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(54) **METHODS, SYSTEMS, AND PRODUCTS FOR MEASURING HEALTH**

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G06Q 50/00 (2012.01)

A61B 5/00 (2006.01)

(52) **U.S. Cl.**

USPC **705/2; 705/3; 600/300**

(58) **Field of Classification Search**

USPC **705/2, 3; 600/300**
See application file for complete search history.

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Primary Examiner — Sind Phongsvirajati

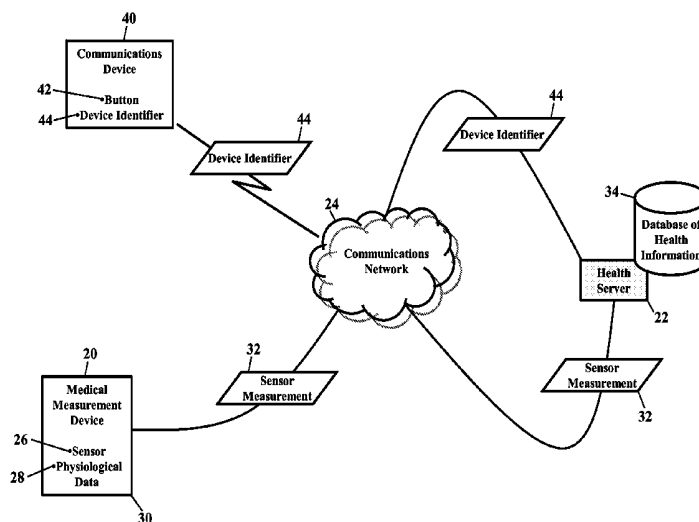
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(57) **ABSTRACT**

Methods, systems, and products measure health data related to a user. A time-stamped device identifier is received that uniquely identifies a communications device. A time-stamped sensor measurement is separately-received. A difference in time between the time-stamped device identifier and the time-stamped sensor measurement is determined. When the difference in time is within a window of time, then the sensor measurement is associated with the device identifier.

