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(54) **REMOTE DIAGNOSTIC & TREATMENT SYSTEM**

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Publication Classification

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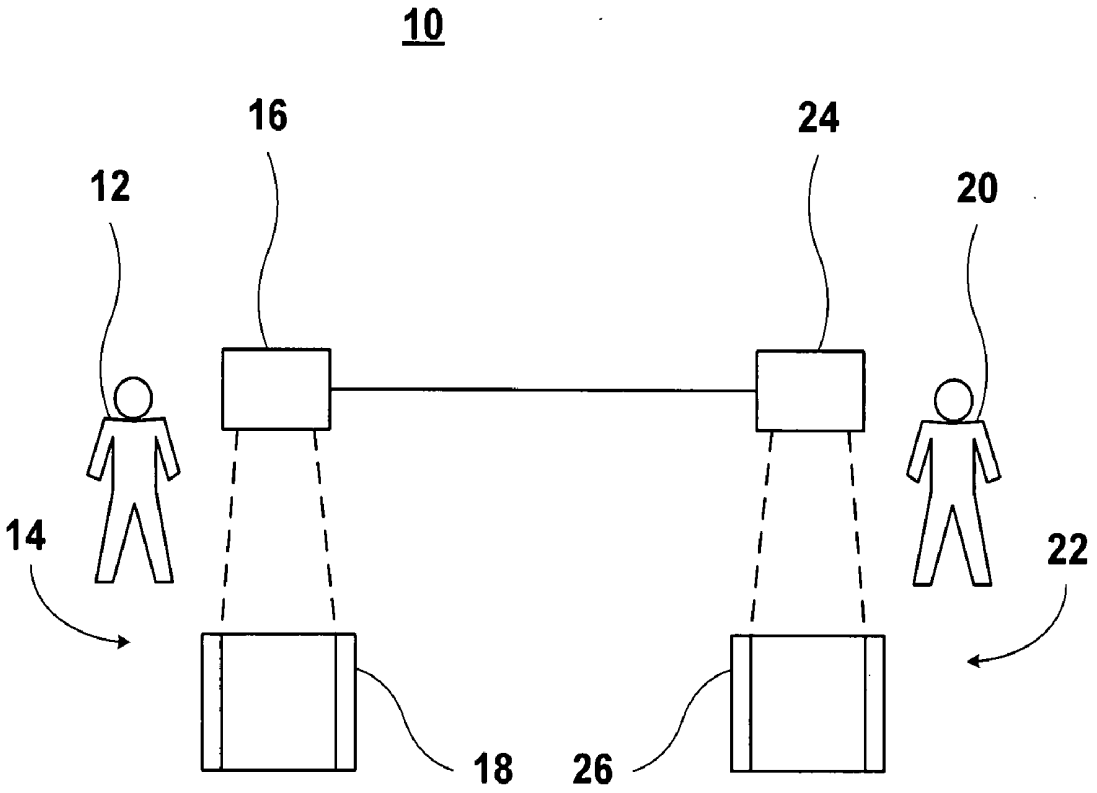
A61B 5/00 (2006.01)

(52) **U.S. Cl.** **600/300**

(57) **ABSTRACT**

Methods and apparatus for providing remote diagnosis and treatment are disclosed. One embodiment of the invention comprises a cellular telephone (**16**A) that includes a camera (**34**), a display (**40**), a speaker (**36**A), a microphone (**36**B) and embedded diagnostic and treatment software (**18**). An alternative embodiment may also include one or more data devices (**88**) that may be connected to the cellular phone (**16**A) using a wireless (**30**A) or wired (**30**B) connection.



