying accurate medical data and instructions to medical personnel throughout the medical treatment process, including but not limited to patient check-in, patient location, surgery preparation, medical examination, surgical operation, and post-operative care.

[0036] Connection device **11** is a component of medical device **10** that may be adapted to be wrapped around and securely attached to a patient. In an exemplary embodiment, connection device **11** may comprise a wristband and may be wrapped around and securely attached to a wrist of a patient. In other exemplary embodiments, however, connection device **11** may securely wrap around the wrist, leg, neck or other limb of a patient. Connection device **11** may securely wrap around or attach to patient by tie, mechanical snapping means, adhesive, elastic properties of the connection device material, or some other method of attachment. Further, in other embodiments of the present invention, connection device **11** may securely attach to a patient, or an article of clothing or other accessory on the patient, without wrapping around the patient's limb. Dimensions of connection device **11** may be tailored specifically to the designated limb of the patient, the size or diameter of the patient's limb, or connection device **11** may comprise a means for tightening or loosening to securely attach to a wrist of the patient.

[0037] Data storage device **12** is designed to receive, store, and transmit or output patient medical data. Data storage device **12** may be permanently or removeably coupled to connection device **11**, as illustrated in FIGS. **1**(*b*) and **1**(*c*). Data storage device **12** may comprise input port **13**, output port **14** and memory **20** (see FIGS. **3-5**, discussed below). Data storage device **12** may also comprise data transmission device **18** (illustrated in FIGS. **1**(*b*) and **1**(*c*)). In exemplary usage of data storage device **12**, a user may input medical data to data storage device **12** via input port **13**, wherein processor **19** (see FIGS. **3-5**) may store medical data in memory **20**, and said medical data may be audibly transmitted or spoken to the user through output port **14**. Users of the present invention may include the patient, nurse, surgeon, medical receptionist, or any other hospital personnel authorized to control medical device **10** when in use by the patient.

[0038] Input port **13** is a component of data storage device **12** in which medical data is received. In various embodiments of the present invention, input port **13** may receive medical data in the form of audible speech or biometric data. In such embodiments, input port **13** may comprise of a microphone able to receive medical data in the form of audio speech or a biometric sensor capable of receiving biometric data. Additionally, data storage device **12** may comprise a plurality of input ports **13**, located on the exterior housing of data storage device **12**.

[0039] Output port **14** is a component of data storage device **12** through which medical data stored in data storage device **12** is outputted in the form of audible speech. Through user interface **15**, a user may activate data storage device **12** to audibly output said medical data through output port **14**. In an exemplary embodiment, user interface **15** may comprise a plurality of buttons on the exterior housing of data storage device **12** that, when activated by a user, medical data is "read" out to the user.

[0040] Data transmission device **18** is a component of data storage device **12** through which medical data may be transferred to or received from an external electronic device. In exemplary usage of the present invention, medical data may be transferred to medical device **10** via data transmission device **18** from an external electronic device. In further exemplary usage of the present invention, medical device **10** may receive medical data via data transmission device **18** from an external electronic device.

[0041] Illustrated in FIGS. **1**(*b*) and **1**(*c*), data storage device **12** may be removeably coupled to connection device **11** via connector **16** and receiver **17**. In such embodiments, data storage device **12** may be reattachable to connection device **11**. In an alternative embodiment of the present invention, however, data storage device **12** may be permanently attached to connection device **11**. In all such embodiments, medical device **10** may be disposable or reusable. Connector **16** and receiver **17** may comprise components utilizing mechanical means, tie, screw rotation, or some other means of secure attachment to securely attach data storage device **12** to connection device **11**.

[0042] FIG. **2**(*a*) illustrates a flow chart of sequence **100** utilized by medical device **10** for the input and storage of medical data. Sequence **100** is explained in the order described below; however, the following steps may be taken in any other conceivable sequence, or with additional steps not discussed, without deviating from the scope of the present invention.