20 Claims, 28 Drawing Sheets



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FIG. 1

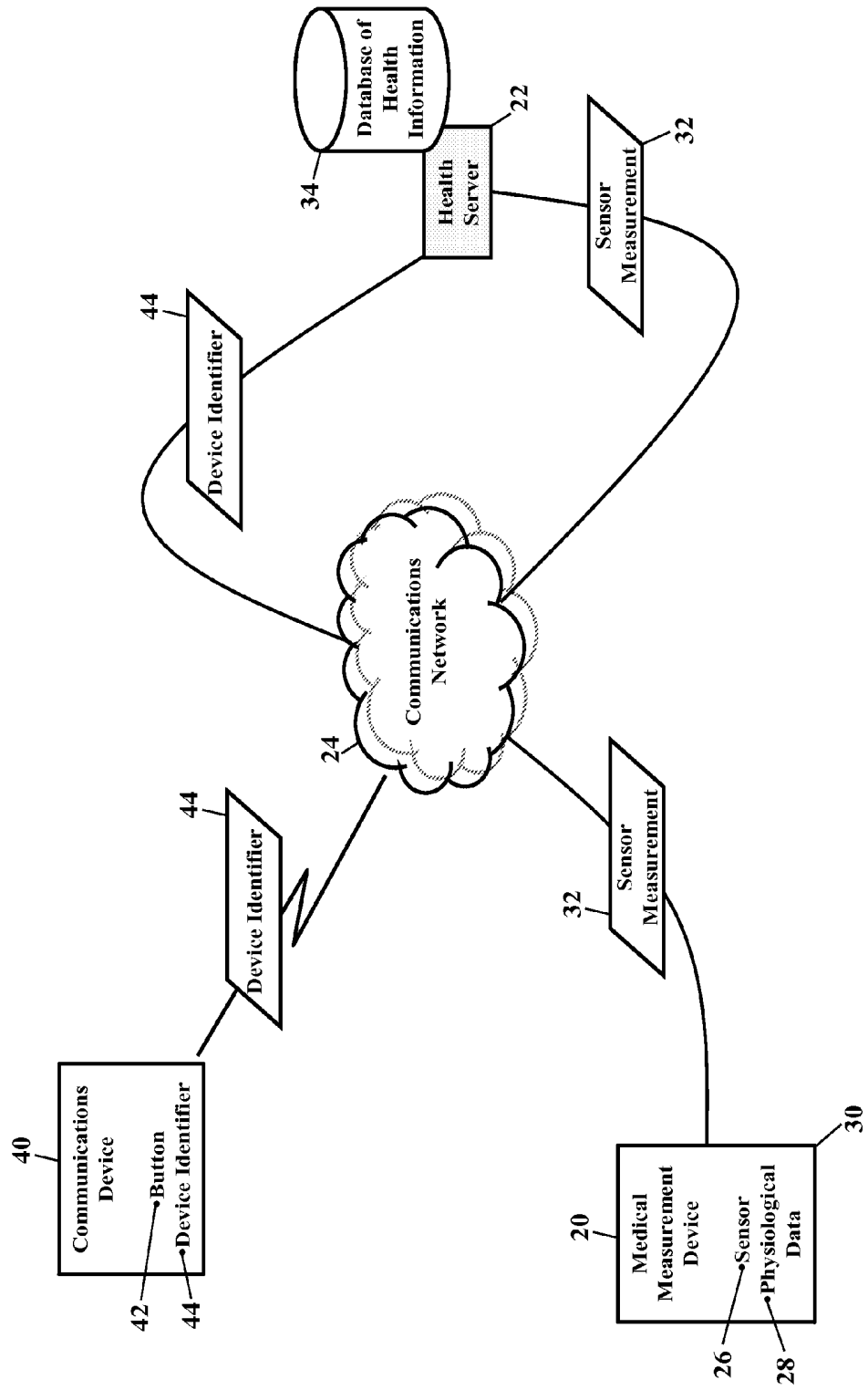


FIG. 3

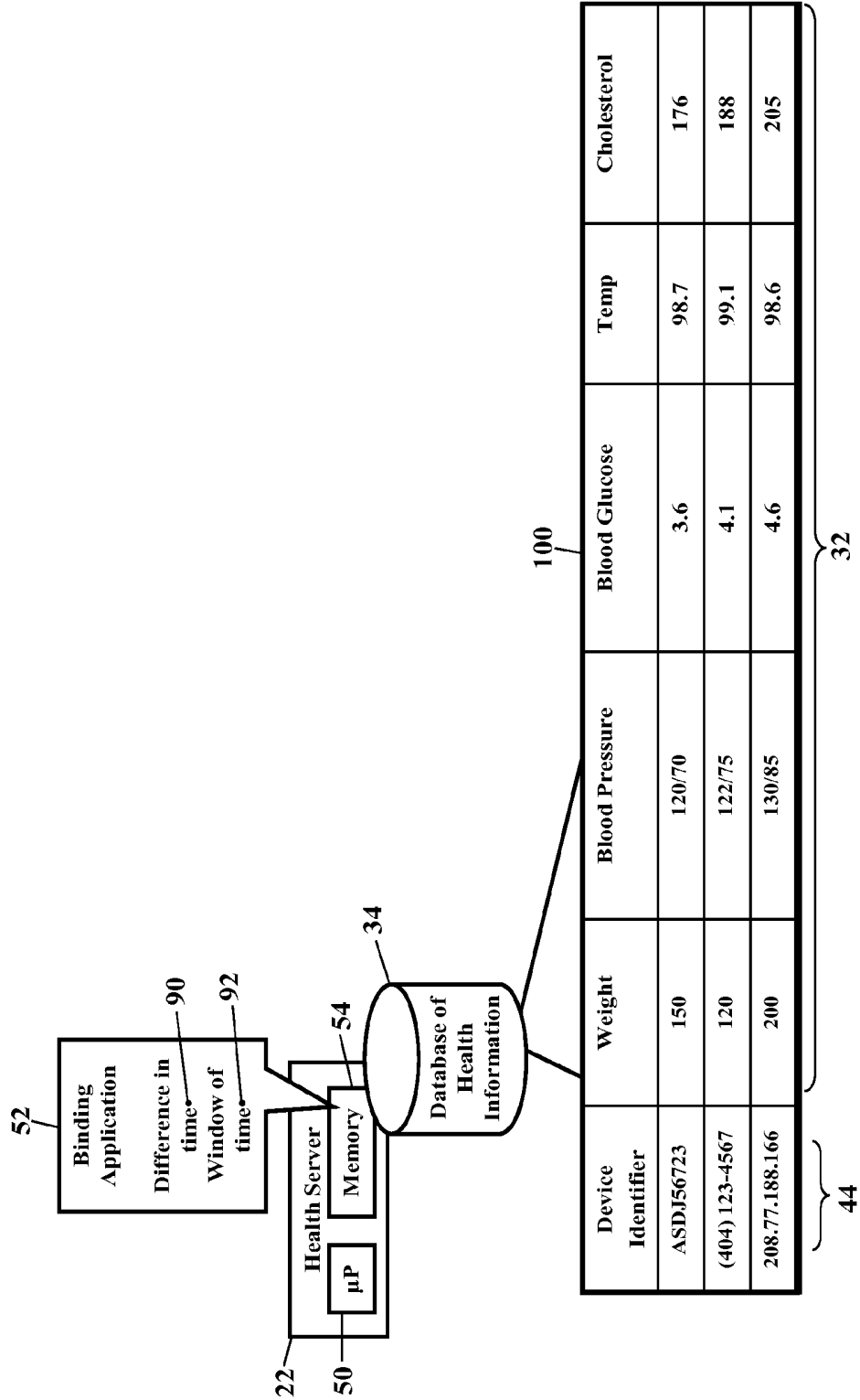


FIG. 4

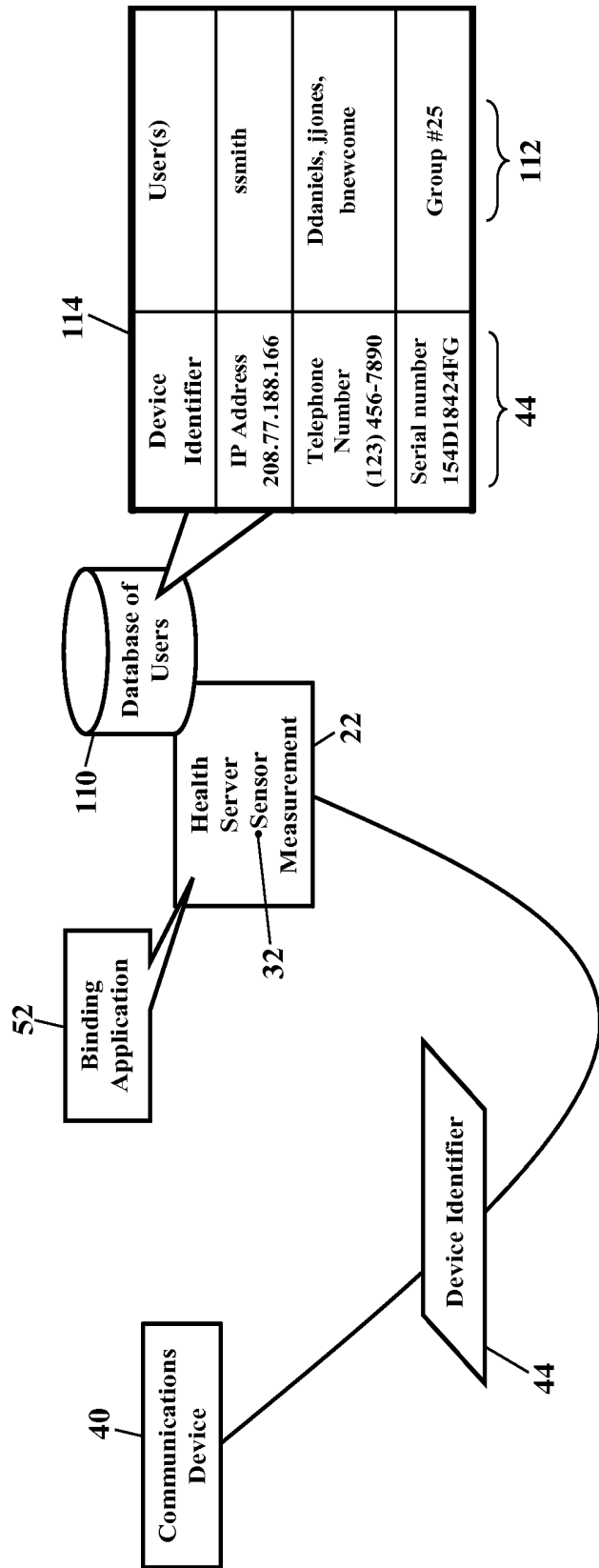


FIG. 5

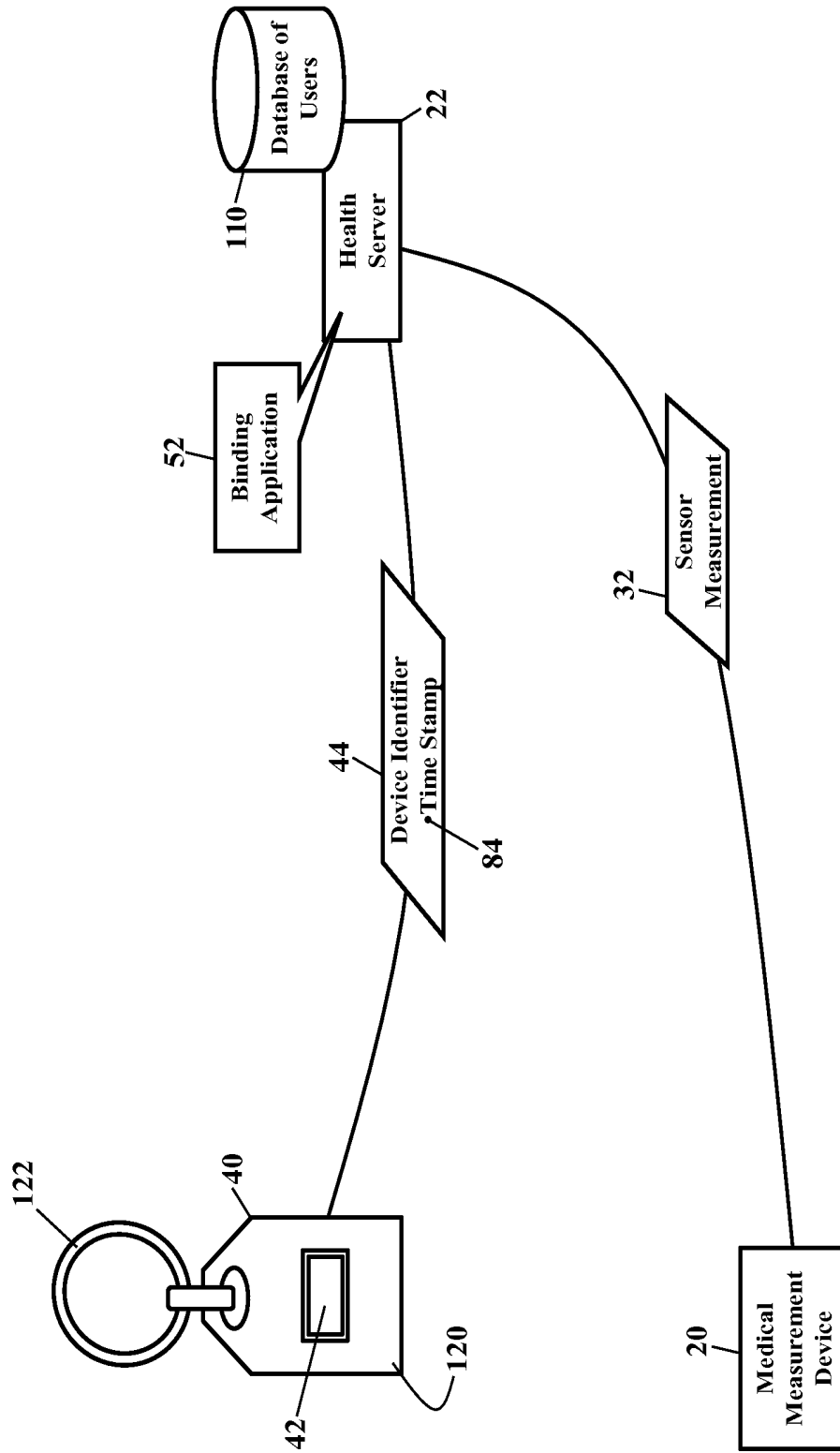


FIG. 6

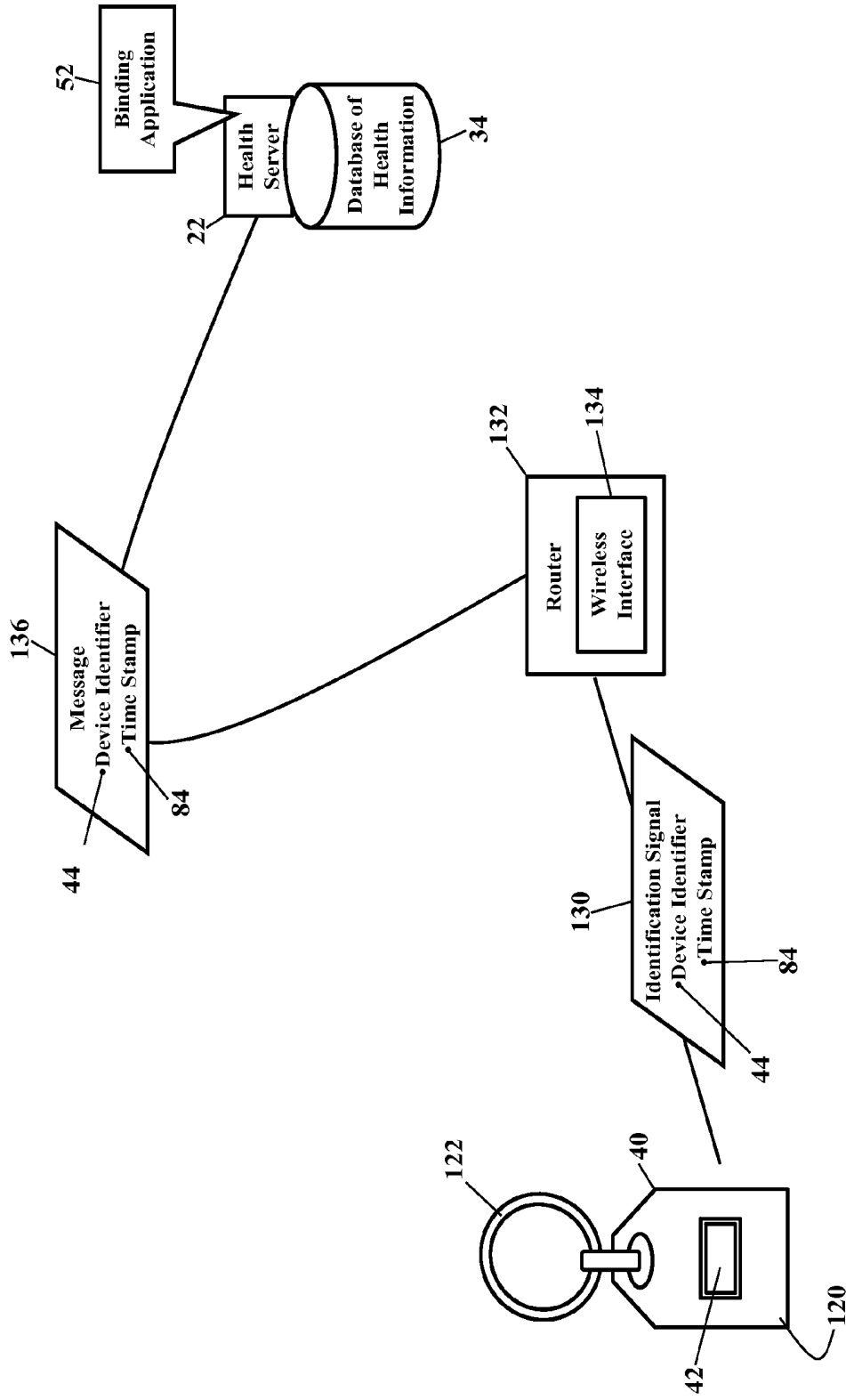


FIG. 7

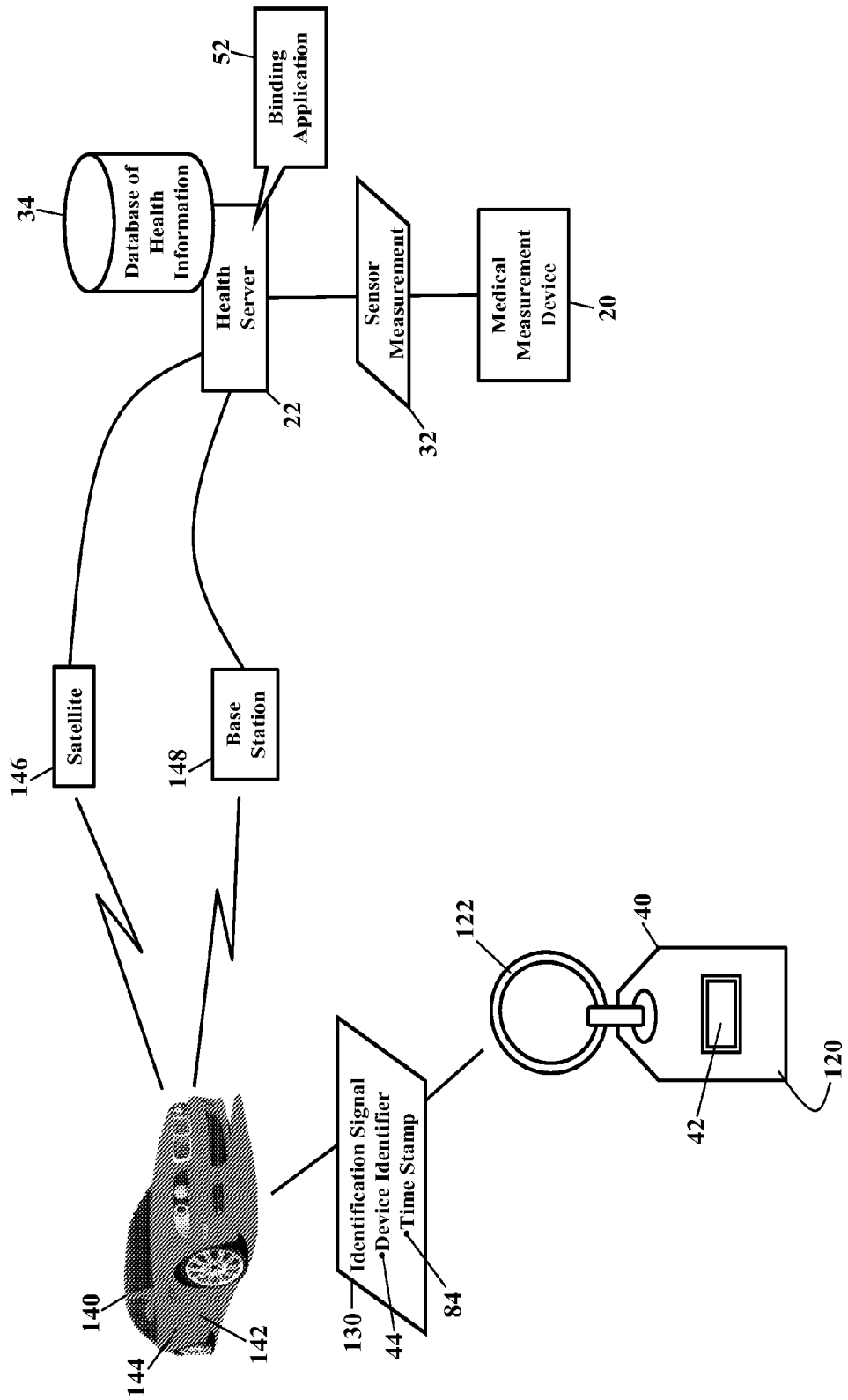


FIG. 8

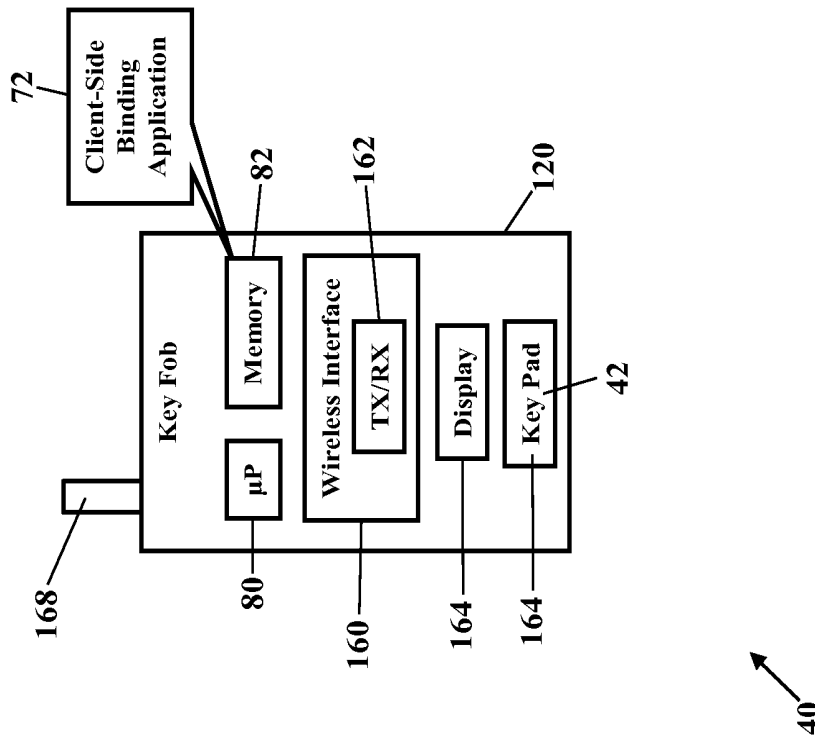


FIG. 9

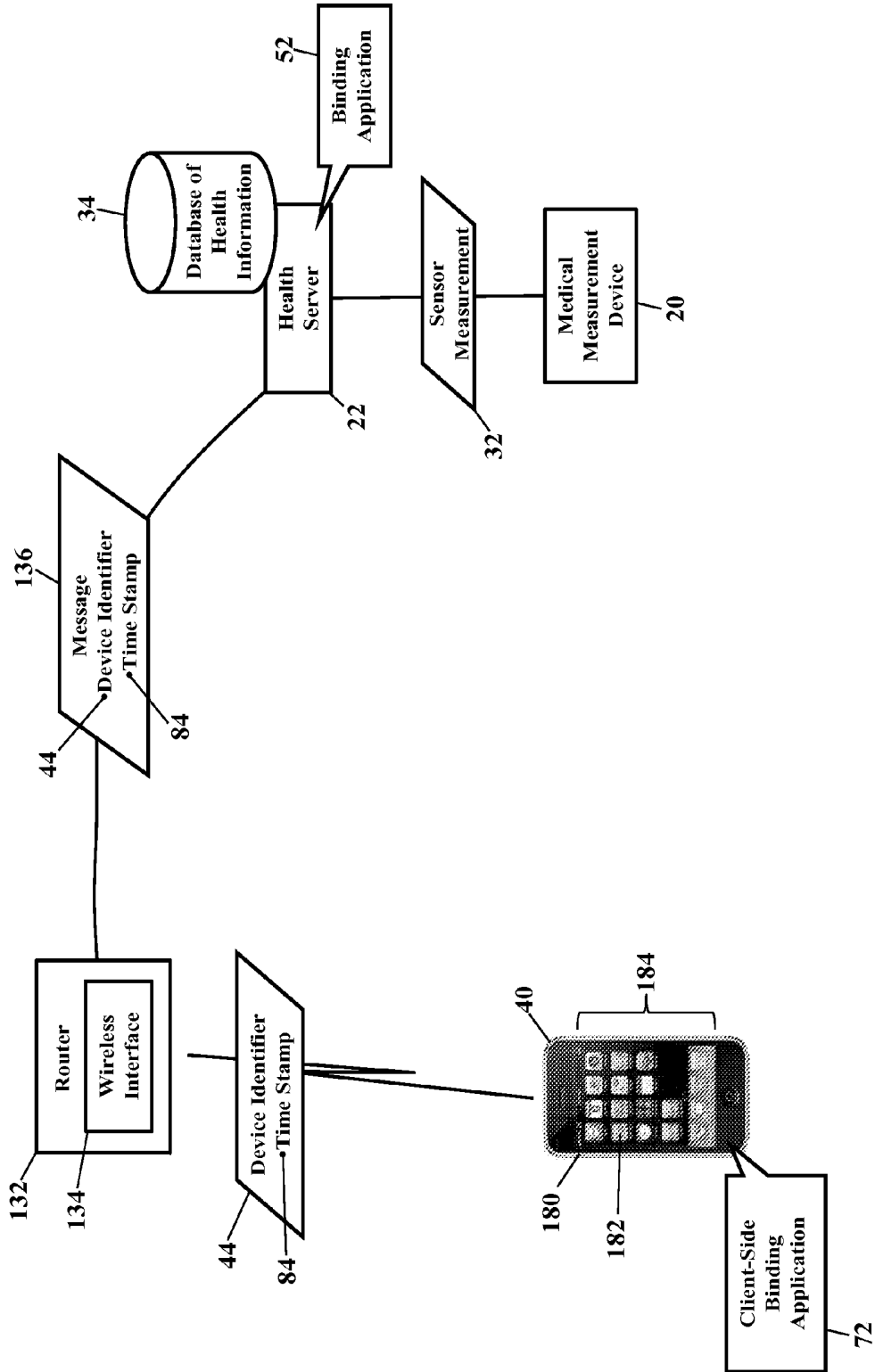


FIG. 10

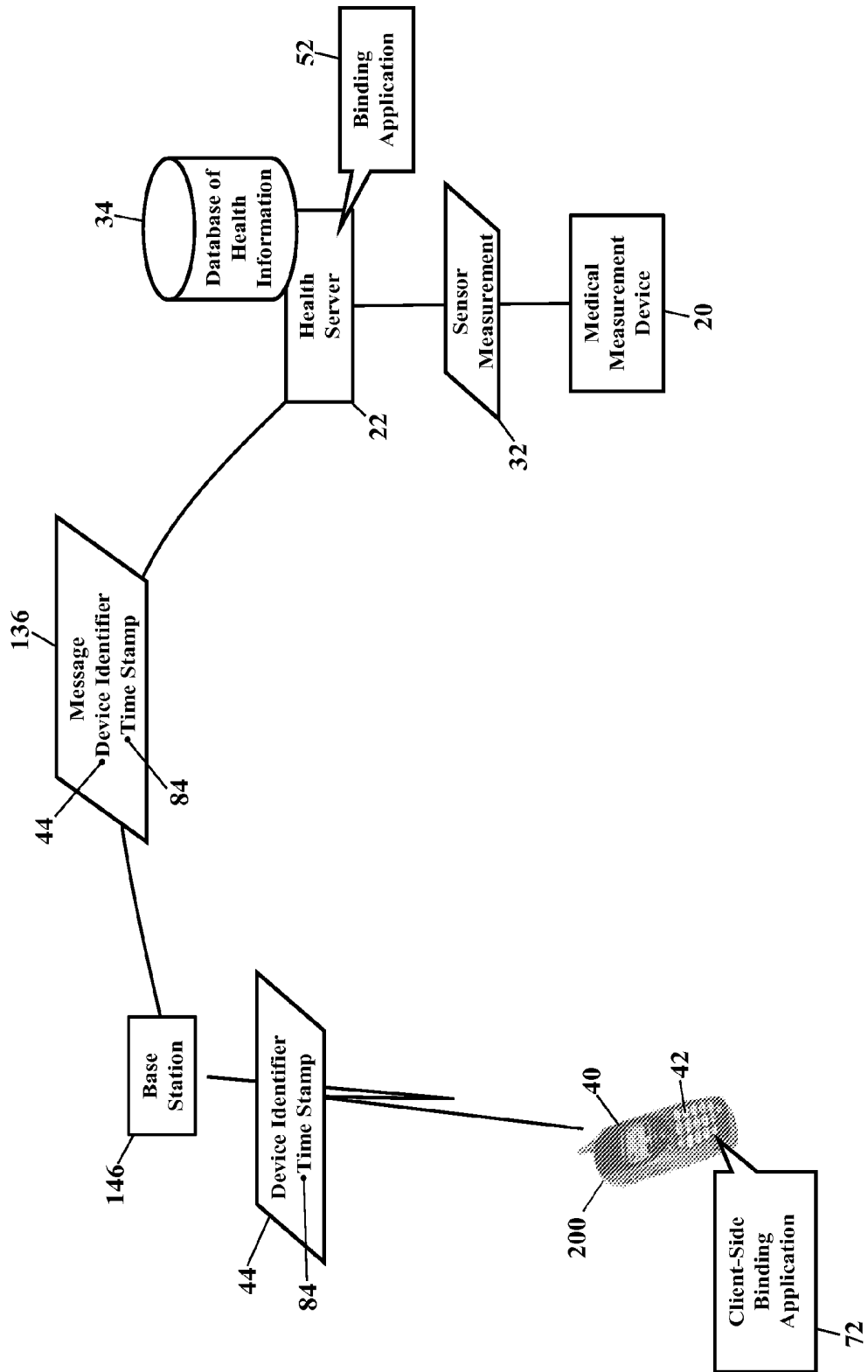


FIG. 11

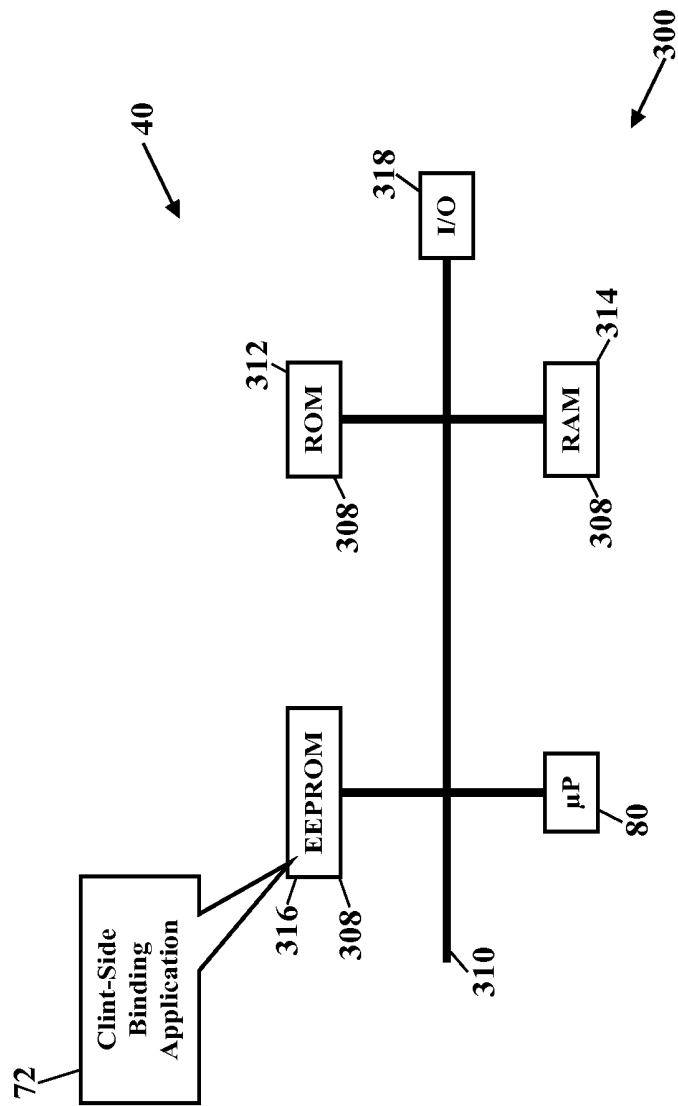


FIG. 12

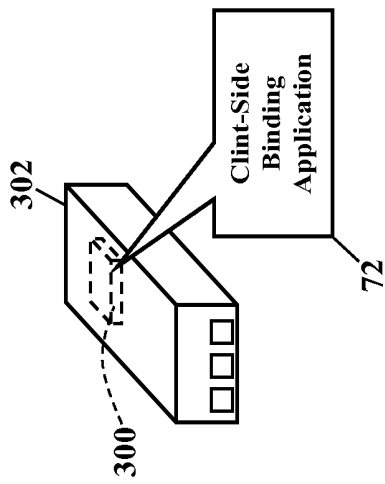


FIG. 13

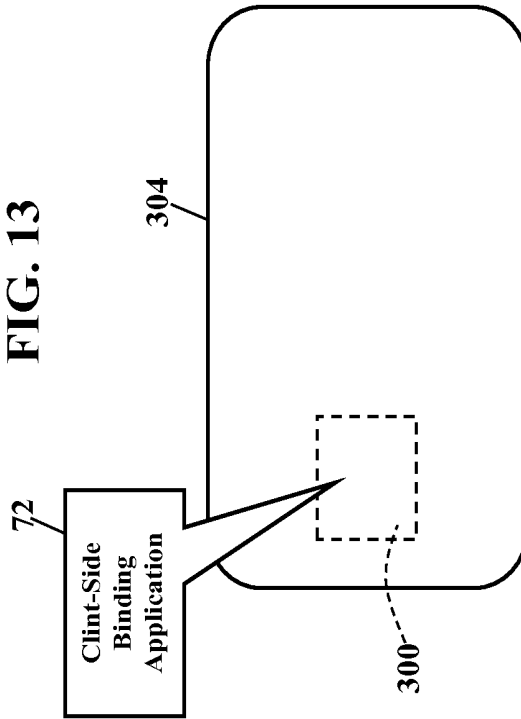


FIG. 14

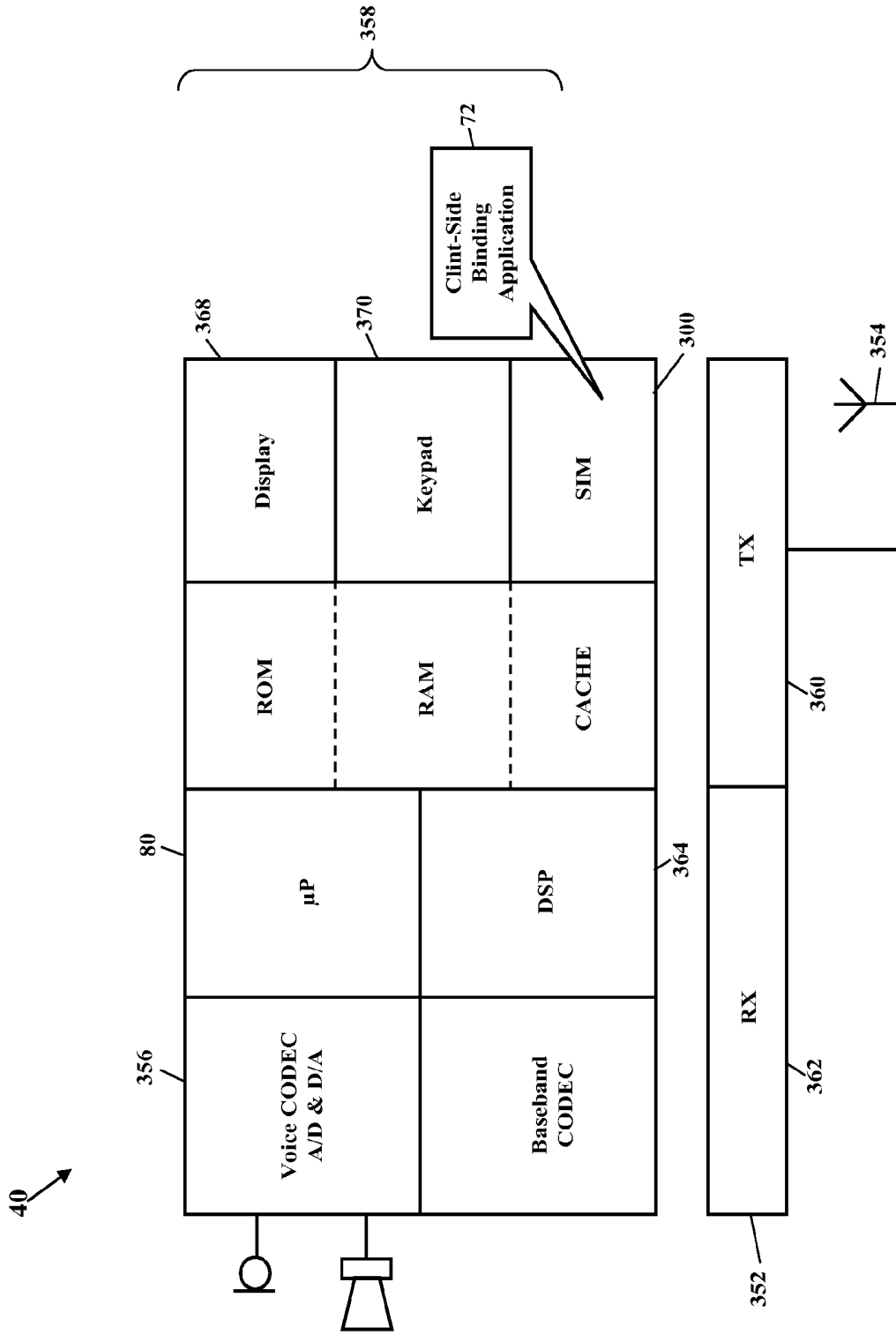


FIG. 15

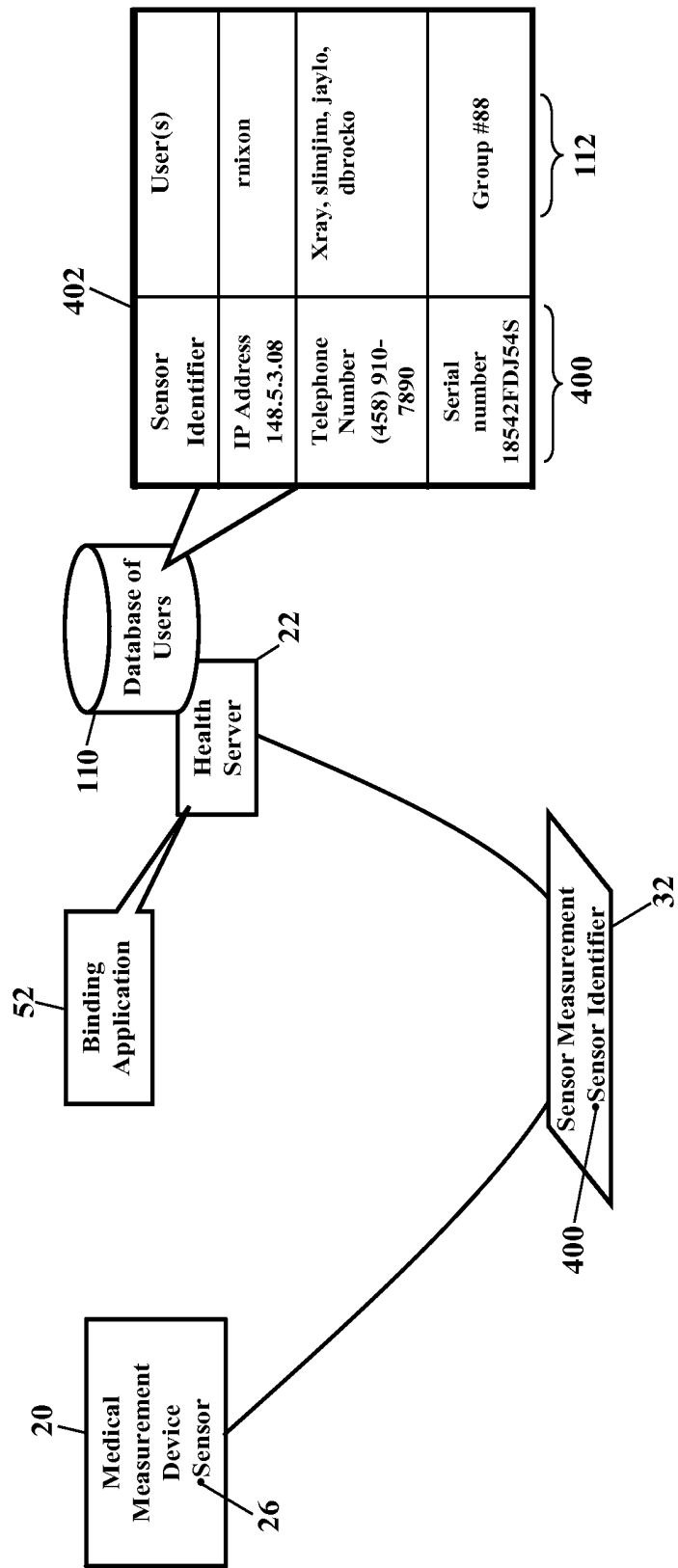


FIG. 16

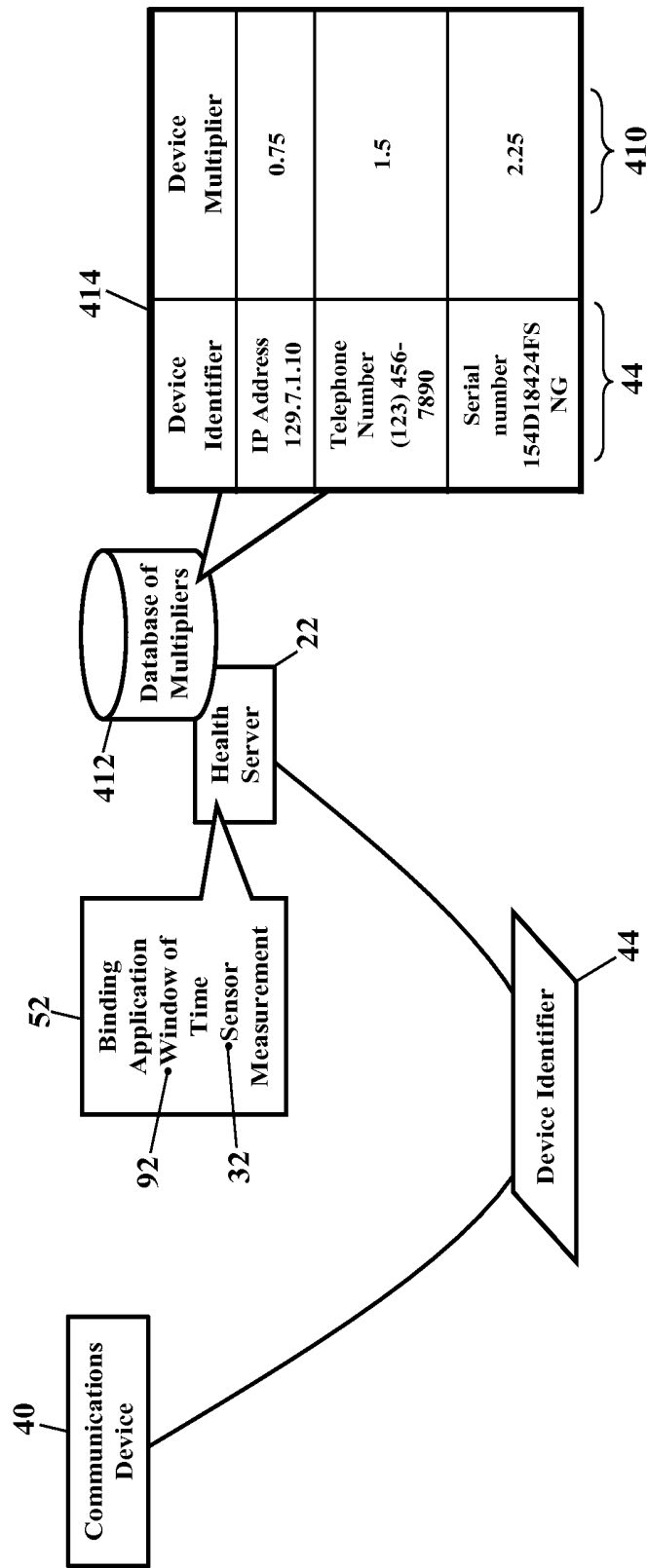


FIG. 17

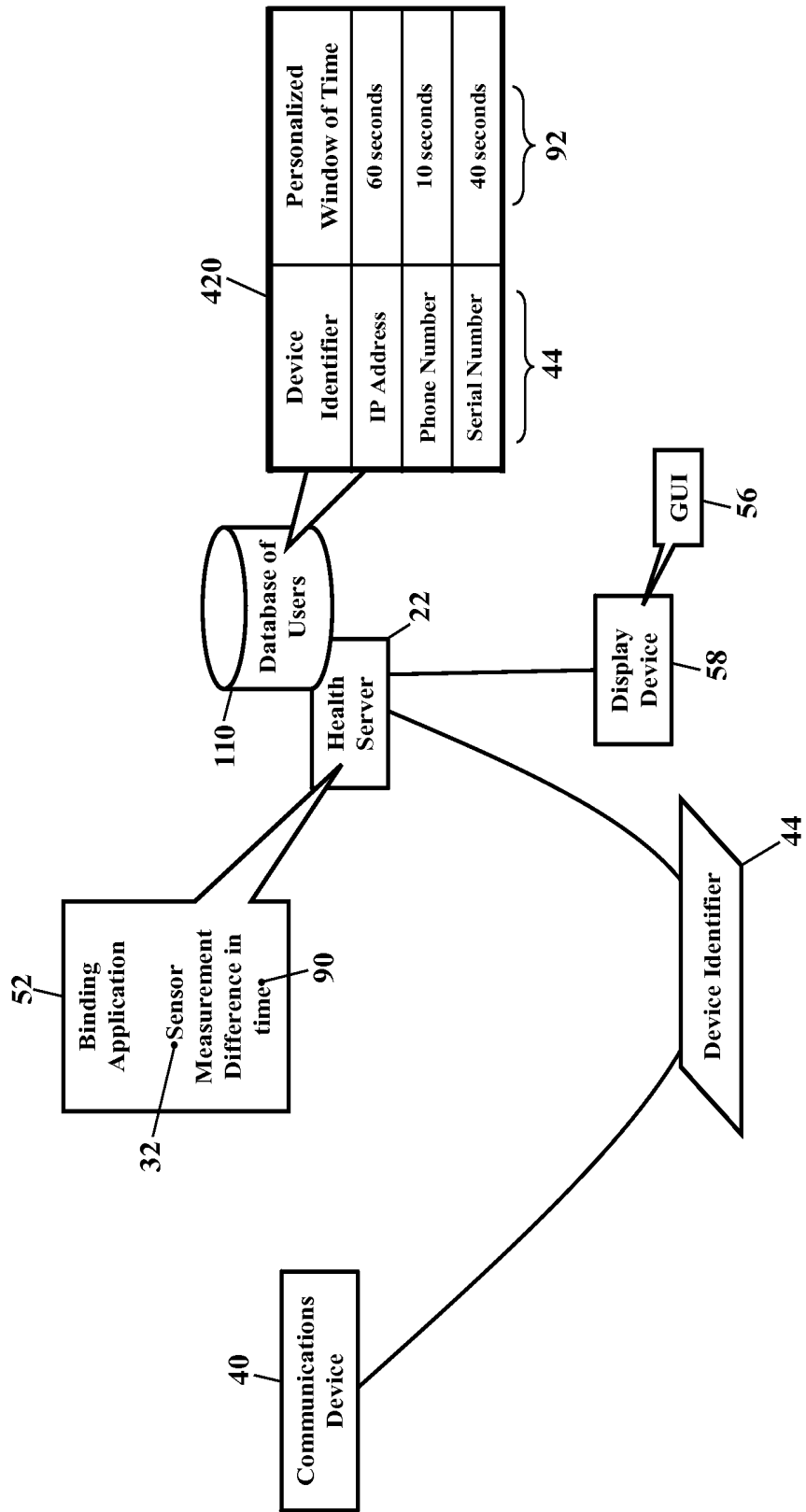


FIG. 18

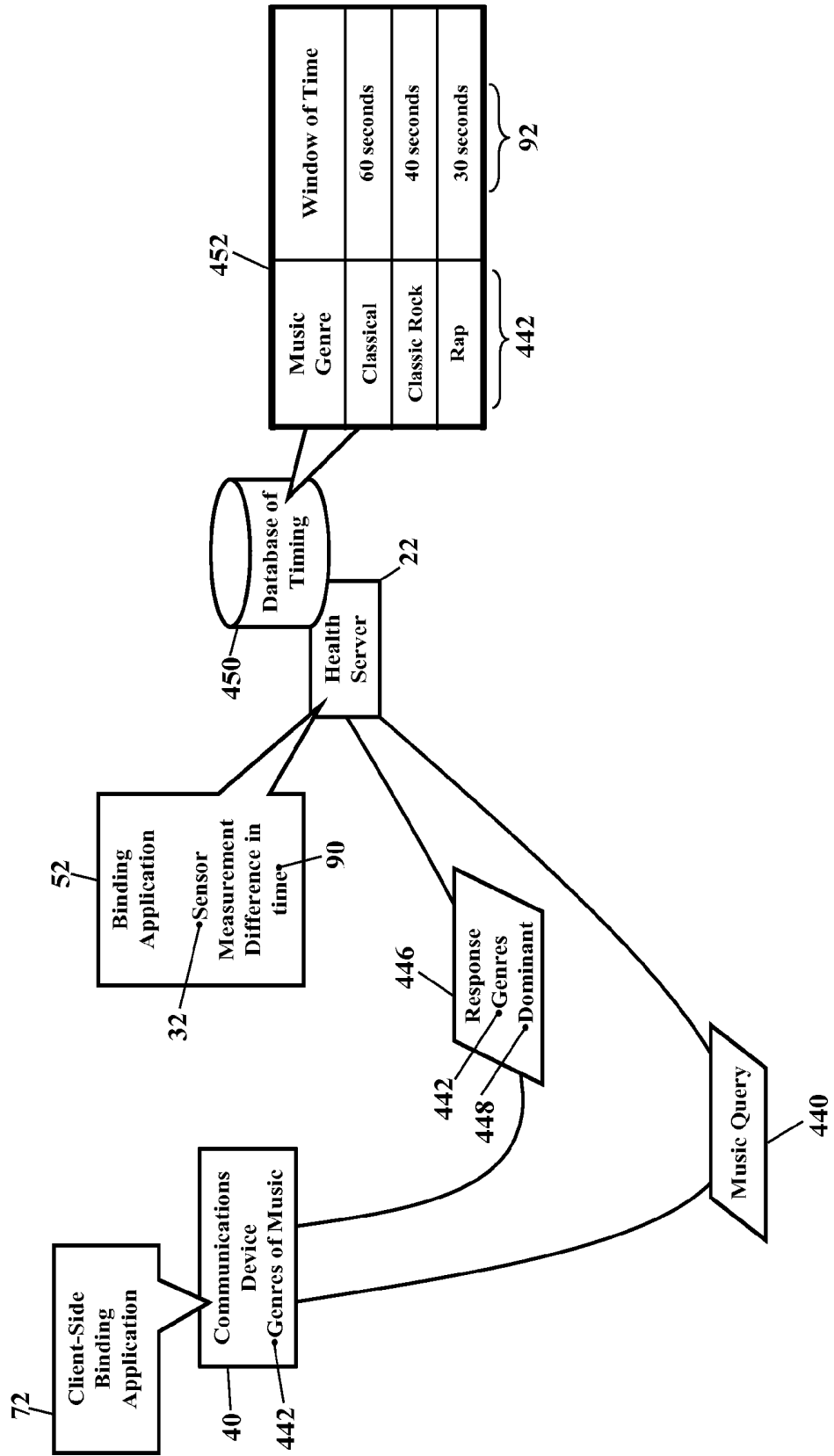


FIG. 19

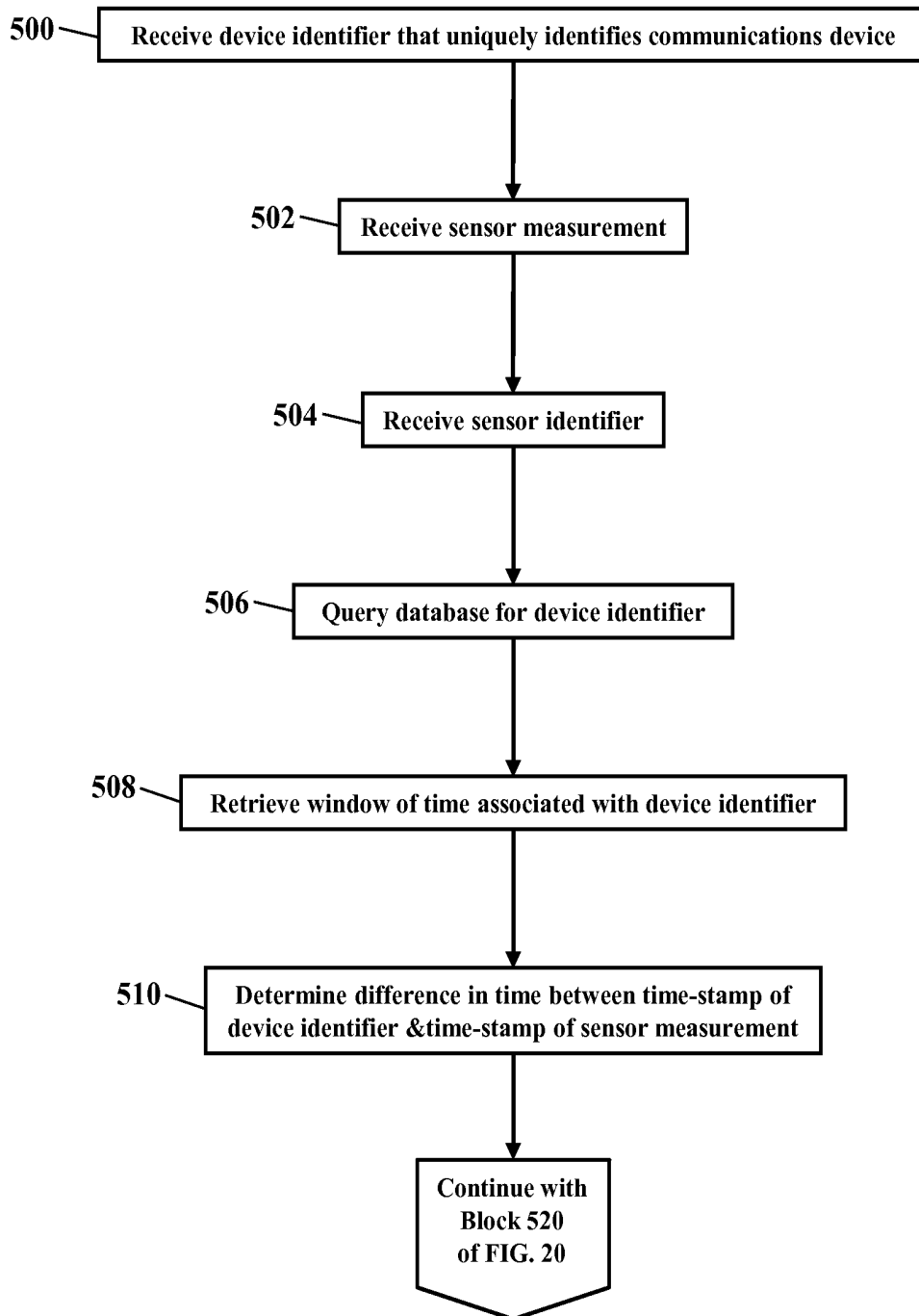


FIG. 20

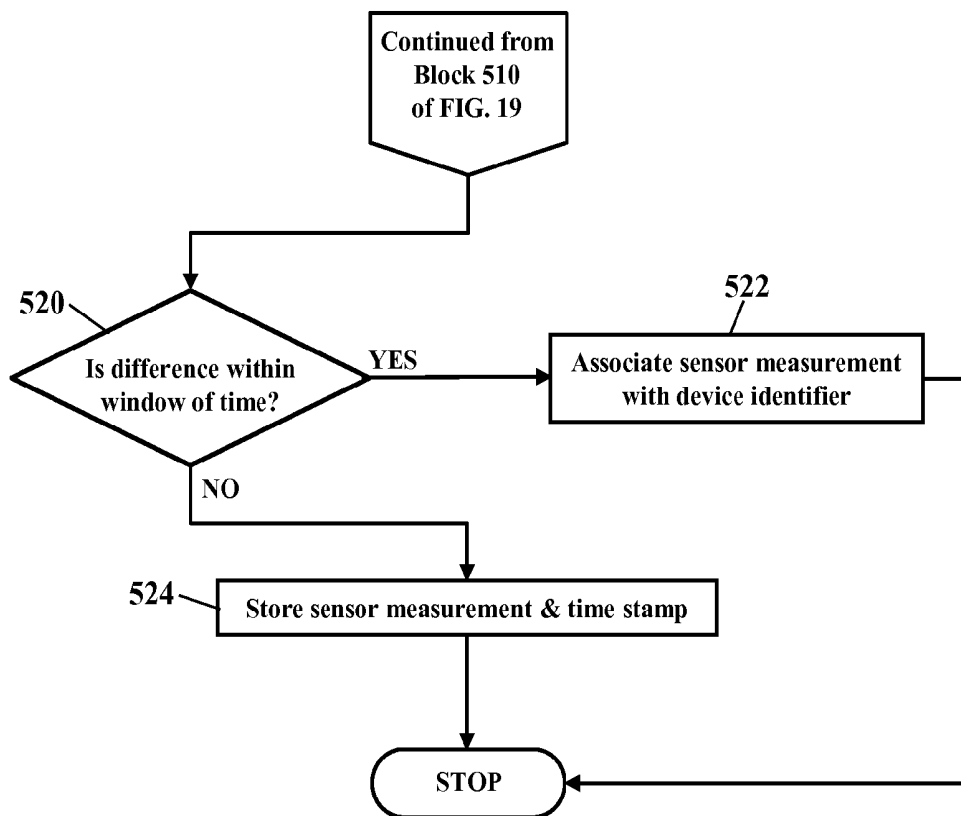


FIG. 21

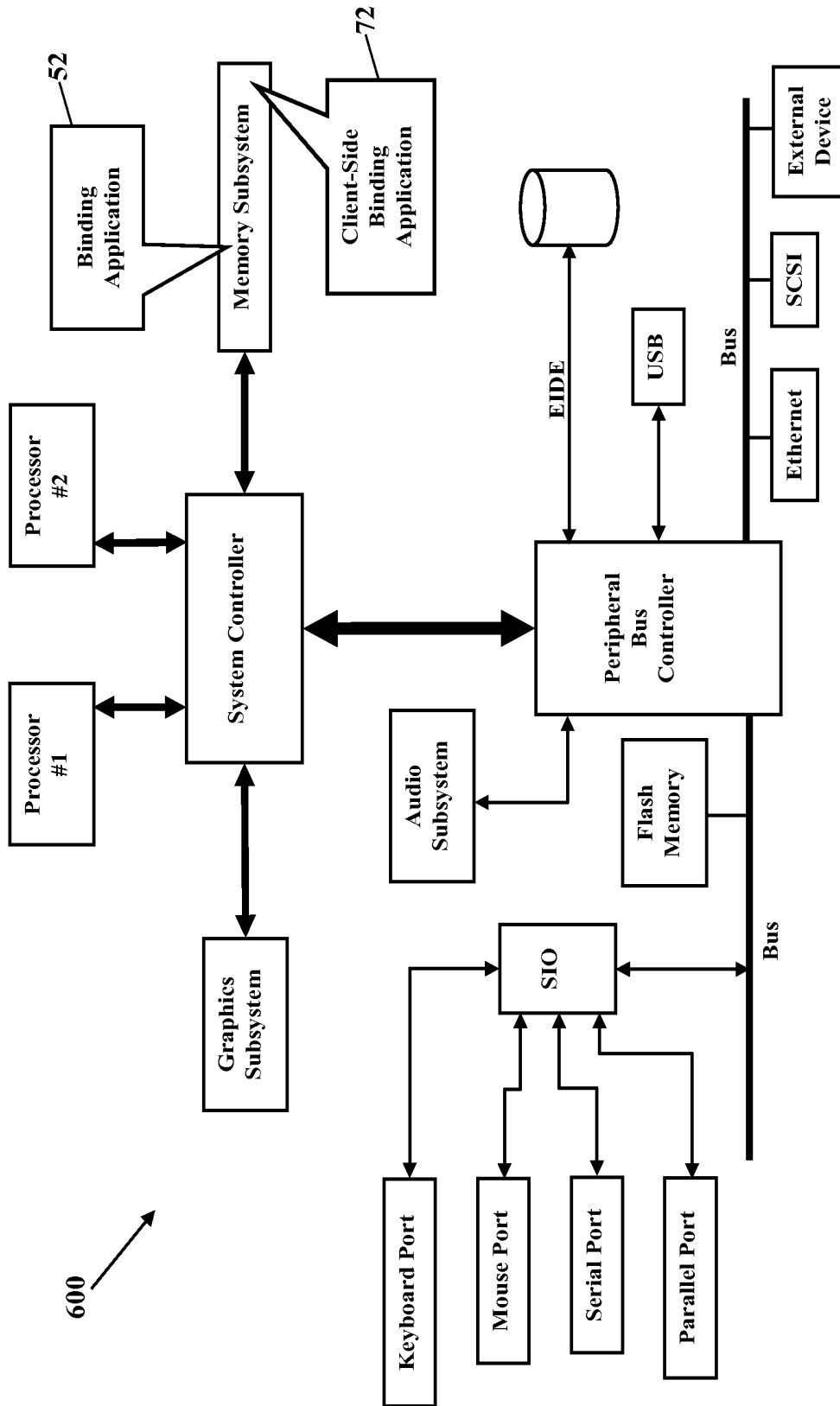


FIG. 22

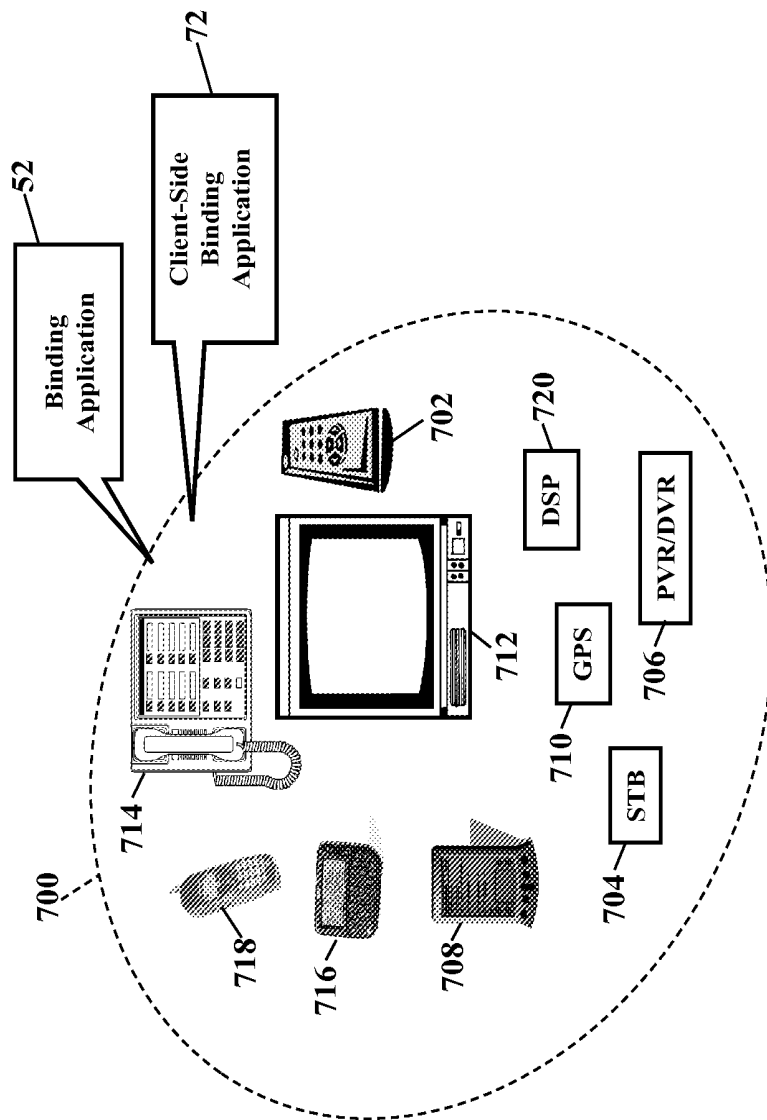


FIG. 23

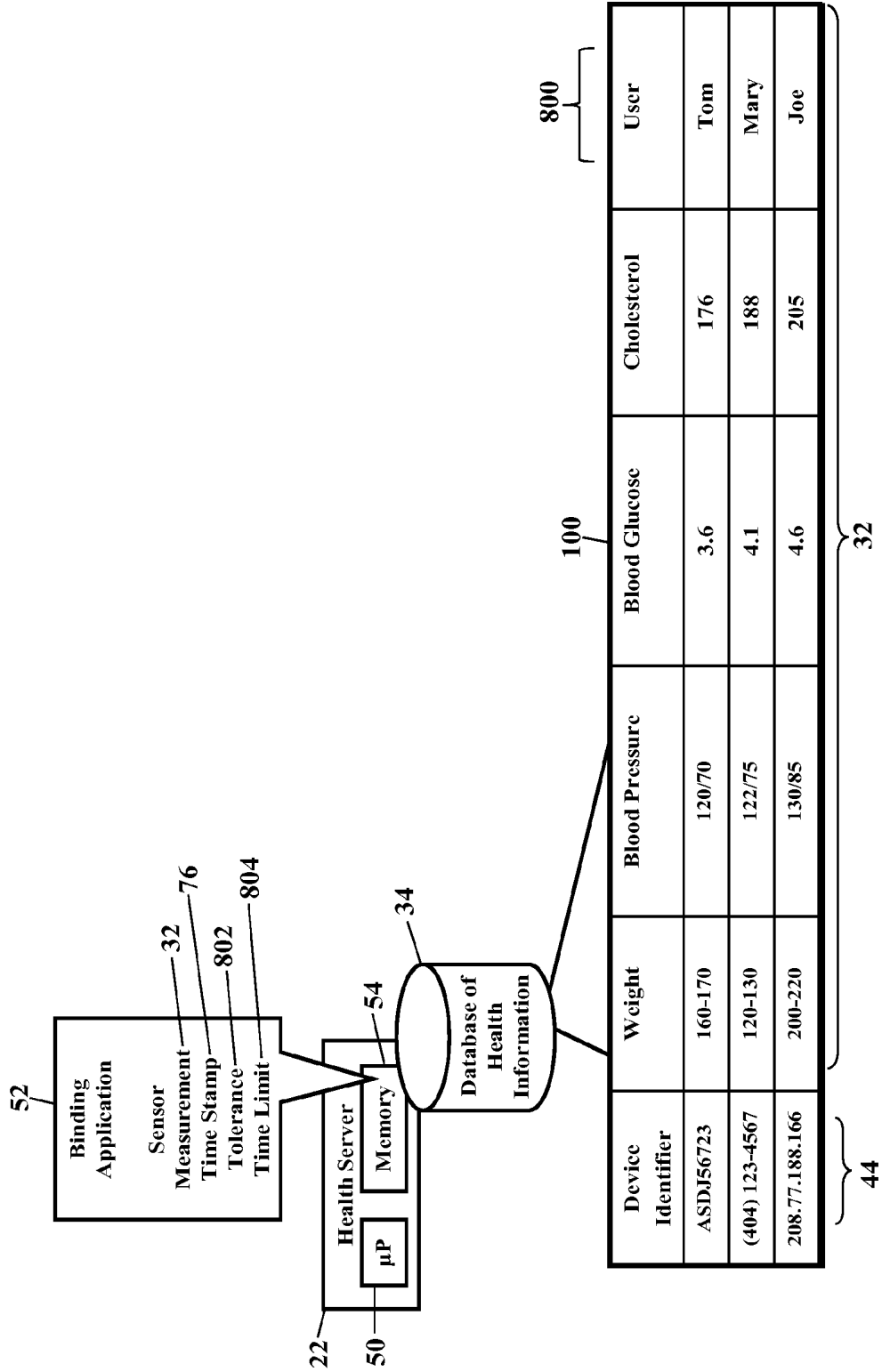


FIG. 24

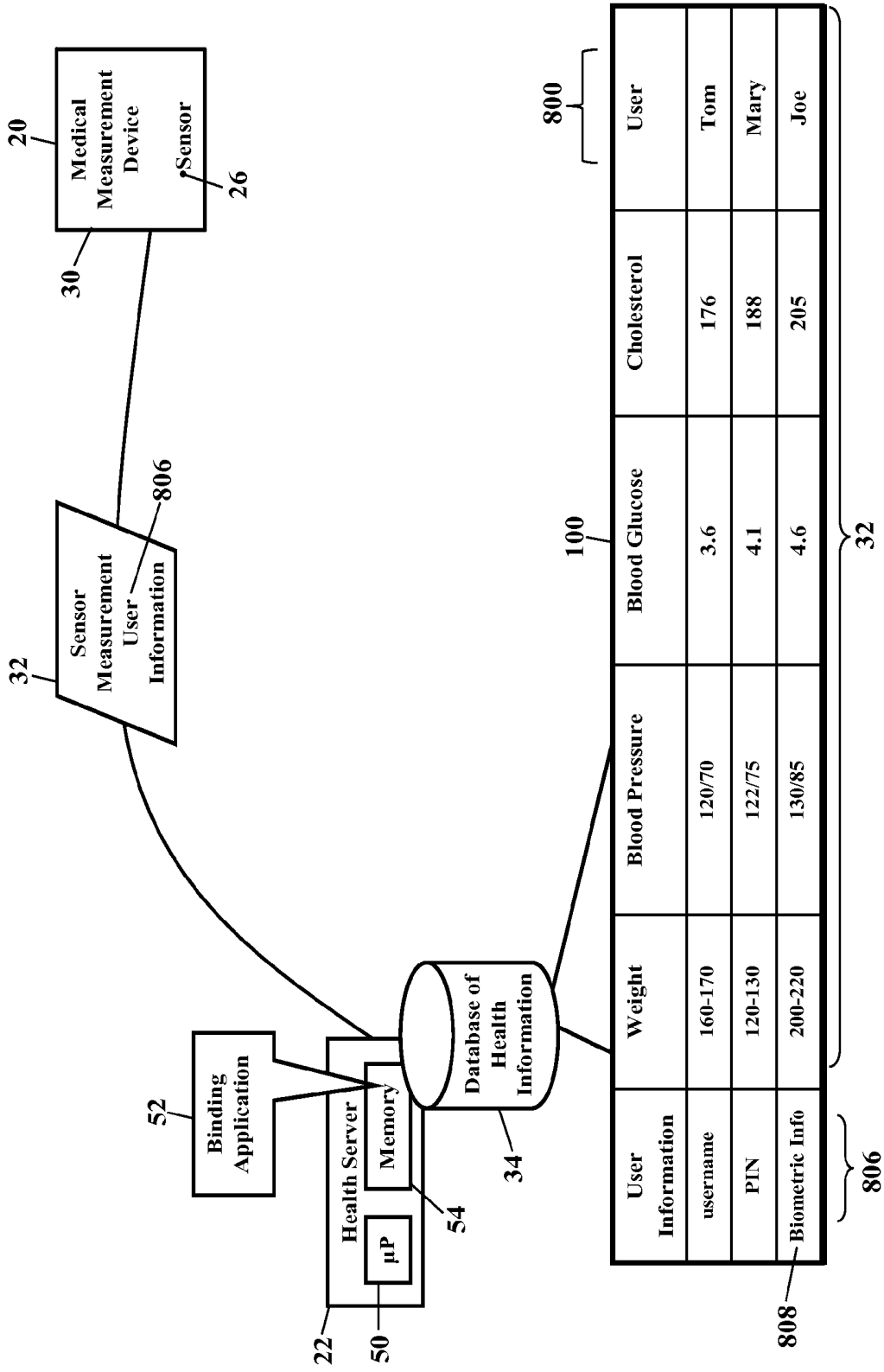


FIG. 25

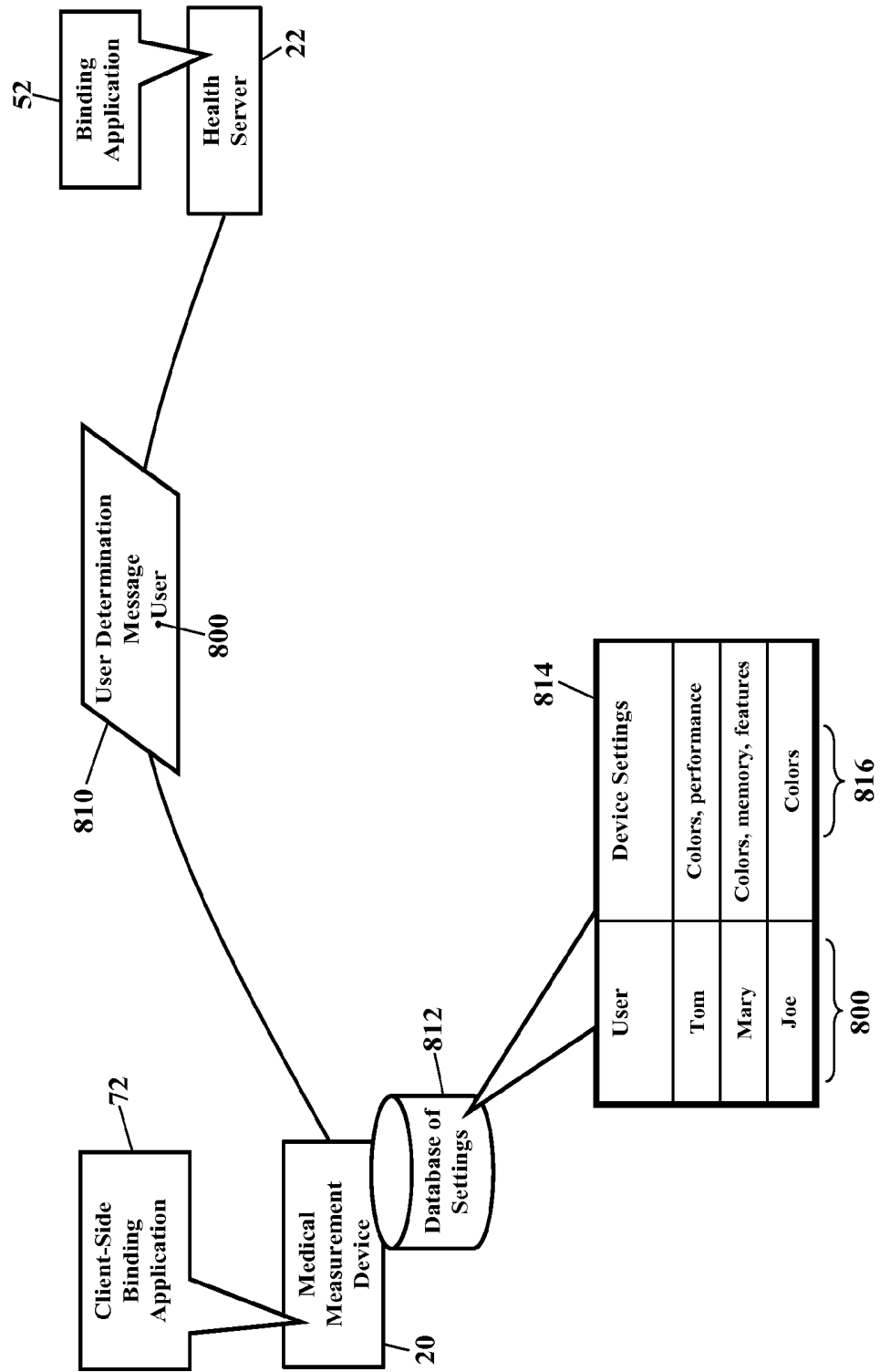


FIG. 26

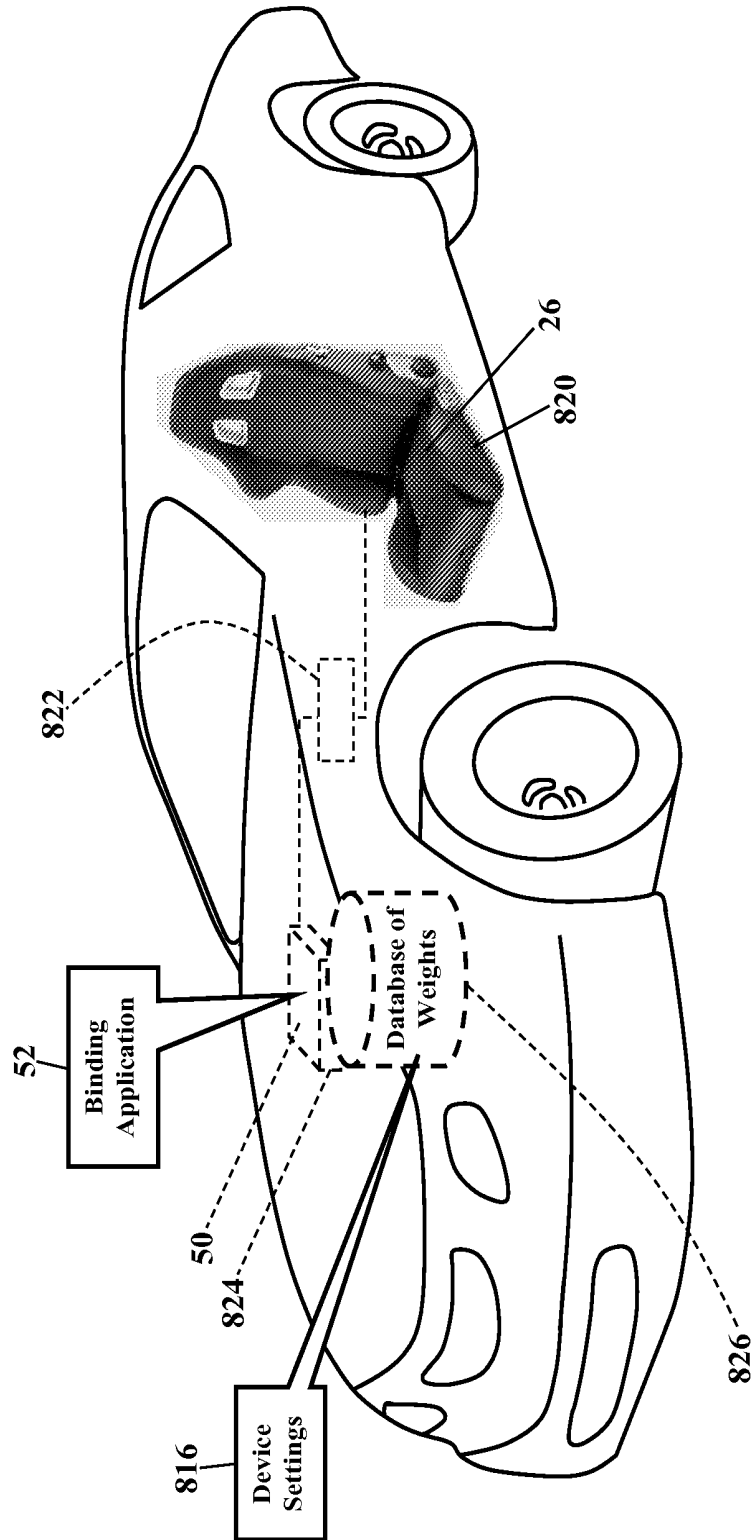


FIG. 27

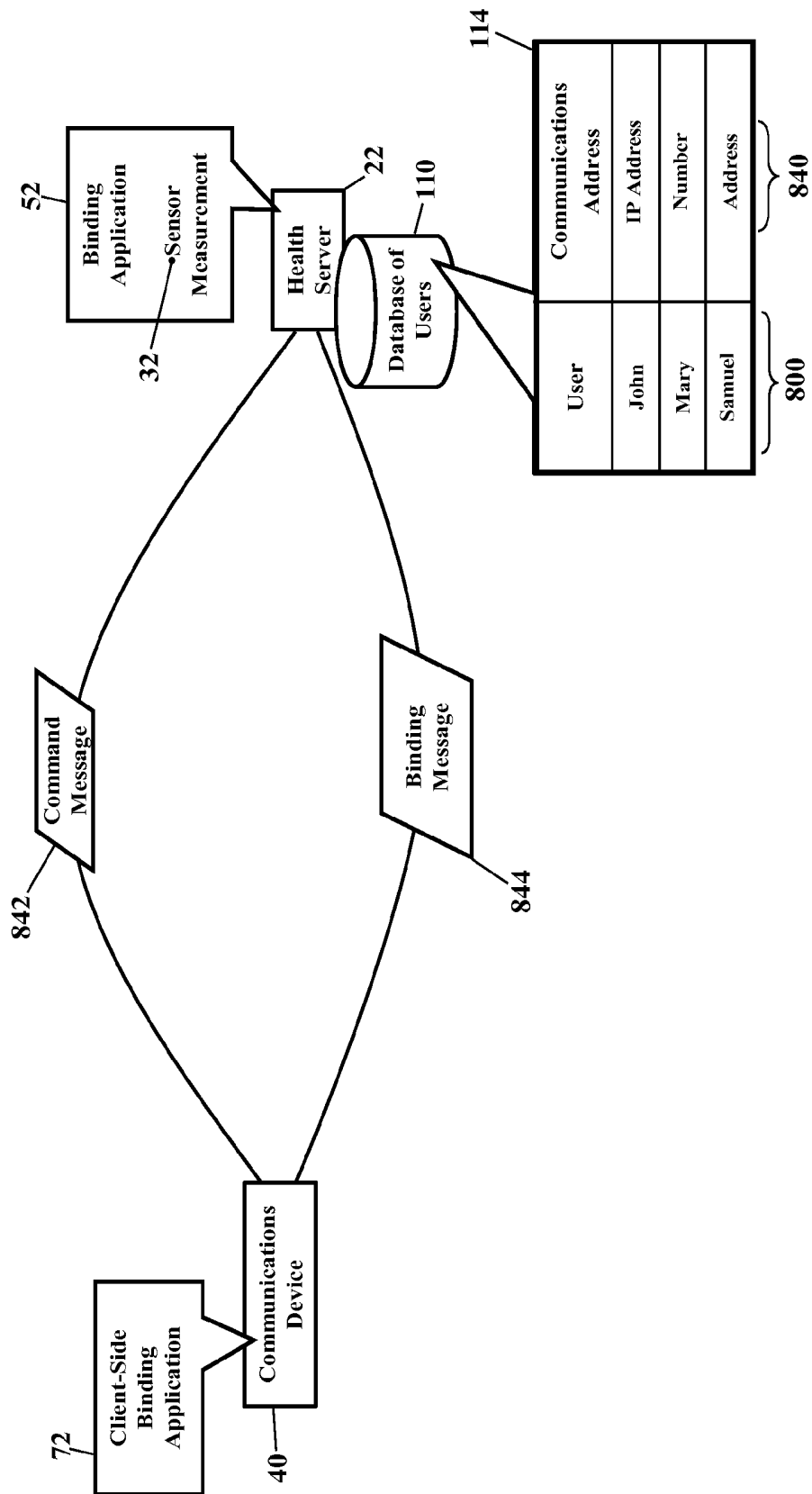


FIG. 28

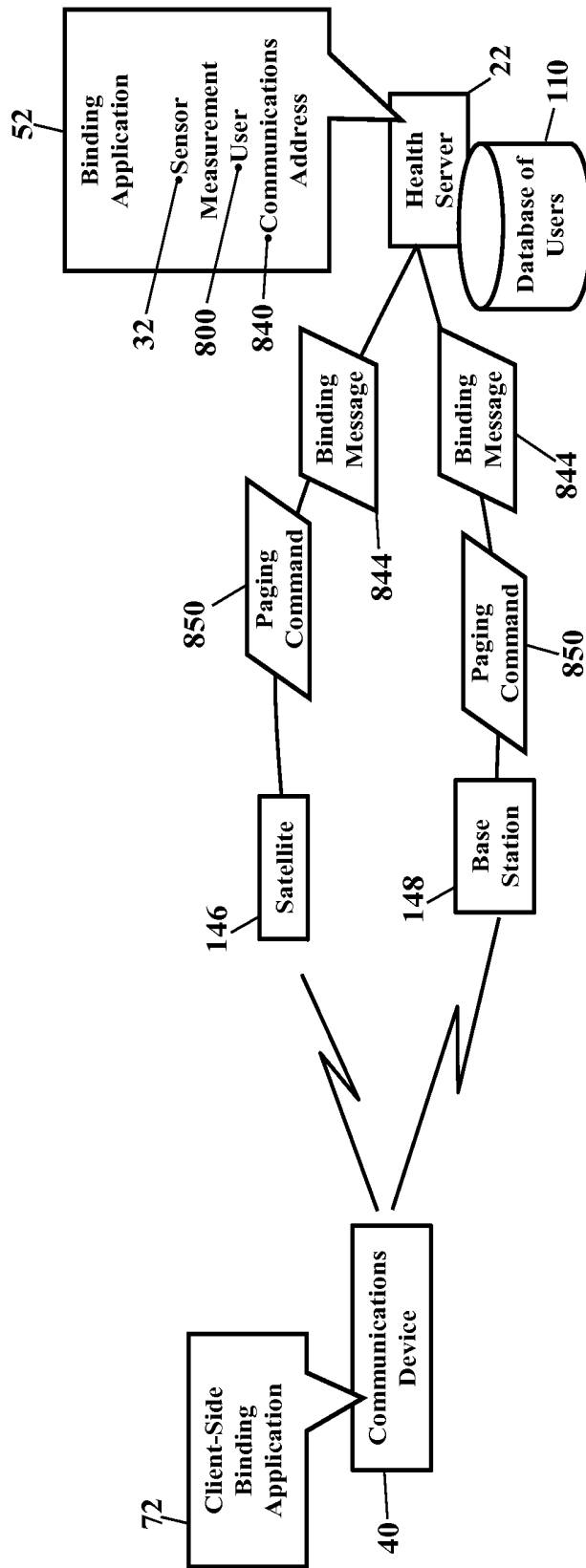
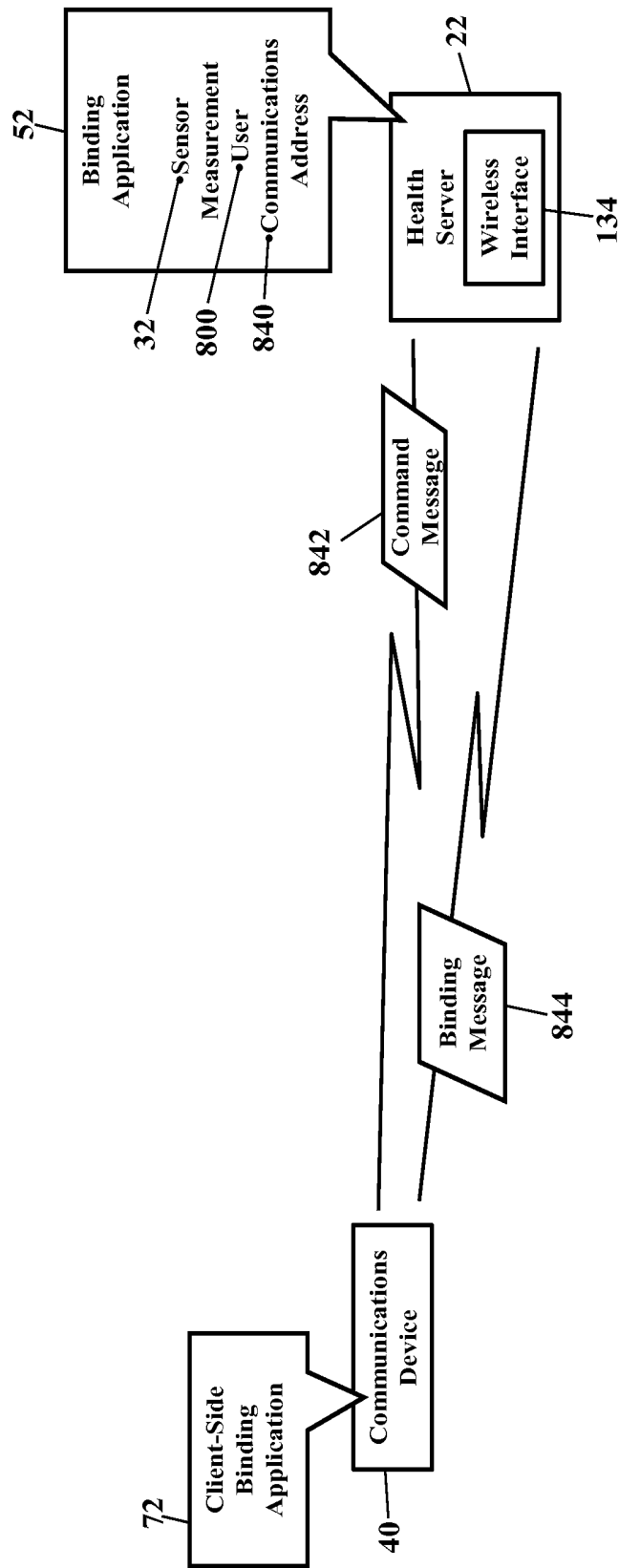


FIG. 29



METHODS, SYSTEMS, AND PRODUCTS FOR MEASURING HEALTH

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BACKGROUND

Exemplary embodiments generally relate to surgery, data processing, electrical communications, and weighing scales and, more particularly, to speech signal processing, speech control, health care management, measurement systems, voice recognition, and speaker identification and verification.

Remote monitoring of health is important. Blood pressure, glucose, weight, and other health factors may be measured from home using a medical measurement device. These health factors may then be communicated to a remote location (such as a doctor's office) for analysis and tracking. A common problem, though, is user binding. Many medical measurement devices are shared between multiple users. A household weight scale, for example, may be shared by multiple members of a household. The members of the household all use the same weight scale to measure their individual weights. If a weight measurement is not bound to the correct member of the household, the weight measurement may be erroneously associated with the wrong user.

BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWINGS

The features, aspects, and advantages of the exemplary embodiments are better understood when the following Detailed Description is read with reference to the accompanying drawings, wherein:

FIG. 1 is a simplified schematic illustrating an environment in which exemplary embodiments may be implemented;

FIGS. 2 and 3 are more detailed schematics illustrating the operating environment, according to exemplary embodiments;

FIG. 4 is a schematic illustrating a device identifier, according to exemplary embodiments;

FIGS. 5-8 are schematics illustrating a key fob, according to exemplary embodiments;

FIG. 9 is a schematic illustrating personal digital assistant, according to exemplary embodiments;

FIG. 10 is schematic illustrating a cellular phone, according to exemplary embodiments;

FIGS. 11-14 are schematics a communications device, according to exemplary embodiments;

FIG. 15 is a schematic illustrating a sensor identifier, according to exemplary embodiments;

FIG. 16 is a detailed schematic illustrating multipliers, according to exemplary embodiments;

FIGS. 17-18 are schematics illustrating personalized windows of time, according to exemplary embodiments;

FIGS. 19-20 are flowcharts illustrating a method of measuring health, according to exemplary embodiments;

FIG. 21 is a schematic illustrating a processor-controlled device, according to exemplary embodiments;

FIG. 22 depicts other possible operating environments for additional aspects of the exemplary embodiments; and

FIGS. 23-29 are schematics illustrating user binding, according to still more exemplary embodiments.