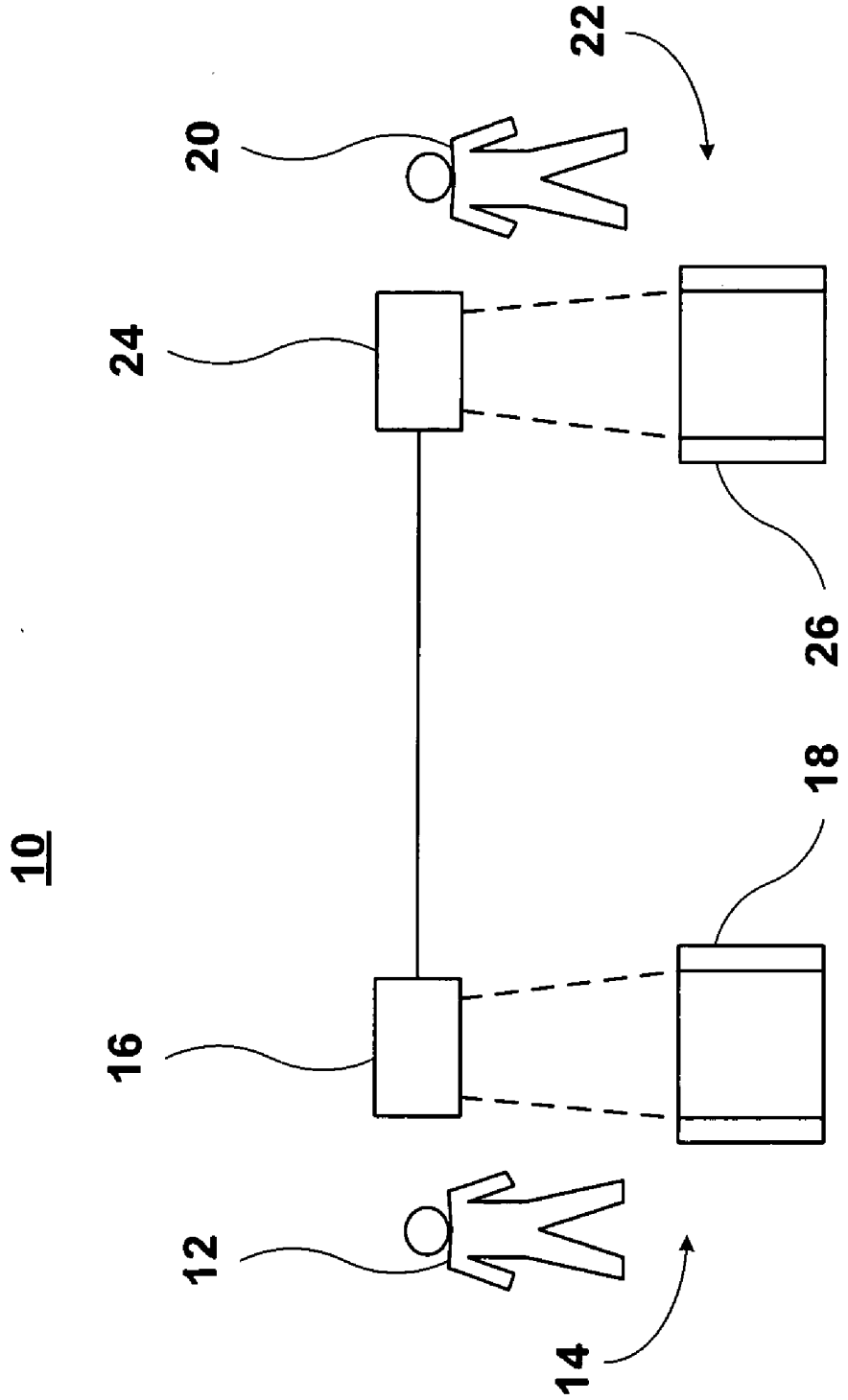


FIG. 1

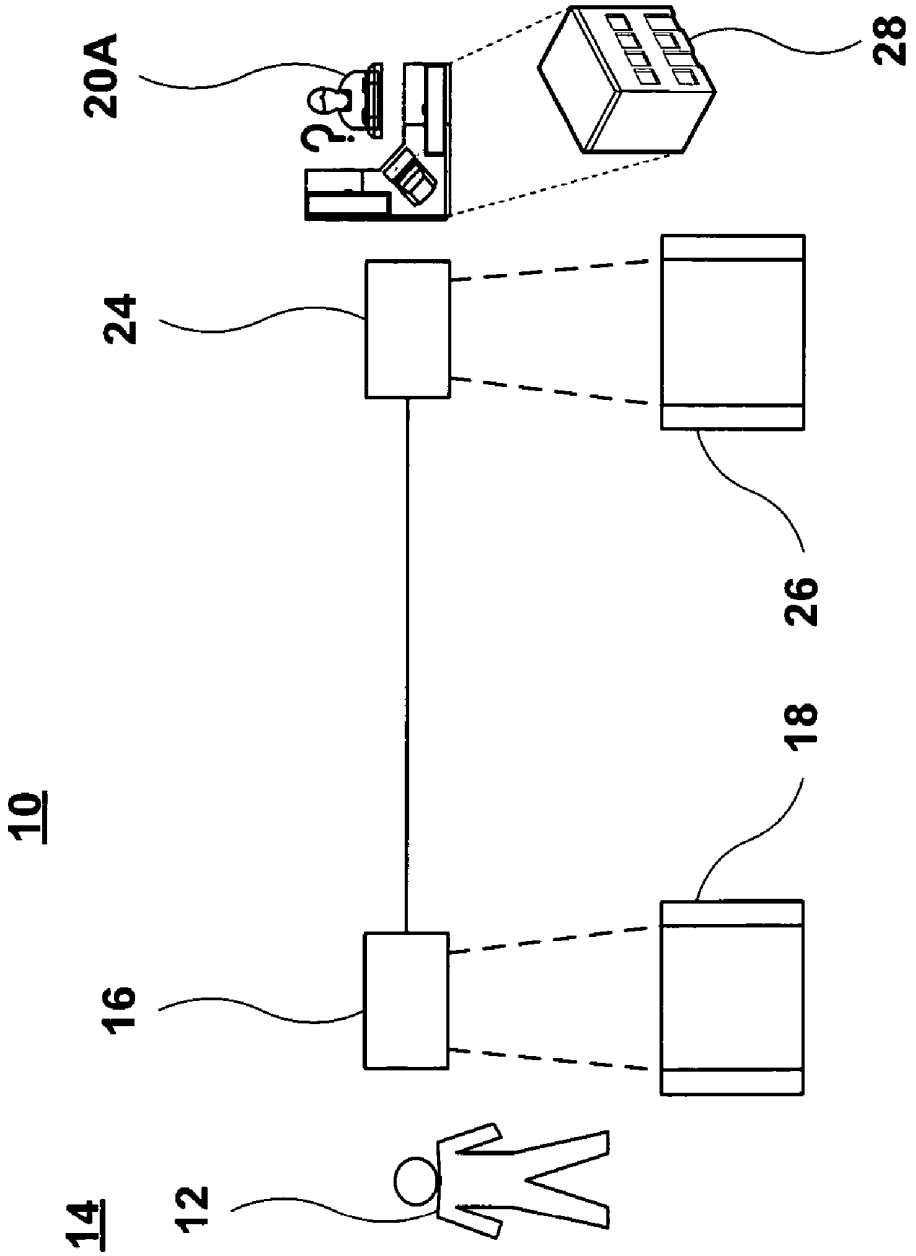


FIG. 2

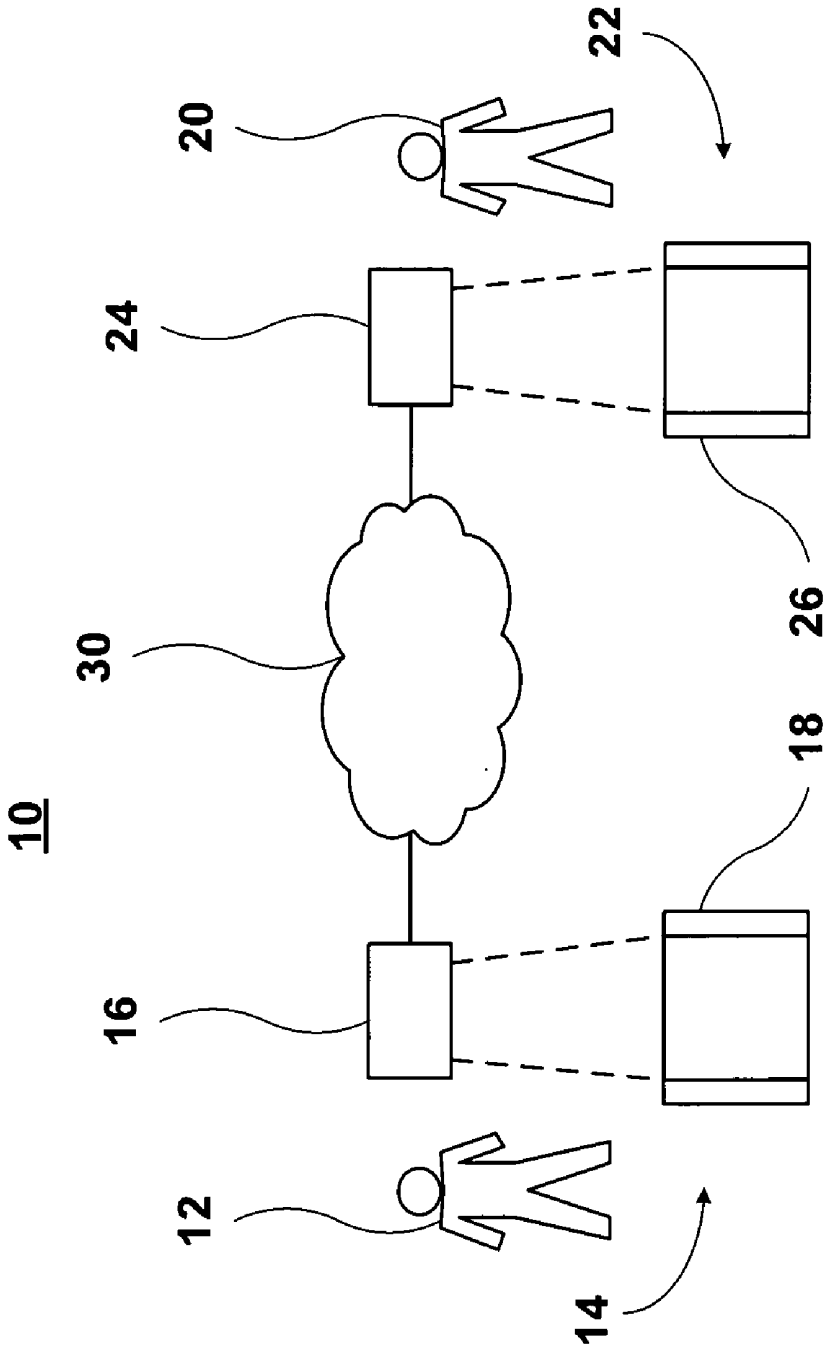


FIG. 3