[0043] In step **101**, a user may activate medical device **10** through user interface **15** or via an external electronic device communication received through data transmission device **18**. In an exemplary embodiment wherein user interface **15** may comprise a plurality of buttons or switches, or a touch screen interface, user interface **15** may be activated by pressing or activating said button, switch or touch screen. Alternatively, medical device **10** may be activated by a command signal sent from an external electronic device, received by data transmission device **18**. Should medical device **10** be activated by a user, medical device **10** will then receive an input command and will proceed to step **102**.

[0044] In step **102**, processor **19** may determine if medical data need be overwritten in memory **20**. If medical data has not already been stored in the designated storage slot in memory **20**, then medical device **10** will proceed to step **105** because no medical data need be overwritten. If medical data has already been stored in the designated storage slot in memory **20**, described below, then medical device **10** will proceed to step **103** because storage of new medical data would require old medical data to be overwritten. To determine if medical data need be overwritten, processor **19** checks the designated storage slot in memory **20** to see if medical data is already stored.

[0045] In step **103**, the user is prompted for confirmation or administrative authentication. This prompt for confirmation may be done either through output port **14**, user interface **15** or through an external electronic device via data transmission device **18**. Should the user of medical device **10** provide confirmation through input port **13**, user interface **15**, or data transmission device **18**, medical device **10** will proceed to step **105**. If, however, confirmation is not provided by user, then medical device **10** will proceed to step **104**.

[0046] In step **104**, the user is prompted with a failure notice. Because confirmation for the deletion and overwriting of data was not provided, medical device **10** will not accept medical data transmission and store the medical data in memory **20**. The user may be prompted with the failure notice either through output port **14**, user interface **15**, or via an external electronic device through data transmission device **18**.

[0047] In step **105**, medical device **10** will receive medical data, either through input port **13** or data transmission device **18**. Once the medical data is received, medical device **10** will proceed to step **106**. Finally in step **106**, the medical data imported into medical device **10** is stored in memory **20**.

[0048] FIG. **2**(*b*) illustrates a flow chart of sequence **200** utilized by medical device **10** for the output or transmission of medical data. Sequence **200** is explained in the order described below; however, the following steps may be taken in any other conceivable sequence, or with additional steps not discussed, without deviating from the scope of the present invention.

[0049] In step **201**, a user may activate medical device **10** through user interface **15** or via an external electronic device through data transmission device **18**. In an exemplary embodiment of the present invention, user interface **15** may be activated by pressing or activating the button, switch or touch screen. Alternatively, medical device **10** may be activated by a command signal sent from an external electronic device, received by data transmission device **18**. Should medical device **10** be activated by a user, medical device **10** will then receive an output command and will proceed to step **102**.

[0050] In step **202**, processor **19** may determine whether audio is to be outputted to the user of medical device **10**, or whether medical data is to be transmitted to an external electronic device. Should speech be outputted to a user of medical device **10**, medical device **10** will proceed to step **203**. In the alternative, should processor **19** determine that medical data is to be transferred to an external electronic device, medical device **10** will proceed to step **208**.

[0051] In step **203**, processor **19** accesses the particular medical data stored in memory **20** that was requested in the output command. In step **204**, processor **19** determines whether the medical data stored in memory **20** was stored as digital audio, or if the medical data is textual or otherwise non-audio in nature. If the medical data was stored as digital audio in memory **20**, medical device **10** will proceed to step **206**. If, however, the medical data was not stored as digital audio in memory **20**, then medical device **10** will proceed to step **205** for speech synthesis.

[0052] In step **205**, processor **19** performs a speech synthesis algorithm on the requested medical data to be audibly outputted to the user. In the speech synthesis algorithm, processor **19** converts the non-audio medical data into a format compatible for audio speech output. Once complete, medical device **10** will proceed to step **206**.

[0053] In step **206**, medical device **10** converts the digital medical data into an analog signal and conditions the analog signal. Finally, in step **207**, medical device **10** outputs the medical data through the audio output of output port **14**.

[0054] In step **208**, processor **19** accesses the particular medical data stored in memory **20** that was requested in the output command. In step **209**, processor **19** determines whether the medical data stored in memory **20** was stored as digital audio, or if the medical data is non-audio in nature. If the medical data was not stored as digital audio in memory **20**, then medical device **10** will proceed to step **211**. If, however, the medical data was stored as digital audio medical, then medical device **10** will need to perform a speech-to-text conversion algorithm in step **210**.