DETAILED DESCRIPTION

The exemplary embodiments will now be described more fully hereinafter with reference to the accompanying drawings. The exemplary embodiments may, however, be embodied in many different forms and should not be construed as limited to the embodiments set forth herein. These embodiments are provided so that this disclosure will be thorough and complete and will fully convey the exemplary embodiments to those of ordinary skill in the art. Moreover, all statements herein reciting embodiments, as well as specific examples thereof, are intended to encompass both structural and functional equivalents thereof. Additionally, it is intended that such equivalents include both currently known equivalents as well as equivalents developed in the future (i.e., any elements developed that perform the same function, regardless of structure).

Thus, for example, it will be appreciated by those of ordinary skill in the art that the diagrams, schematics, illustrations, and the like represent conceptual views or processes illustrating the exemplary embodiments. The functions of the various elements shown in the figures may be provided through the use of dedicated hardware as well as hardware capable of executing associated software. Those of ordinary skill in the art further understand that the exemplary hardware, software, processes, methods, and/or operating systems described herein are for illustrative purposes and, thus, are not intended to be limited to any particular named manufacturer.

As used herein, the singular forms "a," "an," and "the" are intended to include the plural forms as well, unless expressly stated otherwise. It will be further understood that the terms "includes," "comprises," "including," and/or "comprising," when used in this specification, specify the presence of stated features, integers, steps, operations, elements, and/or components, but do not preclude the presence or addition of one or more other features, integers, steps, operations, elements, components, and/or groups thereof. It will be understood that when an element is referred to as being "connected" or "coupled" to another element, it can be directly connected or coupled to the other element or intervening elements may be present. Furthermore, "connected" or "coupled" as used herein may include wirelessly connected or coupled. As used herein, the term "and/or" includes any and all combinations of one or more of the associated listed items.

It will also be understood that, although the terms first, second, etc. may be used herein to describe various elements, these elements should not be limited by these terms. These terms are only used to distinguish one element from another. For example, a first device could be termed a second device, and, similarly, a second device could be termed a first device without departing from the teachings of the disclosure.

FIG. 1 is a simplified schematic illustrating an environment in which exemplary embodiments may be implemented. FIG. 1 illustrates a client-server network architecture that remotely monitors a user's health factors. A medical measurement device 20 communicates with a health server 22 via a communications network 24. The medical measurement device 20 has a sensor 26 that measures any physiological data 28 related to a user's health condition. The medical measurement device 20 and/or the sensor 26 may measure, for example, the user's weight, blood pressure, temperature, pulse rate, glucose level, height, cholesterol level, respiratory

rate, or any other information or data related to the user's physiological condition. For simplicity, though, the medical measurement device 20 will be described as a bathroom weight scale 30. The sensor 26 may thus measure the user's weight. The user steps on a footpad to obtain a weight reading. When the sensor 26 measures the user's weight, the medical measurement device 20 sends a sensor measurement 32 to the health server 22. The health server 22 stores the sensor measurement 32 in a database 34 of health information.