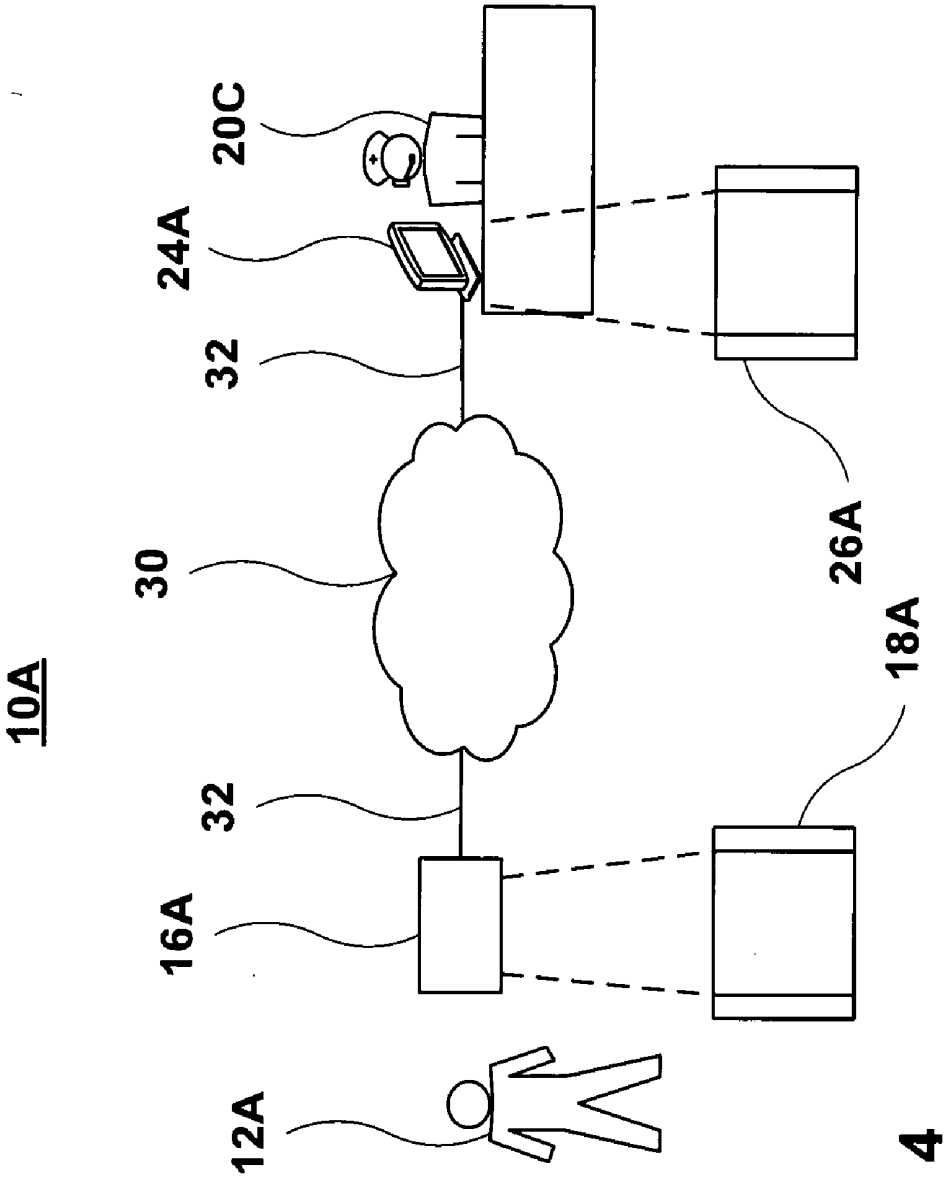


FIG. 4

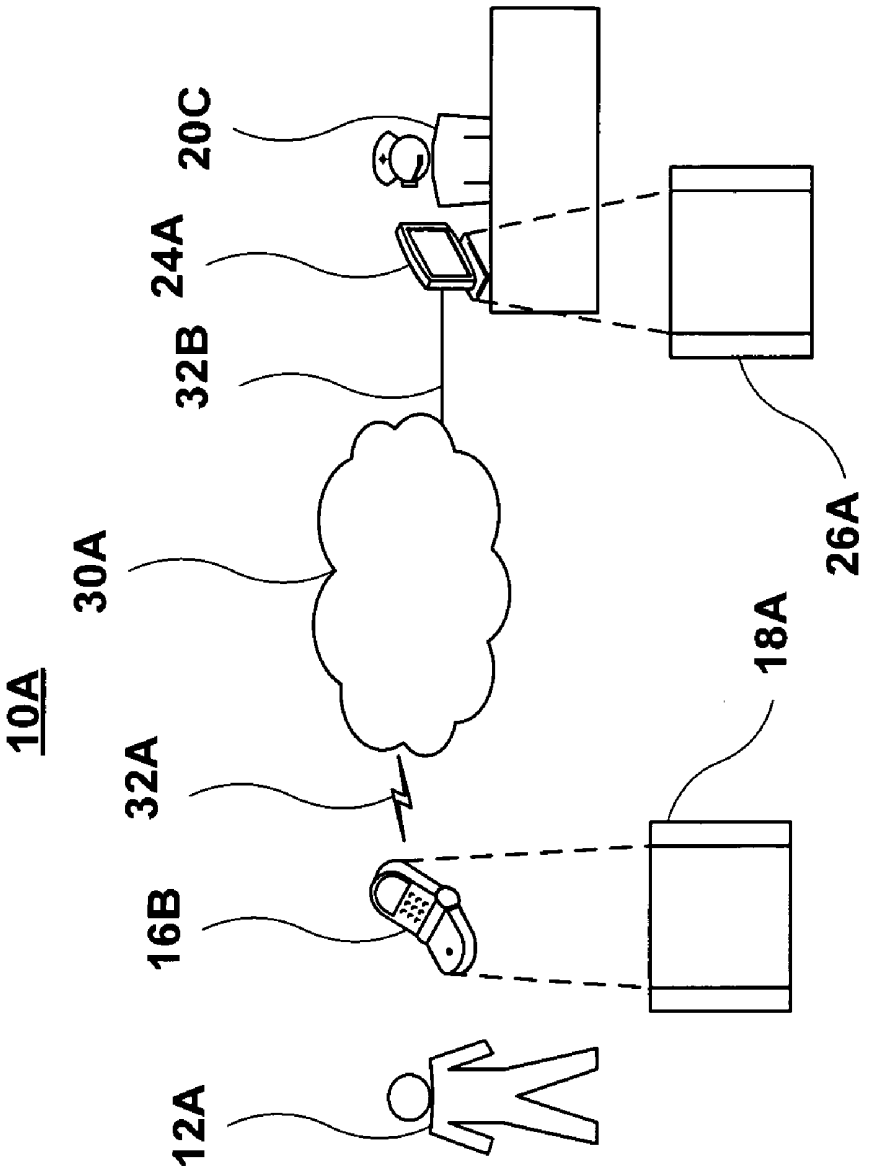


FIG. 5

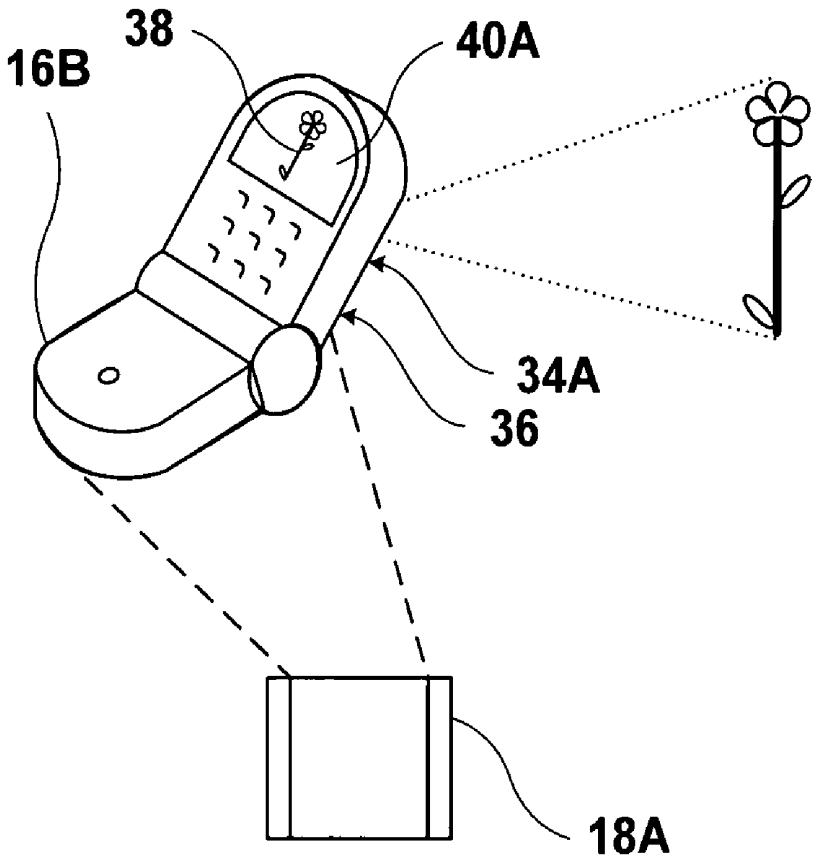


FIG. 6