[0055] In step **210**, processor **19** performs a speech-to-text algorithm on the requested medical data to be digitally transmitted to an external electronic device. In the speech-to-text algorithm, processor **19** converts the audio medical data into a non-audio based format compatible for data transmission to an external electronic device. Once complete, medical device

10 will proceed to step **211**. Finally, in step **211**, medical device **10** transmits the converted medical data to an external electronic device via data transmission device **18**.

[0056] A medical device in accordance with the present invention may further comprise a connection device and a data storage device, which may comprise audio input and output ports. FIG. **3**(*a*) illustrates a block diagram of an exemplary embodiment of a data storage device utilizing audio input and audio output ports. FIG. **3**(*a*) shows data storage device **12**, comprising input port **13**, output port **14**, processor **19**, and memory **20**. Input port **13** may comprise audio input **21**, signal conditioner **22**, and analog to digital converter **23** ("A/D converter"), and output port **14** may comprise audio output **24**, signal conditioner **25**, and digital to analog converter **26** ("D/A converter"). In the embodiment of the present invention depicted in FIG. **3**(*a*), data storage device **12** is designed to receive medical data from an audible source and to audibly output medical data.

[0057] Input port **13**, which may comprise audio input **21**, signal conditioner **22**, and A/D converter **23**, may receive medical data from an audible source and transform it into a digital form that may be stored in memory **20**. In an exemplary process performed by data storage device **12** of receiving and storing medical data, audible medical data may be inputted by a user through audio input **21**, which in an exemplary embodiment may comprise a microphone. An analog signal of the medical data may be amplified and cleaned by signal conditioner **22**. Once conditioned, the medical data may be transformed into digital data by A/D converter **23**. Processor **19** may then store the medical data in memory **20**.

[0058] Output port **14**, which comprises audio output **24**, signal conditioner **25**, and D/A converter **26**, may transform the medical data stored in memory **20** into an analog signal then audibly output the medical data to a user. In an exemplary process performed by data storage device **12**, medical data stored in memory **20** may be converted into an analog signal by D/A converter **26**. The analog signal of the medical data may then be amplified and cleaned by signal conditioner **25**. Once conditioned, the analog signal of the medical data may be audibly dispatched to the user through audio output **24**, which in an exemplary embodiment may comprise a speaker.

[0059] Processor **19** is a controlling component of data storage device **12**. In an exemplary embodiment of the present invention, when a user activates user interface **15** to input medical data, processor **19** activates input port **13** in order to turn on audio input **21**. Processor **19** may also store digital medical data within memory **20**. Further, when user interface **15** is activated to output medical data, processor **19** may access memory **20** and transfer it to output port **14** in order to dispatch audible medical data.

[0060] In an exemplary embodiment of the present invention, memory **20** is non-volatile and electrically erasable programmable read-only memory (EEPROM), allowing data to be stored when power is removed from medical device **10**. In alternative embodiments of the present invention, however, memory **20** may comprise another memory type or format.

[0061] In one embodiment of the present invention, medical data may be stored in memory **20**, but may not be overwritten by any subsequent input. In alternative embodiments of the present invention, however, medical data may be stored in memory **20** and later overwritten with new medical data. In such embodiments, a user may input and overwrite medical data in memory **20**, or the user may be required to input an administrative authorization or be prompted for confirmation in order to overwrite the stored medical data as described in sequence **100**.

[0062] In exemplary embodiments of the present invention, memory **20** may contain a specific number of storage slots for medical data. In such embodiments, each specific storage slot in memory **20** may be designated for a specific piece or type of medical data. For example, in one such embodiment, slot one of memory **20** may be designated for an audio recording of the patients name, while slot two may be designated for an audio recording of the patients consent to surgery. In such an embodiment, the amount of medical data that may be stored in data storage device **12** is limited by both the number of slots available and the total storage capacity of memory **20**. In alternative embodiments of the present invention, however, memory **20** may be dynamic in nature, meaning that slots are not defined in size or quantity, and the amount of medical data stored is only limited by the total storage capacity of memory **20**.