The sensor measurement 32, though, should be bound to the user. Even though the sensor measurement 32 has been received at the health server 22, the sensor measurement 32 must be associated to the correct user. Because the medical measurement device 20 is often shared among many people, the sensor measurement 32 must be correctly identified with the corresponding user. The bathroom weight scale 30, for example, is usually shared by multiple members of a household. The household members all use the same weight scale to measure their individual weights. If a weight measurement is confused with the wrong user, the health server 22 may incorrectly associate the sensor measurement 32 with the wrong user.

Exemplary embodiments, then, bind the sensor measurement 32 to the correct user. As FIG. 1 illustrates, a separate communications device 40 also communicates with the health server 22 via the communications network 24. As the medical measurement device 20 obtains the sensor measurement 32, the user also makes some input to the communications device 40. The input, for example may be pushing a button 42 on the communications device 40. The communications device 40 wirelessly or physically communicates with the communications network 24 and is capable of receiving some input or indication from the user. The communications device 40 sends a device identifier 44 to an address in the communications network 24 that is associated with the health server 22. The device identifier 44 uniquely identifies the communications device 40 associated with the user. When the health server 22 receives the device identifier 44, the health server 22 may bind or associate the sensor measurement 32 to the device identifier 44 of the user's communications device 40. The health server 22 may thus store the sensor measurement 32 in the database 34 of health information, and the sensor measurement 32 is associated or mapped to the device identifier 44 of the user's communications device 40.

The binding is further explained using the bathroom weight scale 30. As the above paragraphs explained, the medical measurement device 20 may be the bathroom weight scale 30 that measure's the user's weight. When the user steps on the bathroom weight scale 30, the user also makes an input to the user's communications device 40. The communications device 40 may be a phone, laptop computer, remote control, key fob, or any other processor-controlled device (as later paragraphs will explain). The communications device 40 sends the device identifier 44 to the health server 22, and the bathroom weight scale 30 separately sends the sensor measurement 32 to the health server 22. The health server 22 associates the sensor measurement 32 to the device identifier 44 of the user's communications device 40. Exemplary embodiments thus permit the health server 22 to accurately associate the sensor measurement 32 to the communications device 40 that sent the device identifier 44. Because the device identifier 44 uniquely identifies the communications device 40, the health server 22 may even identify a human user of the communications device 40. The health server 22 thus accurately associates each user's weight measurement in the database 34 of health information.

Exemplary embodiments may be applied regardless of networking environment. The communications network 24 may be a cable network operating in the radio-frequency domain and/or the Internet Protocol (IP) domain. The communications network 24, however, may also include a distributed computing network, such as the Internet (sometimes alternatively known as the "World Wide Web"), an intranet, a local-area network (LAN), and/or a wide-area network (WAN). The communications network 24 may include coaxial cables, copper wires, fiber optic lines, and/or hybrid-coaxial lines. The communications network 24 may even include wireless portions utilizing any portion of the electromagnetic spectrum and any signaling standard (such as the I.E.E.E. 802 family of standards, GSM/CDMA/TDMA or any cellular standard, and/or the ISM band). The communications network 24 may even include powerline portions, in which signals are communicated via electrical wiring. The concepts described herein may be applied to any wireless/wireline communications network, regardless of physical componentry, physical configuration, or communications standard(s).