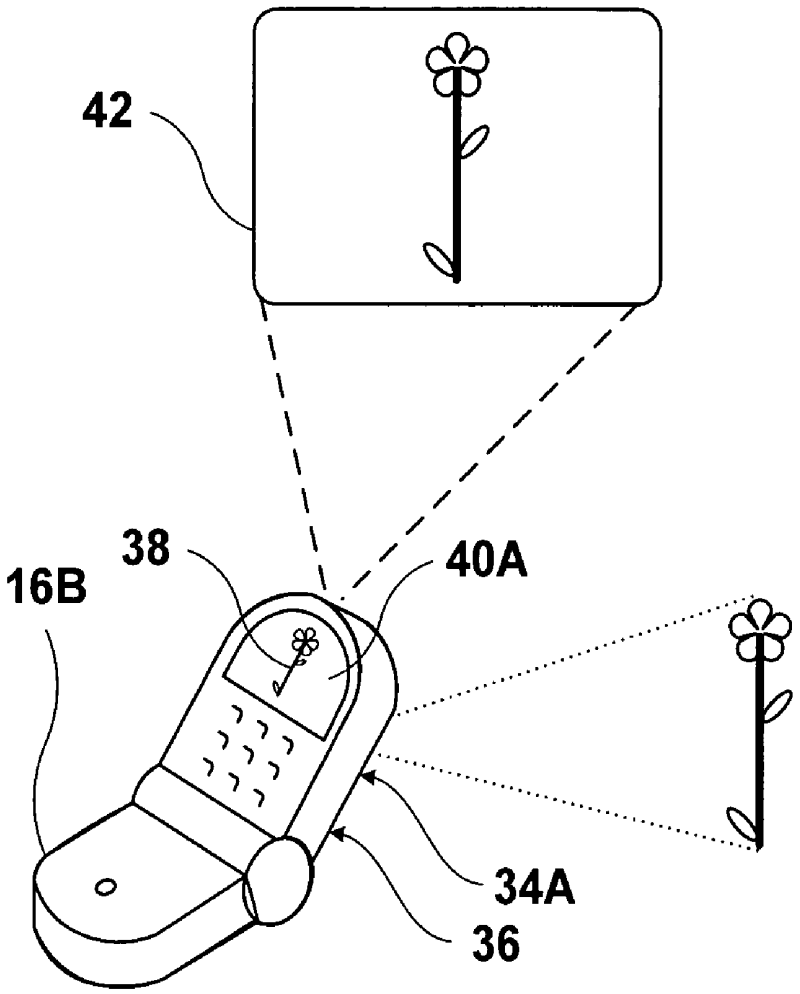


FIG. 7

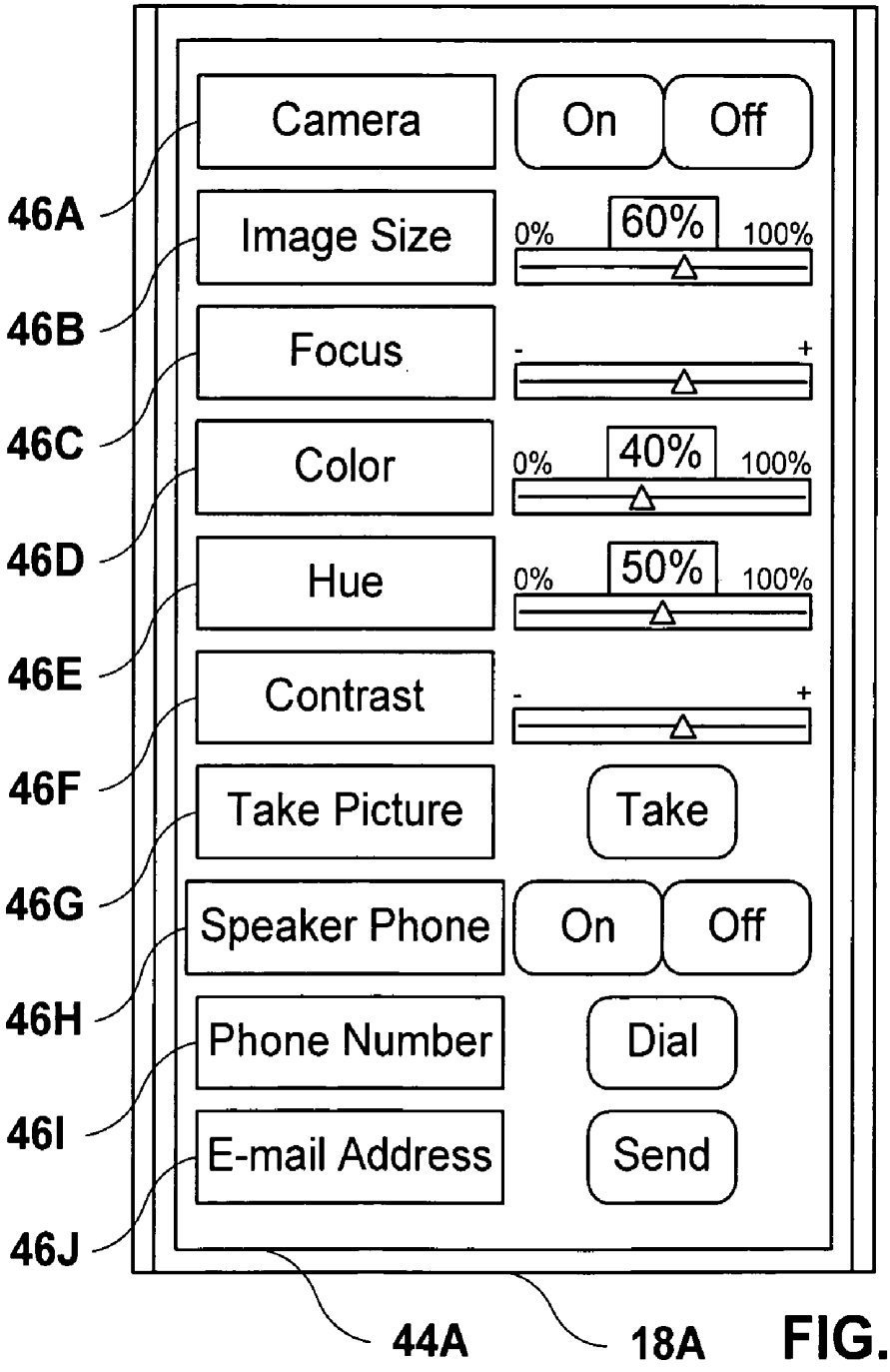

Camera
On
Off
Image Size
0%
60%
100%
Focus
-
+
Color
0%
40%