[0063] A medical device in accordance with the present invention may alternatively comprise a connection device and a data storage device, which may comprise audio input port and a data transmission device. FIG. **3**(*b*) illustrates a block diagram of an exemplary embodiment of a data storage device utilizing an audio input and a data transmission device. FIG. **3**(*b*) shows data storage device **12**, comprising input port **13**, data transmission device **18**, processor **19**, and memory **20**. In the embodiment of the present invention depicted in FIG. **3**(*b*), data storage device **12** is designed to receive medical data from an audio input, and transmit stored medical data to an external electronic device via data transmission device **18**.

[0064] In the embodiment of medical device **10** depicted in FIG. **3**(*b*) a user may activate audio input and medical data storage via user interface **15**. Alternatively, a user may activate audio input and medical data storage via an external electronic device through data transmission device **18**.

[0065] Data transmission device **18** is a component of medical device **10**. In the embodiment of medical device **10** depicted in FIG. **3**(*b*), data transmission device **18** may transmit medical data stored in memory **20** to an external electronic device. In the present embodiment, data transmission device **18** may transmit medical data to an external electronic device. In alternative embodiments of the present invention, data transmission device **18** may accept command instructions from an external electronic device.

[0066] In the present embodiment, medical data may be audibly inputted to medical device **10** via input port **13** and stored in memory **20** as a digital audio recording. Depending upon the command instruction inputted into medical device **10**, the audio medical data may be transmitted via data transmission device **18**, or alternatively, processor **19** may perform a speech-to-text algorithm, creating text data from the digital audio recording, thereby allowing textual medical data to be transferred via data transmission device **18** to the external electronic device. As such, data transmission device **18** may transmit either digital audio medical data or textual medical data to an external electronic device.

[0067] Data transmission device **18** may comprise a wired connection interface. In an embodiment comprising a wired connection interface, data transmission device **18** may comprise a universal serial bus ("USB") connection interface such that medical device **10** may couple with an external electronic device via a USB cable and transmit medical data to, and

receive medical data from said external electronic device. Alternatively, in another exemplary embodiment, data transmission device **18** may comprise a fire wire connection interface.

[0068] In other embodiments of the present invention, data transmission device **18** may comprise a wireless connection interface. In such embodiments, data transmission device **18** may utilize peer-to-peer or network based wireless protocols such as Bluetooth, wifi, cellular, analog, or some other type of wireless data transmission technology protocol. In such embodiments, medical device **10** may transmit medical data to, or receive medical data from, an external electronic device via wireless transmission to or from data transmission device **18**.

[0069] Other embodiments of medical device **10** may comprise a data transmission device for the transmission and reception of medical data. FIG. **4**(*a*) illustrates a block diagram of an exemplary embodiment of a data storage device utilizing a data transmission device for both data reception and transmission. FIG. **4**(*a*) shows data storage device **12**, which comprises data transmission device **18**, processor **19**, and memory **20**. In the embodiment of medical device **10** depicted in FIG. **4**(*a*), medical data may be transmitted from or received by data transmission device **18**.

[0070] In the embodiment of the present invention depicted in FIG. **4**(*a*), medical data may be transmitted from an external electronic device to medical device **10** via data transmission device **18** and stored in memory **20**. Medical data may also be transmitted to an external electronic device from medical device **10** via data transmission device **18**. Medical data transmission or reception may be activated by a user command input into user interface **15** or from an external electronic device received via data transmission device **18**.

[0071] Alternatively, medical data may be output by medical device **10** through user interface **15**. In an exemplary embodiment of the present invention, user interface **15** may comprise a visual display such that medical data may be visually outputted to a user. In another embodiment, user interface **15** may comprise a touch screen visual display such that the user may input commands to medical device **10** through the touch screen, and medical data may be displayed.