FIGS. 2 and 3 are more detailed schematics illustrating the operating environment, according to exemplary embodiments. Here the health server 22 has a processor 50 (e.g., "µP"), application specific integrated circuit (ASIC), or other component that executes a binding application 52 stored in a memory 54. The binding application 52 may cause the processor 50 to produce a graphical user interface ("GUI") 56. The graphical user interface 56 is illustrated as being visually produced on a display device 58, yet the graphical user interface 56 may also have audible features. The binding application 52, however, may operate in any processor-controlled device, as later paragraphs will explain.

The health server 22 receives the sensor measurement 32 from the medical measurement device 20. The medical measurement device 20 has a processor 70 (e.g., "µP"), application specific integrated circuit (ASIC), or other component that executes a client-side binding application 72 stored in a memory 74. The client-side binding application 72 may cooperate with the binding application 52 to send the sensor measurement 32 to the address associated with the health server 22. The sensor measurement 32 may include a time stamp 76. The time stamp 76 may be added by the client-side binding application 72 and may thus represent a date/time of generation by the medical measurement device 20. The time stamp 76, however, may be added by the binding application 52 upon receipt at the health server 22.

The health server 22 also receives the device identifier 44 from the user's communications device 40. The user's communications device 40 also has a processor 80 (e.g., "µP"), application specific integrated circuit (ASIC), or other component that also executes the client-side binding application 72 stored in a memory 82. The client-side binding application 72 may again cooperate with the binding application 52 to send the device identifier 44 to the address associated with the health server 22. The device identifier 44 may also include a time stamp 84. The time stamp 84 may be added by the client-side binding application 72, or the time stamp 84 may be added by the binding application 52 upon receipt at the health server 22.

The binding application 52 then correctly associates the sensor measurement 32 to the device identifier 44. The binding application 52 determines a difference 90 in time between the time-stamped device identifier 44 and the time-stamped sensor measurement 32. The binding application 52 compares the difference 90 in time to a window 92 of time. The window 92 of time may be a configurable or definable parameter for binding the sensor measurement 32 to the device

identifier 44. The window 92 of time may be retrieved from the memory 54 of the health server. When the difference 90 in time is within the window 92 of time, then the sensor measurement 32 may be confidently bound to the device identifier 44 that uniquely identifies the user's communications device 40. The binding application 52 may thus associate the sensor measurement 32 to the user's communications device 40 and, thus, to the user.

The window 92 of time is confidence. If the time-stamped sensor measurement 32 and the time-stamped device identifier 44 are contemporaneous, then the binding application 52 is assured that the sensor measurement 32 relates to the user's communications device 40. If the time-stamped sensor measurement 32 is stale compared to the time-stamped device identifier 44, then the binding application 52 may not be assured that the sensor measurement 32 relates to the user. The greater the difference 90 in time (between the time-stamped device identifier 44 and the time-stamped sensor measurement 32), then less relation may exist between communications device 40 (and the user) and the sensor measurement 32. If the difference 90 in time lies within the window 92 of time, then the binding application 52 may associate the sensor measurement 32 to the device identifier 44 of the user's communications device 40. When, however, the difference 90 in time lies outside the window 92 of time, then the binding application 52 may consider the sensor measurement 32 to be indeterminable to any user. The binding application 52 may thus decline to associate the sensor measurement 32 to the device identifier 44.