100%
Hue
0%
50%
100%
Contrast
-
+
Take Picture
Take
Speaker Phone
On
Off
Phone Number
Dial
E-mail Address
Send
46A
46B
46C
46D
46E
46F
46G
46H
46I
46J
44A
18A

FIG. 8

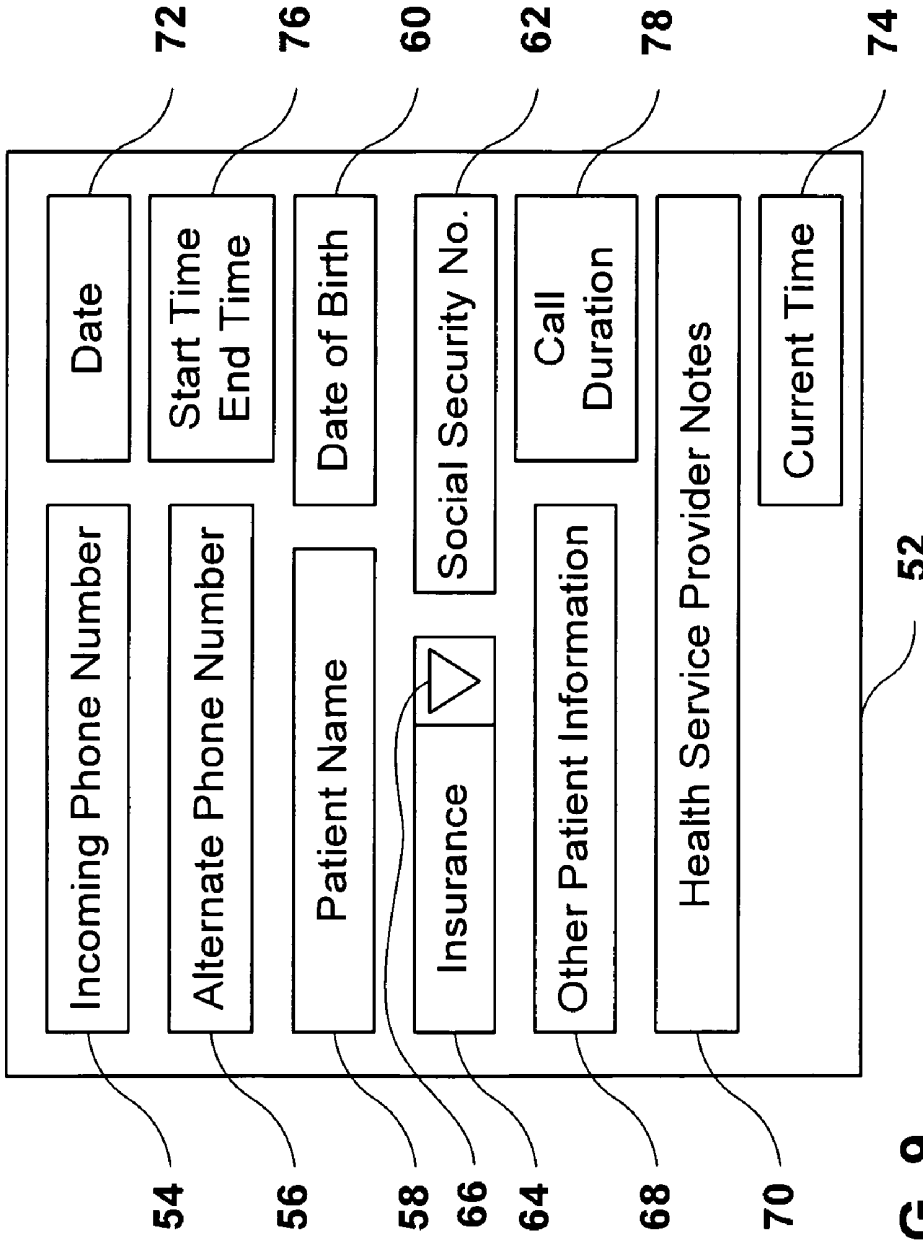

72
76
60
62
78
74
Date
Start Time
End Time
Date of Birth
Social Security No.
Call
Duration
Current Time
Incoming Phone Number
Alternate Phone Number
Patient Name
Insurance
Other Patient Information
Health Service Provider Notes
52
54
56
58
66
64
68
70