[0072] Medical device **10** may also audibly output medical data that was received through electronic data transmission. FIG. **4**(*b*) illustrates a block diagram of an exemplary embodiment of a data storage device utilizing a data transmission device for data reception and an audio output. FIG. **4**(*b*) shows data storage device **12**, comprising data output **14**, data transmission device **18**, processor **19**, and memory **20**. Data output **14** may further comprise audio output **24**, signal conditioner **25**, and D/A converter **26**. In the present embodiment, medical data may be received through data transmission and audibly outputted to a user.

[0073] In the embodiment of the present invention depicted in FIG. **4**(*b*), medical data may be audibly outputted to a user whether it is stored in speech or textual form. Should medical data be imported through data transmission device **18** in textual or otherwise non-audible form, processor **19** must perform a text-to-speech algorithm, thereby converting the medical data into a format compatible with audible output. If the medical data imported is already in an audible output format, text-to-speech need not be performed. Once the medical data is in an audio output-compatible format, processor **19** may instruct output port **14** to output the medical data through audio output **24**, as previously described (see discussion above, FIG. **3**(*a*)).

[0074] A medical device in accordance with the present invention may comprise a biometric sensor for medical data recording and input. FIG. **5**(*a*) illustrates a block diagram of an exemplary embodiment of a data storage device utilizing a biometric sensor input and an audio output. FIG. **5**(*b*) illustrates a block diagram of an exemplary embodiment of a data storage device utilizing a biometric sensor input and a data transmission device for data transmission. FIGS. **5**(*a*) and **5**(*b*) show data storage device **12**, comprising input port **13**, processor **19**, memory **20**, and output port **14** or data transmission device **18**. Input port **13** may further comprise biometric sensor **27**, signal conditioner **22**, and A/D converter **23**. In the embodiment of the present invention depicted in FIGS. **5**(*a*) and **5**(*b*), medical device **10** may receive biometric medical data and output the medical data audibly or through data transmission.

[0075] Biometric sensor **27** is a component of input port **13** in an exemplary embodiment of medical device **10**. Biometric sensor **27** may sense and record a variety biometric medical data types. For example, in one embodiment of the present invention, if medical device **10** is worn on the surface of the patient's body, biometric sensor **27** may record the pulse rate of a patient. Alternatively, biometric sensor **27** may measure and record the temperature of a patient, the breathe rate of a patient, movement of a patient, or some other biometric medical data type.

[0076] Once biometric medical data is recorded by biometric sensor **27**, the medical data is conditioned and digitally converted by signal conditioner **22** and A/D converter **23**, respectively. Processor **19** may then store the biometric medical data in memory **20**, where it later may be accessed and outputted audibly by output port **14** or transferred digitally by data transmission device **18**.

[0077] The utilization of biometric sensor **27** may also allow medical device **10** to provide audio or visual alerts to medical personnel should the biometric medical data trigger some predetermined activation mechanism. For example, where medical device **10** is utilized to monitor a patient, and biometric sensor **27** is actively recording the patient's pulse rate, should the patient's pulse reach a certain predetermined level, an audio alert may be triggered by processor **19** and outputted through output port **14**. Such an audible warning may be outputted by audio output **24**, including a speech output stating "warning," "high pulse rate," or "attention," or a reading of the pulse rate.

[0078] Alternatively, medical device **10** may be utilized to provide for alerts to be transmitted to an external electronic device should a predetermined triggering mechanism be activated. For example, where medical device **10** is utilized to monitor a patient, and biometric sensor **27** is actively recording the patient's body temperature, an alert may be transmitted to an external electronic device to alert medical personnel when the patient's body temperature reaches a specific level. Such a data transmission may be transmitted by data transmission device **18** and may include an audio or visual alert on an external electronic device, including screen flashing, beeper alarms, text messages, hospital P.A. announcement, or some other external electronic device activation.

What is claimed is:

1. A medical device, comprising:
a connection device adapted to be wrapped around and securely attached to a patient;
a data storage device attached to or integral with the connection device, wherein the data storage device comprises:
an input port adapted to receive medical data pertaining to the patient;
a memory adapted to store the medical data; and
an output port adapted to produce the medical data.