FIG. 3 further illustrates the database 34 of health information. The health server 22 builds and/or accesses the database 34 of health information. The database 34 of health information is illustrated as being locally stored in the memory 54 of the health server 22, but the database 34 of health information may be remotely accessed and maintained at any location in communications network (illustrated as reference numeral 24 in FIG. 1). Regardless, the database 34 of health information stores the sensor measurements 32 associated with different device identifiers 44 of different communications devices. FIG. 3, for example, illustrates the database 34 of health information as a table 100 that maps, relates, or otherwise associates the sensor measurements 32 to different device identifiers 44. Each sensor measurement 32 represents some physiological data (illustrated as reference numeral 28 in FIGS. 1-2) associated with the device identifier 44. Each sensor measurement 32, for example, may indicate the user's weight, blood pressure, temperature, pulse rate, glucose level, height, cholesterol level, respiratory rate, or any other information or data related to the user's physiological condition. When the difference 90 in time (between the time-stamped device identifier 44 and the time-stamped sensor measurement 32) is less than or equal to the window 92 of time (in seconds or minutes, for example), then the binding application 52 associates the sensor measurement 32 to the device identifier 44 of the user's communications device 40. The health server 22 thus accurately associates each user's sensor measurement 32 in the database 34 of health information.

FIG. 4 is a schematic further illustrating the device identifier 44, according to exemplary embodiments. The device identifier 44 uniquely identifies the communications device 40 that sent the device identifier 44. The device identifier 44 may be a serial number, Internet Protocol address, telephone number, or any other alphanumeric string or combination. When the health server 22 receives the device identifier 44, the binding application 52 may use the device identifier 44 to bind the sensor measurement 32 to the correct user.

The binding application 52 may then query a database 110 of users. The database 110 of users stores associations between device identifiers 44 and users 112. Once the device identifier 44 is known, the database 110 of users may reveal a single user, or even a group of users, that are associated with the communications device 40. Most cell phones, intelligent phones, personal digital assistants, and other communications devices are owned and used by a single user. However, some computers, gaming devices, televisions, and remote controls are shared by multiple users. If multiple users share the same communications device 40, then multiple users may be associated to the device identifier 44 of the shared communications device 40. The database 110 of users, for example, is illustrated as being locally stored in the health server 22, but the database 110 of users may be remotely accessed. The database 110 of users is illustrated as a table 114 that maps, relates, or otherwise associates the device identifier 44 to one or more users 112. The binding application 52 queries the database 110 of users for the device identifier 44 and retrieves the single user, or a group of users, that is/are associated with the device identifier 44 of the communications device 40.

FIGS. 5-8 are schematics illustrating a key fob 120, according to exemplary embodiments. Here the user's communications device 40 is illustrated as the key fob 120 that may be hung from the user's key ring 122. The user makes some input to the key fob 120 that is contemporaneous to the sensor measurement 32 at the medical measurement device 20 (as the above paragraphs explained). The key fob 120, for example, may have one or more of the buttons 42. As the medical measurement device 20 obtains the sensor measurement 32, the user also depresses the button 42 on the key fob 120. The key fob 120 wirelessly sends the device identifier 44 to the health server 22. The key fob 120 may also add the time stamp 84. The time stamp 84 may indicate the time that the button 42 was depressed, the time the device identifier 44 was sent/transmitted, or any other timing reference.

FIG. 6 illustrates a more detailed operating environment for the key fob 120, according to exemplary embodiments. When the user depresses the button 42 on the key fob 120, here the key fob 120 sends an identification signal 130. The identification signal 130 is illustrated as being wirelessly transmitted to a router 132. The router 132 has a wireless interface 134 that receives the identification signal 130. The router 132 then forwards the device identifier 44 in a packetized message 136 to the health server 22 (via the communications network 24 illustrated in FIG. 1). The device identifier 44 uniquely identifies the key fob 120 associated with the user. When the health server 22 receives the device identifier 44, the health server 22 may bind or associate the sensor measurement 32 to the device identifier 44 of the user's key fob 120. The health server 22 may thus store the sensor measurement 32 in the database 34 of health information, and the sensor measurement 32 is associated or mapped to the device identifier 44 of the user's key fob 120.

FIG. 7 illustrates an automotive operating environment for the key fob 120, according to exemplary embodiments. As the medical measurement device 20 obtains the sensor measurement 32, the user may depress the button 42 on the key fob 120. Here, though, the key fob 120 communicates with a vehicle 140. The key fob 120 wirelessly sends the identification signal 130, and/or the device identifier 44, to a wireless receiver 142 installed in the vehicle 140. The wireless receiver 142 may operate according to BLUETOOTH, WI-FI, or any other I.E.E.E. 802 family of standards. The wireless receiver 142 may utilize any portion of the electromagnetic spectrum and any signaling standard (such as GSM/CDMA/

TDMA or any cellular standard, and/or the ISM band). A transmitter **144** in the vehicle **140** then wirelessly sends the device identifier **44** to a base station **146** or to an orbiting satellite **148**. When the base station **146** or the satellite **148** receives the device identifier **44**, the base station **146** and the satellite **148** forwards the device identifier **44** to the address associated with the health server **22** (via the communications network **24** illustrated in FIG. **1**). The device identifier **44** again uniquely identifies the key fob **120**. The health server **22** binds or associates the sensor measurement **32** to the device identifier **44** of the user's key fob **120**, as earlier paragraphs explained.

FIG. **8** is a block diagram of the key fob **120**, according to exemplary embodiments. The key fob **120** has the processor **80** and the memory **82** and a wireless interface **160**. The wireless interface **160** may include a transmitter and/or receiver (illustrated as "TX/RX" **162**) for transmitting and/or receiving wireless signals. The wireless interface **160** may operate according to WI-FI, BLUETOOTH, or any of the IEEE 802 family of standards. The wireless interface **160** may utilize any portion of the electromagnetic spectrum and any signaling standard (such as GSM/CDMA/TDMA or any cellular standard, and/or the ISM band). The key fob **120** may even have a display **164**. When the user depresses the button **42** on a key pad **166**, the transmitter **162** wirelessly sends the device identifier **44** from an antenna **168**.

FIG. **9** is a schematic illustrating the user's communications device **40**, according to exemplary embodiments. Here the user's communications device **40** is illustrated as a personal digital assistant **180**. As the medical measurement device **20** obtains the sensor measurement **32**, the user makes an input or selection on the personal digital assistant **180**. The personal digital assistant **180** is illustrated as an APPLE® IPHONE® that executes the client-side binding application **72**. The personal digital assistant **180**, however, may be any other manufacturer's model. The user, for example, may touch an icon **182** on a display **184**. The personal digital assistant **180** then wirelessly sends the device identifier **44**. FIG. **9** illustrates wireless transmission to the wireless interface **134** of the router **132**. The router **132** then forwards the device identifier **44** in the packetized message **136** to the health server **22**. The health server **22** then binds or associates the sensor measurement **32** to the device identifier **44** associated with the personal digital assistant **180**.

FIG. **10** is another schematic illustrating the user's communications device **40**, according to exemplary embodiments. Here the user's communications device **40** is illustrated as a cellular phone **200**. As the medical measurement device **20** obtains the sensor measurement **32**, the user makes an input or selection on the cellular phone **200** (such as by pushing the button **42**). The cellular phone **200** executes the client-side binding application **72** and wirelessly sends the device identifier **44** to the base station **146**. The base station **146** then forwards the device identifier **44** in the packetized message **136** to the address associated with the health server **22**. The health server **22** then binds or associates the sensor measurement **32** to the device identifier **44** associated with the personal digital assistant **180**.

FIGS. **11-13** are schematics further illustrating the user's communications device **40**, according to exemplary embodiments. FIG. **11** is a block diagram of a Subscriber Identity Module **300**, while FIGS. **12** and **13** illustrate, respectively, the Subscriber Identity Module **300** embodied in a plug **302** and in a card **304**. As those of ordinary skill in the art recognize, the Subscriber Identity Module **300** may be used in conjunction with many communications devices (such as the personal digital assistant **180** and the cellular phone **200**,

illustrated respectively in FIGS. **9** and **10**). The Subscriber Identity Module **300** stores user information (such as the user's International Mobile Subscriber Identity, the user's K, number, and other user information) and any portion of the client-side binding application **72**. As those of ordinary skill in the art also recognize, the plug **302** and the card **304** each interface with the communications device **40**.

FIG. **11** is a block diagram of the Subscriber Identity Module **300**, whether embodied as the plug **302** of FIG. **12** or as the card **304** of FIG. **13**. Here the Subscriber Identity Module **300** comprises the processor (μ P) **80** communicating with memory modules **308** via a data bus **310**. The memory modules **308** may include Read Only Memory (ROM) **312**, Random Access Memory (RAM) and or flash memory **314**, and Electrically Erasable-Programmable Read Only Memory (EEPROM) **316**. The Subscriber Identity Module **300** stores some or all of the client-side binding application **72** in one or more of the memory modules **308**. FIG. **11** shows the client-side binding application **72** residing in the Erasable-Programmable Read Only Memory **316**, yet the client-side binding application **72** may alternatively or additionally reside in the Read Only Memory **312** and/or in the Random Access/Flash Memory **314**. An Input/Output module **318** handles communication between the Subscriber Identity Module **300** and the communications device **40**. Because Subscriber Identity Modules are well known in the art, this disclosure will not further discuss the operation and the physical/memory structure of the Subscriber Identity Module **300**.

FIG. **14** is another schematic illustrating the communications device **40**, according to exemplary embodiments. Here the communications device **40** comprises a radio transceiver unit **352**, an antenna **354**, a digital baseband chipset **356**, and a man/machine interface (MMI) **358**. The transceiver unit **352** includes transmitter circuitry **360** and receiver circuitry **362** for receiving and transmitting radio-frequency (RF) signals. The transceiver unit **352** couples to the antenna **354** for converting electrical current to and from electromagnetic waves. The digital baseband chipset **356** contains a digital signal processor (DSP) **364** and performs signal processing functions for audio (voice) signals and RF signals. As FIG. **14** shows, the digital baseband chipset **356** may also include the on-board microprocessor **80** that interacts with the man/machine interface (MMI) **358**. The man/machine interface (MMI) **358** may comprise a display device **368**, a keypad **370**, and the Subscriber Identity Module **300**. The on-board microprocessor **80** may perform TDMA, CDMA, GSM or other protocol functions and control functions for the radio circuitry **360** and **362**, for the display device **368**, and for the keypad **370**. The on-board microprocessor **80** may also interface with the Subscriber Identity Module **300** and with the client-side binding application **72**. Because the functional architecture of the communications device **40** is well known to those of ordinary skill in the art, the architecture will not be further discussed.

Exemplary embodiments may be applied to any signaling standard. As those of ordinary skill in the art recognize, FIGS. **11-14** may illustrate a Global System for Mobile (GSM) communications device. That is, the communications device **40** may utilize the Global System for Mobile (GSM) communications signaling standard. Those of ordinary skill in the art, however, also recognize that exemplary embodiments are equally applicable to any communications device **40** utilizing the Time Division Multiple Access signaling standard, the Code Division Multiple Access signaling standard, the "dual-mode" GSM-ANSI Interoperability Team (GAIT) signaling standard, or any variant of the GSM/CDMA/TDMA signaling standard. Exemplary embodiments may also be applied to

other standards, such as the I.E.E.E. 802 family of standards, the Industrial, Scientific, and Medical band of the electromagnetic spectrum, BLUETOOTH®, and any other.

FIG. 15 is a schematic illustrating a sensor identifier 400, according to exemplary embodiments. When the health server 22 receives the sensor measurement 32 from the medical measurement device 20, the sensor measurement 32 may include the sensor identifier 400. The sensor identifier 400 uniquely identifies the medical measurement device 20, and/or the sensor 26, that sent the sensor measurement 32. The sensor identifier 400 may be a serial number, Internet Protocol address, telephone number, or any other alphanumeric combination. When the health server 22 receives the sensor identifier 400, the binding application 52 may use the sensor identifier 400 to further help identify the user of the medical measurement device 20.

The binding application 52 may then query the database 110 of users. Here the database 110 of users also stores associations between sensor identifiers 400 and users 112. Once the sensor identifier 400 is known, the database 110 of users may reveal a single user, or a group of users, that are associated with the sensor identifier 400. The binding application 52 queries the database 110 of users for the sensor identifier 400 and retrieves the associated user or group of users. Many medical measurement devices are shared by multiple users (as earlier paragraphs explained). The database 110 of users is illustrated as a table 402 that maps, relates, or otherwise associates the sensor identifier 400 to one or more users 112. The binding application 52 queries the database 110 of users for the sensor identifier 400 and retrieves the single user, or a group of users, that is/are associated with the sensor identifier 400.

FIG. 16 is another detailed schematic illustrating multipliers, according to exemplary embodiments. Here multipliers may be used to expand, or contract, the window 92 of time. FIG. 16, for example, illustrates a device multiplier 410 that may be associated to the device identifier 44, according to exemplary embodiments. The device multiplier 410 may be a multiplication factor that increases, or decreases, the window 92 of time. The window 92 of time, in other words, may be increased, or decreased, based on the communications device 40 that sent the device identifier 44. Suppose, for example, that the device identifier 44 reveals that the user's communications device 40 has a large form-factor keypad. The keys of the keypad are enlarged for easier identification and depression. These enlarged keys may indicate that the user has reduced eyesight or physical capabilities. The device multiplier 410, then, may be used to expand the window 92 of time. If the device identifier 44 indicates that the user may need additional time to perfect the binding, then the window 92 of time may be adjusted to provide more time.

The binding application 52 may thus query a database 412 of multipliers. The database 412 of multipliers stores associations between device identifiers 44 and device multipliers 410. Once the device identifier 44 is known, the database 412 of multipliers may be queried for the corresponding device multiplier 410. The database 412 of multipliers is illustrated as being locally stored in the health server 22, but the database 412 of multipliers may be remotely accessed. The database 412 of multipliers is illustrated as a table 414 that maps, relates, or otherwise associates the device identifier 44 to the corresponding device multiplier 410. The binding application 52 queries the database 412 of multipliers for the device identifier 44 and retrieves the corresponding device multiplier 410. The binding application 52 may then increase, or decrease, the window 92 of time based on the device multi-

plier 410. If the window 92 of time is one minute (60 seconds), for example, and the device multiplier 410 is 1.5, then the

$$\text{final window 92 of time is } (60 \text{ seconds}) \times (1.5) = 90 \text{ seconds.}$$

Conversely, should the device identifier 44 indicate that the communications device 40 is an APPLE® IPHONE® or other "smart" device, then the user may be proficient and skilled at binding their sensor measurement 32 to the input to their communications device 40. In this case, then, the device multiplier 410 may actually reduce the window 92 of time. Again, if the window 92 of time is one minute (60 seconds), but the device multiplier 410 is 0.75, then the

$$\text{final window 92 of time is } (60 \text{ seconds}) \times (0.75) = 45 \text{ seconds.}$$

FIG. 17 is a schematic illustrating personalized windows of time, according to exemplary embodiments. Here each individual user may determine and configure a unique window 92 of time. The window 92 of time, in other words, may be associated with the device identifier 44. Exemplary embodiments may thus permit each user to configure and personalize the window 92 of time, based on the user's individual characteristics or capabilities. If the user is proficient, then the user may want a short window 92 of time. If a different user desires more time to perfect the binding, then the window 92 of time may be longer for that user. The window 92 of time may thus be configurable to suit each user's desires.

FIG. 17 further illustrates the database 110 of users. The database 110 of users stores associations between device identifiers and windows of time. Once the device identifier 44 is obtained, the database 110 of users may be queried for the corresponding window 92 of time. The database 110 of users is illustrated as being locally stored in the health server 22, but the database 110 of users may be remotely accessed. The database 110 of users is illustrated as a table 420 that maps, relates, or otherwise associates the device identifier 44 to the corresponding window 92 of time. The binding application 52 queries the database 110 of users for the device identifier 44 and retrieves the corresponding window 92 of time. The binding application 52 may then use the window 92 of time when comparing the difference 90 in time between the sensor measurement 32 and the corresponding window 92 of time (as earlier paragraphs explained).

The graphical user interface 56 may be used to input the personalized window 92 of time. The graphical user interface 56 may include one or more visual and/or audible prompts for personalizing the window 92 of time. The graphical user interface 56 may include one or more data fields for entry of a user's personalized window 92 of time. Once a user inputs their desired window 92 of time, then the user's personalized window 92 of time may be stored and associated to the device identifier 44 in the database 110 of users.

FIG. 18 is another schematic illustrating personalized windows of time, according to exemplary embodiments. Here the window 92 of time may also be determined from a user's music selections. The binding application 52 may query the user's communications device 40 for genres of music stored and/or played by the communications device 40. The age of the user may be inferred from the genres of music, and the length of the window 92 of time may then be adjusted based on the user's age. The window 92 of time, in other words, may be at least partially derived from the genres of music enjoyed by the user. Rap music may indicate a younger and more proficient user, so the window 92 of time may be reduced (perhaps to a minimum value). Classic rock may indicate a

member of the “baby boomer” generation, so the window 92 of time may be increased to a middle value. 1940s and 1950s music may indicate seniors and elderly, so the window 92 of time may be expanded to a maximum value. The window 92 of time may be further refined by “decades” music, such as 70s, 80s, and 90s hits that may more accurately indicate the user’s age.

FIG. 18 thus illustrates a music query 440. When the health server 22 communicates with the user’s communications device 40, the binding application 52 may communicate with the client-side binding application 72 stored in the user’s communications device 40. The binding application 52 and the client-side binding application 72 cooperate to determine the genres 442 of music that are stored by, and/or played by, the communications device 40. The binding application 52 causes the processor in the health server 22 to send the music query 440. The music query 440 communicates to an address associated with the user’s communications device 40. When the user’s communications device 40 receives the music query 440, the client-side binding application 52 causes the client processor (illustrated as reference numeral 80 in FIG. 2) in the user’s communications device 40 to determine the genres 442 of music stored and/or played by the communications device 40. If the user’s communications device 40 stores or plays multiple genres, then the client-side binding application 52 may determine which genre is most played or enjoyed in time. The client-side binding application 52, for example, may determine that “90s hits” are cumulatively played or executed more than any other genre.

The client-side binding application 52 may send a response 446. The response 446 may include information related to the genres 442 of music stored and/or played by the communications device 40. More particularly, the response 446 may identify a dominant genre 448 achieving the most playing time. When the health server 22 receives the response 446, the binding application 52 retrieves the genres 442 of music stored and/or played by the communications device 40 and/or the dominant genre 448 having the greatest cumulative playing time.

The binding application 52 may then consult a database 450 of timing. The database 450 of timing information stores associations between the genres 442 of music and the window 92 of time. Once the user’s music selections are identified, the database 450 of timing information may be queried for the corresponding window 92 of time. The database 450 of timing information is illustrated as being locally stored in the health server 22, but the database 450 of timing information may be remotely accessed. The database 450 of timing information is illustrated as a table 452 that maps, relates, or otherwise associates the genres 442 of music to the corresponding window 92 of time. The binding application 52 queries the database 450 of timing information for the genres 442 of music and retrieves the corresponding window 92 of time. The binding application 52 may then use the window 92 of time when comparing the difference 90 in time between the sensor measurement 32 and the corresponding window 92 of time (as earlier paragraphs explained).

Few users, though, have a single genre of music in their music selection. Most users have many genres of music, and each genre is enjoyed at different times. The binding application 52, then, may blend windows of time when multiple genres of music are identified. This blending may correspond to the cumulative times for each genre of music. Again referring to FIG. 18, suppose classical music is dominant and enjoyed 60% of the total playing time, while classic rock is 20% and rap is 20%. The binding application 52, then, may

blend their windows 92 of time to obtain a final value for the window 92 of time according to

$$\text{final window of time} = [(0.6) \times (60 \text{ seconds})] + [(0.2) \times (40 \text{ seconds})] + [(0.2) \times (40 \text{ seconds})],$$

or

$$\text{final window of time} = 52 \text{ seconds}.$$

Here, then, the final value for the window 92 of time is proportional to the cumulative playing time for each genre of music. The binding application 52 may then use the final value (e.g., 52 seconds) for the window 92 of time when comparing the difference 90 in time between the sensor measurement 32 and the corresponding window 92 of time (as earlier paragraphs explained).

FIGS. 19-20 are flowcharts illustrating a method of measuring health, according to exemplary embodiments. A device identifier is received that uniquely identifies a communications device (Block 500). A sensor measurement is received (Block 502). A sensor identifier, associated with a sensor that measured the sensor measurement, is received (Block 504). A database is queried for the device identifier (Block 506) and a window of time is retrieved (Block 508). A difference in time is determined between a time-stamp of the device identifier and a time-stamp of the sensor measurement (Block 510).

The flowchart continues with FIG. 20. If the difference in time is within the window of time (Block 520), then the sensor measurement is associated with the device identifier (Block 522). If the difference in time is outside the window of time (Block 520), then the sensor measurement cannot be bound without further information, so the sensor measurement is stored in a database, along with the associated time stamp (Block 524).