2. The medical device of claim **1**, wherein the input port comprises:
a microphone adapted to convert speech into an audio signal for audio input;
a signal conditioner adapted to process the audio signal; and
an analog to digital converter adapted to digitize the processed audio signal to generate the medical data.

3. The medical device of claim **1**, wherein the input port comprises:
a biometric sensor adapted to generate a biometric signal;
a signal conditioner adapted to process the biometric signal; and
an analog to digital converter adapted to digitize the processed biometric signal to generate the medical data.

4. The medical device of claim **3**, wherein the biometric sensor is adapted to measure the temperature of the patient.

5. The medical device of claim **3**, wherein the biometric sensor is adapted to measure the pulse rate of the patient.

6. The medical device of claim **3**, wherein the biometric sensor is adapted to measure movement of the patient's limb.

7. The medical device of claim **1**, wherein the output port comprises:
a digital to analog converter adapted to convert digitized audio data based on the medical data into an analog audio signal;
a signal conditioner adapted to process the analog audio signal; and
a speaker for audio output adapted to produce sound based on the processed analog audio signal.

8. The medical device of claim **1**, wherein the data storage device is comprises a receiver adapted to connect to a corresponding connector on the connection device.

9. The medical device of claim **1**, wherein medical data comprises one or more of the following:
information related to a patient;
information related to the patient's waiver;
information related to the patient's consent;
information related to patient allergies;
information related to special surgical instructions; or
information related to message to medical personnel;

10. The medical device of claim **1**, further comprising a processor for receiving medical data and storing in memory.

11. The medical device of claim **1**, wherein the input port comprises a wireless peer-to-peer connection interface.

12. A medical device, comprising:
a connection device adapted to be wrapped around and securely attached to a patient;
a data storage device attached to or integral with the connection device, wherein the data storage device comprises:
a memory adapted to receive medial data pertinent to a patient; and
a transceiver adapted to transmit and receive the medical data.

13. The medical device of claim **12**, wherein the transceiver comprises a Bluetooth device adapted to transmit and receive medical data.

14. The medical device of claim **12**, wherein the transceiver comprises a USB connection interface adapted to transmit and receive medical data.

15. The medical device of claim **12**, wherein the transceiver comprises a wireless local area network connection interface adapted to transmit and receive medical data.

16. The medical device of claim **12**, wherein the transceiver comprises a cellular connection interface adapted to transmit and receive medical data.

17. The medical device of claim **12**, wherein the data storage device further comprises an input port adapted to receive medical data pertaining to the patient, comprising:
a microphone adapted to convert speech into an audio signal for audio input;
a signal conditioner adapted to process the audio signal; and
an analog to digital converter adapted to digitize the processed audio signal to generate the medical data.

18. The medical device of claim **12**, wherein the data storage device further comprises an input port adapted to receive medical data pertaining to the patient, comprising:
a biometric sensor adapted to generate a biometric signal;
a signal conditioner adapted to process the biometric signal; and
an analog to digital converter adapted to digitize the processed biometric signal to generate the medical data.

19. The medical device of claim **12**, wherein the data storage device further comprises a digital to analog converter adapted to convert digitized audio data based on the medical data into an analog audio signal;
a signal conditioner adapted to process the analog audio signal; and
a speaker for audio output adapted to produce sound based on the processed analog audio signal.

20. The medical device of claim **12**, further comprising a processor for receiving medical data and storing in memory.

* * * * *

专利名称(译)	医疗装置		
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申请号	US12/610218	申请日	2009-10-30
[标]发明人	NAJI MOHAMMED		
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摘要(译)

根据本发明的医疗设备包括适于缠绕并牢固地附接到患者的连接装置，附接到连接装置或与连接装置集成的数据存储装置，其中数据存储装置包括适于接收的输入端口。与患者有关的医疗数据，适于存储医疗数据的存储器，以及适于产生医疗数据的输出端口。根据本发明的医疗设备还可以包括适于缠绕并牢固地连接到患者的连接设备，连接到连接设备或与连接设备集成的数据存储设备，其中数据存储设备包括适于接收与患者相关的医疗数据，以及适于发送和接收医疗数据的收发器。