FIG. 21 is a schematic illustrating still more exemplary embodiments. FIG. 21 is a generic block diagram illustrating the binding application 52 operating within a processor-controlled device 600. FIGS. 1-10 illustrated the binding application 52 operating within the health server 22. As paragraph [0014] explained, though, the binding application 52 may operate in any processor-controlled device 600. FIG. 21, then, illustrates the binding application 52 stored in a memory subsystem of the processor-controlled device 600. FIG. 21 also illustrates the client-side binding application 72 operating within the processor-controlled device 600. The medical measurement device 20 and the communications device 40, in other words, may be any processor-controlled device 600. One or more processors communicate with the memory subsystem and execute the binding application 52 and/or the client-side binding application 72. Because the processor-controlled device 600 is well-known to those of ordinary skill in the art, no detailed explanation is needed.

FIG. 22 depicts other possible operating environments for additional aspects of the exemplary embodiments. FIG. 22 illustrates the binding application 52 and the client-side binding application 72 operating within various other devices 700. FIG. 22, for example, illustrates that the binding application 52 and/or the client-side binding application 72 may entirely or partially operate within a remote control 702, a set-top box (“STB”) (704), a personal/digital video recorder (PVR/DVR) 706, a personal digital assistant (PDA) 708, a Global Positioning System (GPS) device 710, an interactive television 712, an Internet Protocol (IP) phone 714, a pager 716, a cellular/satellite phone 718, or any computer system, communications device, or processor-controlled device utilizing the processor 50 and/or a digital signal processor (DP/DSP)

720. The device 700 may also include watches, radios, vehicle electronics, clocks, printers, gateways, mobile/implantable medical devices, and other apparatuses and systems. Because the architecture and operating principles of the various devices 700 are well known, the hardware and software componentry of the various devices 700 are not further shown and described.

FIGS. 23-26 are schematics further illustrating user binding, according to still more exemplary embodiments. FIG. 23 illustrates how the sensor measurement 32 may be used to identify the user of medical measurement device 20. When the health server 22 receives the sensor measurement 32, the binding application 52 may infer the user from the sensor measurement 32. The binding application 52 may query the database 34 of health information for the sensor measurement 32. Here the database 34 of health information may associate sensor measurements to different users. Even though the medical measurement device 20 may be shared by multiple users, it may be unlikely that the multiple users have similar physiological data (illustrated as reference numeral 28). The multiple users, in other words, are unlikely to share similar weight readings, blood pressure readings, glucose readings, or other physiological data. The binding application 52, then, may infer the user from the sensor measurement 32.

As FIG. 23 illustrates, the database 34 of health information may associate the sensor measurements 32 to different users 800. When the health server 22 receives the sensor measurement 32, the binding application 52 may query the database 34 of health information for the sensor measurement 32. The binding application 52 retrieves the user 800 that matches the sensor measurement 32. The binding application 52 may even apply a tolerance 802 to the sensor measurement 32 to account for permissible fluctuations in readings. Suppose, for example, that the sensor measurement 32 represents a weight reading of 165 pounds. The binding application 52 may query the database 34 of health information for any weight reading of 165 pounds. The binding application 52 retrieves the user 800 that has a database entry matching 165 pounds. The binding application 52 may even apply the tolerance 802 of ± 5 pounds and broaden the query to 160-170 pounds. The binding application 52 thus retrieves the user 800 that has a previous weight reading in the range of 160-170 pounds.

The binding application 52 may even apply a time limit 804 to further limit the query. When the binding application 52 queries for the user 800 associated with the sensor measurement 32, the time limit 804 may constrain the query to only recent database entries. Suppose, for example, that a database entry matches the range of 160-170 pounds, but the database entry is two years old. The database entry is obviously old and stale and may not correctly associate to the correct user of the medical measurement device 20. The time limit 804, then, may limit the query to only fresh or recent entries. The time limit 804 may thus be configured to a maximum-permissible hourly or daily limit on a date/time of the entries in the database 34 of health information. When the binding application 52 obtains a matching database entry to the sensor measurement 32, the binding application 52 may compare a data/time associated with the database entry to the time limit 804. If the date/time associated with the database entry exceeds, or is older than, the time stamp 76, then the binding application 52 may disregard the query result as stale. The binding application 52, in other words, cannot confidently match the sensor measurement 32 (received from the medical measurement device 20) to a user in the database 34 of health information. When, however, the date/time associated with the database entry is within the time limit 804, then the

binding application 52 may confidently match the sensor measurement 32 to a user in the database 34 of health information.

FIG. 24 illustrates user information 806, according to more exemplary embodiments. Here the user information 806 may be used to identify the user of medical measurement device 20. When the health server 22 receives the sensor measurement 32, the sensor measurement 32 may include the user information 806. The user information 806 may be any information that can be collected at and/or by the medical measurement device 20. The user information 806, for example, may be a username or personal identification number ("PIN") entered into a user interface of the medical measurement device 20. If the medical measurement device 20 includes a keypad or touch screen, then the user may enter their unique user information 806. The medical measurement device 20 may then send the user information 806 with the sensor measurement 32. When the health server 22 receives the user information 806, the binding application 52 may use the user information 806 to determine or infer the user of the medical measurement device 20.

The user information 806 may include biometric information 808. When the medical measurement device 20 obtains the sensor measurement 32, the medical measurement device 20 may also obtain the biometric information 808. The biometric information 808, for example, may be a fingerprint or footprint obtained by the medical measurement device 20. As the user steps on the weight scale 30, for example, the weight scale 30 may obtain a footprint or pressure print of the user's foot. The medical measurement device 20 may then send the biometric information 808 with the sensor measurement 32. When the health server 22 receives the biometric information 808, the binding application 52 may use the biometric information 808 to determine or infer the user of the medical measurement device 20. The biometric information 808 may also include voice prints using voice recognition technology and/or retinal scans.

The binding application 52 may query the database 34 of health information. As FIG. 24 illustrates, the database 34 of health information may associate the user information 806 to the different users 800. When the health server 22 receives the user information 806, the binding application 52 may query the database 34 of health information for the user information 806. The binding application 52 retrieves the user 800 that matches the user information 806.

FIG. 25 illustrates personalization of devices, according to more exemplary embodiments. If previous sensor measurements can be confidently matched to a particular user, then the binding application 52 may immediately personalize the medical measurement device 20. Once the user is determined, the binding application 52 may inform the medical measurement device 20 of the determined user. The binding application 52, for example, may send a user determination message 810 to the medical measurement device 20. The user determination message 810 includes or contains information that identifies the user 800 matched to the database 34 of health information. When the medical measurement device 20 receives the user determination message 810, the client-side binding application 72 may then retrieve personalization settings associated with the user 800. The client-side binding application 72, for example, may query a database 812 of settings for the user 800 identified in the user determination message 810. FIG. 25 illustrates the database 812 of settings as a table 814 that maps, relates, or otherwise associates the user 800 to different device settings 816. The device settings 816 represent configuration options that may be personalized for each user 800. The device settings 816 may include, for

example, display colors, audible features, and any other options for each user. Once the device settings **816** are retrieved, the medical measurement device **20** may be configured according to the desires of the determined user **800**.

FIG. **26** also illustrates personalization of devices, according to more exemplary embodiments. Here the exemplary embodiments may be used to personalize much more than medical devices. The user determination message **810** may be sent to any device to implement personalization of features. The user determination message **810** may be sent via the communications network (illustrated as reference numeral **24** in FIG. **1**) to personalize televisions, seats, cars, audio systems, and any other processor-controlled devices. FIG. **26**, for example, illustrates an automotive environment that may be personalized to the determined user **800**. Suppose a car seat **820** has the sensor **26** that measures an occupant's weight reading **822**. The weight reading **822** (e.g., the sensor measurement **32** illustrated in FIG. **1**) is sent to a controller **824** that controls automotive settings. The processor **50** (here operating in the controller **824**) executes the binding application **52** and queries a database **826** of weights. The database **826** of weights may be another data table that maps, relates, or otherwise associates different weight readings to the user **800**. If the weight reading **822** matches an entry in the database **826** of weights (perhaps using the tolerance **802** and the time limit **804**, explained above), then the binding application **52** may retrieve the device settings **816** associated with the user **800**. The device settings **816** may represent seating positions, mirror positions, pedal positions, heating and air conditioning settings, audio settings (e.g., favorite channels), and instrument panel options that are preferred by the associated user **800**. The device settings **816** may also implement transmission settings, shock absorber settings, speed limits, and other performance settings. The automotive environment, in other words, may be personalized based on the user's weight reading **822**.

Personalization also provides assurances. The user of the medical measurement device **20** may be concerned that their physiological data **28** is confidently bound. If the blood pressure, weight, and other physiological data **28** is incorrectly bound to the wrong user, users may quickly lose confidence in the binding application **52**. The binding application **52**, then, may provide assurances that the user's physiological data **28** is confidently and correctly bound. When the binding application **52** determines the user (as described above), the personalization of the medical measurement device **20** immediately lets the user know of the binding. If the medical measurement device **20**, for example, is correctly personalized to the user's liking, then the user should have confidence that their physiological data **28** is correctly bound. If the medical measurement device **20** assumes colors, settings, and messages that are foreign to the user, then the user knows that their physiological data **28** was incorrectly bound. Likewise, if the automotive environment assumes the user's preferred seating position, mirror position, and audio settings, then the user knows their physiological data **28** is correctly bound.

FIGS. **27-29** are schematics further illustrating user binding, according to still more exemplary embodiments. Here the determination of the user **800** may be used to perfect the binding of the sensor measurement **32**. Once the sensor measurement **32** is associated to the correct user (as the above paragraphs explained), the user's communications device **40** may be commanded to perfect the binding. As FIG. **27** illustrates, once the user **800** is determined, the database **110** of users may be queried for a communications address **840** associated with the user's communications device **40**. The database **110** of users is illustrated as the table **114** that maps,

relates, or otherwise associates the different users **800** to communications addresses **840**. The binding application **52** queries the database **110** of users for the user **800** (determined from the sensor measurement **32**, as above explained). The binding application **52** retrieves the communications address **840** associated with the user **800**. The binding application **52** then sends a command message **842** to the communications address **840** associated with the user **800**. The command message **842** communicates to the communications address **840** associated with the user's communications device **40**. FIG. **27** illustrates the command message **842** communicating to an Internet Protocol address associated with the user's communications device **40** (via the communications network **24** illustrated in FIG. **1**). As FIG. **27** also illustrates, though, the command message **842** may communicate to some other number (such as a telephone number) or address associated with the user's communications device **40**.

When the client-side binding application **72** receives the command message **842**, the command message **842** instructs the client-side binding application **72** to send a binding message **844**. The binding message **844** return communicates to the health server **22** and confirms the binding of the sensor measurement **32** to the device identifier **44** associated with the user's communications device **40**. The binding application **42**, operating in the health server **22**, then binds the sensor measurement **32** to the device identifier **44** (as earlier paragraphs explained with reference to FIG. **3**). So, FIG. **27** illustrates the binding operation, even if the user does not have their communications device **40**. If the user has their weight or blood pressure measured, the binding application **42** may correctly associate the sensor measurement **32** to the user, even if the user does not have their communications device **40**.

FIG. **28** illustrates paging commands, according to more exemplary embodiments. Once the sensor measurement **32** is associated to the correct user (as the above paragraphs explained), here the user's communications device **40** may be paged to perfect the binding. Once the user **800** is determined, and the database **110** of users is queried for the communications address **840**, the binding application **52** sends a paging command **850** to the communications address **840**. The paging command **850** may communicate to the base station **148**, and/or to the satellite **146**, depending on the network configuration. The paging command **850** instructs the base station **148**, and/or the satellite **146**, to page the communications address **840** associated with the user's communications device **40**. When the client-side binding application **72** receives the page, the client-side binding application **72** returns the binding message **844**. The binding message **844** routes to the health server **22** and confirms the binding of the sensor measurement **32** to the device identifier **44** associated with the user's communications device **40** (as earlier paragraphs explained with reference to FIG. **3**). Again, then, exemplary embodiments may perfect binding, even if the user does not have their communications device **40**.

FIG. **29** illustrates a local area network, according to more exemplary embodiments. Here exemplary embodiments may be implemented in a local area network, such as a home or office environment. The health server **22** again receives the sensor measurement **32**, but the binding application **52** must still bind the sensor measurement **32** to a user. Here, then, the binding application **52** may determine what communications devices are within the local area network. Any communications devices proximate to the medical measurement device **20** are more likely to perfect binding.

As FIG. **29** illustrates, when the health server **22** receives the sensor measurement **32**, the health server **22** may broad-

cast the command message 842. The command message 842 communicates to any communications devices in the local area network. FIG. 29 illustrates a near-field wireless broadcast using BLUETOOTH®, WI-FI®, or any other standard. The health server 22 calls or invokes the wireless interface 134 to broadcast the command message 842. The command message 842 communicates to any communications devices within range of the wireless interface 134. The command message 842 may also communicate to any communications devices that physically connect to the local area network. If the command message 842 is received by the communications device 40, the command message 842 instructs the client-side binding application 72 to send the binding message 844. The binding message 844 may wirelessly communicate back to the wireless interface 134, or the binding message 844 may route along cables and/wires back to the health server 22. Regardless, the binding message 844 is received by the health server 22 and confirms the binding of the sensor measurement 32 to the device identifier 44 associated with the user's communications device 40 (as earlier paragraphs explained with reference to FIG. 3). Again, then, exemplary embodiments may perfect binding, even if the user does not have their communications device 40.

Exemplary embodiments may be physically embodied on or in a computer-readable storage medium. This computer-readable medium may include CD-ROM, DVD, tape, cassette, floppy disk, memory card, and large-capacity disks. This computer-readable medium, or media, could be distributed to end-subscribers, licensees, and assignees. These types of computer-readable media, and other types not mentioned here but considered within the scope of the exemplary embodiments. A computer program product comprises processor-executable instructions for measuring a user's health, as the above paragraphs explained.

While the exemplary embodiments have been described with respect to various features, aspects, and embodiments, those skilled and unskilled in the art will recognize the exemplary embodiments are not so limited. Other variations, modifications, and alternative embodiments may be made without departing from the spirit and scope of the exemplary embodiments.

What is claimed is:

1. A method of measuring health, comprising:
 - receiving, at a server, a time-stamped device identifier that uniquely identifies a key fob;
 - receiving, at the server, a time-stamped physiological measurement sent from a medical measurement device, wherein the time-stamped physiological measurement represents data selected from a group consisting of weight, blood pressure, temperature, pulse rate, glucose level, height, cholesterol level, and respiratory rate;
 - determining, by a processor, a difference in time between the time-stamped device identifier and the time-stamped physiological measurement;
 - comparing, by a processor, the difference in time to a window of time; and
 - binding, by a processor, the time-stamped device identifier to the time-stamped physiological measurement in a database in response to determining the difference in time is within the window of time.
2. The method according to claim 1, further comprising querying for the time-stamped device identifier.
3. The method according to claim 2, further comprising retrieving the window of time that is associated with the time-stamped device identifier.

4. The method according to claim 1, wherein the time-stamped device identifier is selected from a telephone number, an Internet Protocol address, and an assigned alphanumeric string.

5. The method according to claim 1, further comprising receiving a sensor identifier associated with the medical measurement device.

6. The method according to claim 5, further comprising querying for the sensor identifier.

7. The method according to claim 6, further comprising retrieving a group of user identifiers associated with the sensor identifier.

8. A system, comprising:

a processor; and

memory storing code that when executed causes the processor to perform operations, the operations comprising: receiving a time-stamped device identifier that uniquely identifies a key fob;

determining a vehicle associated with the key fob;

receiving a time-stamped physiological measurement sent from a weight scale;

querying the memory for a user identifier of a user associated with the vehicle;

determining a difference in time between the time-stamped device identifier and the time-stamped physiological measurement;

comparing the difference in time to a window of time; and binding the user to the time-stamped physiological measurement in a database in response to determining the difference in time is within the window of time.

9. The system according to claim 8, wherein the operations further comprise querying the memory for the time-stamped device identifier.

10. The system according to claim 9, wherein the operations further comprise retrieving the window of time from the memory.

11. The system according to claim 8, wherein the time-stamped device identifier is selected from a telephone number, an Internet Protocol address, and an assigned alphanumeric string.

12. The system according to claim 8, wherein the operations further comprise receiving a sensor identifier associated with the medical measurement device.

13. The system according to claim 12, wherein the operations further comprise querying the memory for the time-stamped sensor identifier.

14. The system according to claim 13, wherein the operations further comprise retrieving a group of user identifiers associated with the time-stamped sensor identifier.

15. A hardware memory storing instructions that when executed cause a processor to perform operations, the operations comprising:

receiving a time-stamped weight reading obtained by a weight scale;

querying a database that associates weight readings to a group of users of the weight scale;

determining the time-stamped weight reading matches one of the weight readings in the database;

retrieving one user identifier of the group of users associated with the one of the weight readings;

retrieving a communications address associated with the one user identifier;

sending a binding command message to the communications address that commands a key fob to bind;

receiving a time-stamped device identifier from the communications address in response to the binding command message;

determining a difference in time between the time-stamped device identifier and the time-stamped weight reading; comparing the difference in time to a window of time; and binding the one user identifier to the time-stamped weight reading in a database in response to determining the difference in time is within the window of time. 5

16. The memory according to claim 15, wherein the operations further comprise retrieving device settings associated with the one user.

17. The memory according to claim 15, wherein the operations further comprise retrieving the window of time that is associated with the time-stamped device identifier. 10

18. The memory according to claim 15, wherein the time-stamped device identifier is selected from a telephone number, an Internet Protocol address, and an assigned alphanumeric string. 15

19. The memory according to claim 15, wherein the operations further comprise receiving a sensor identifier associated with the weight scale that measured the weight reading.

20. The memory according to claim 15, wherein the operations further comprise retrieving a seating position of a car seat, the seating position associated with the one user. 20

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摘要(译)

方法，系统和产品测量与用户相关的健康数据。接收标记通信设备的带时间戳的设备标识符。分别接收带时间戳的传感器测量。确定带时间戳的设备标识符和带时间戳的传感器测量之间的时间差。当时间差在时间窗口内时，传感器测量值与设备标识符相关联。