FIG. 9

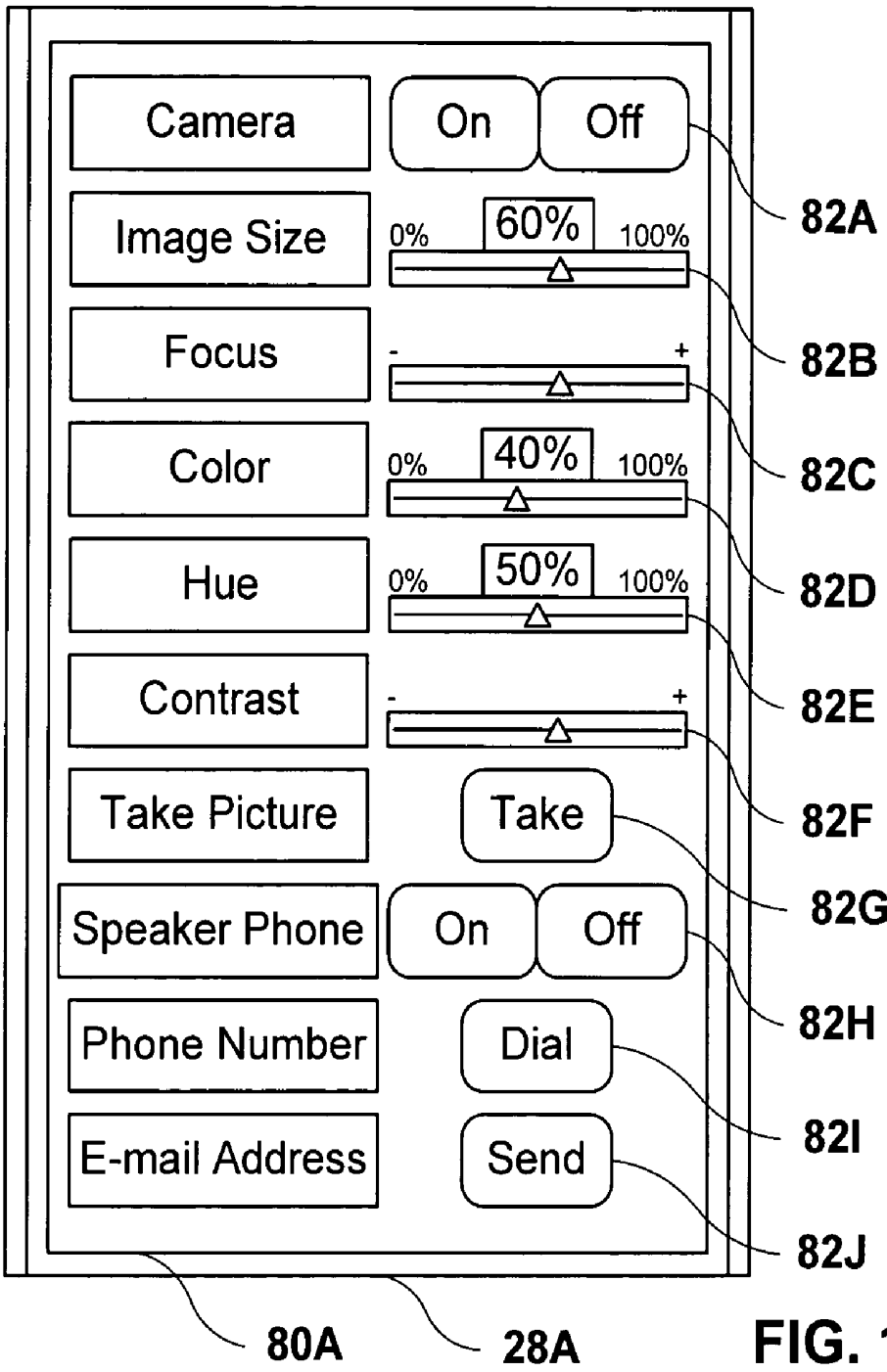

Camera
On
Off
82A
Image Size
0%
60%
100%
82B
Focus
-
+
82C
Color
0%
40%
100%
82D
Hue
0%
50%
100%
82E
Contrast
-
+
82F
Take Picture
Take
82G
Speaker Phone
On
Off
82H
Phone Number
Dial
82I
E-mail Address
Send
82J
80A
28A

FIG. 10

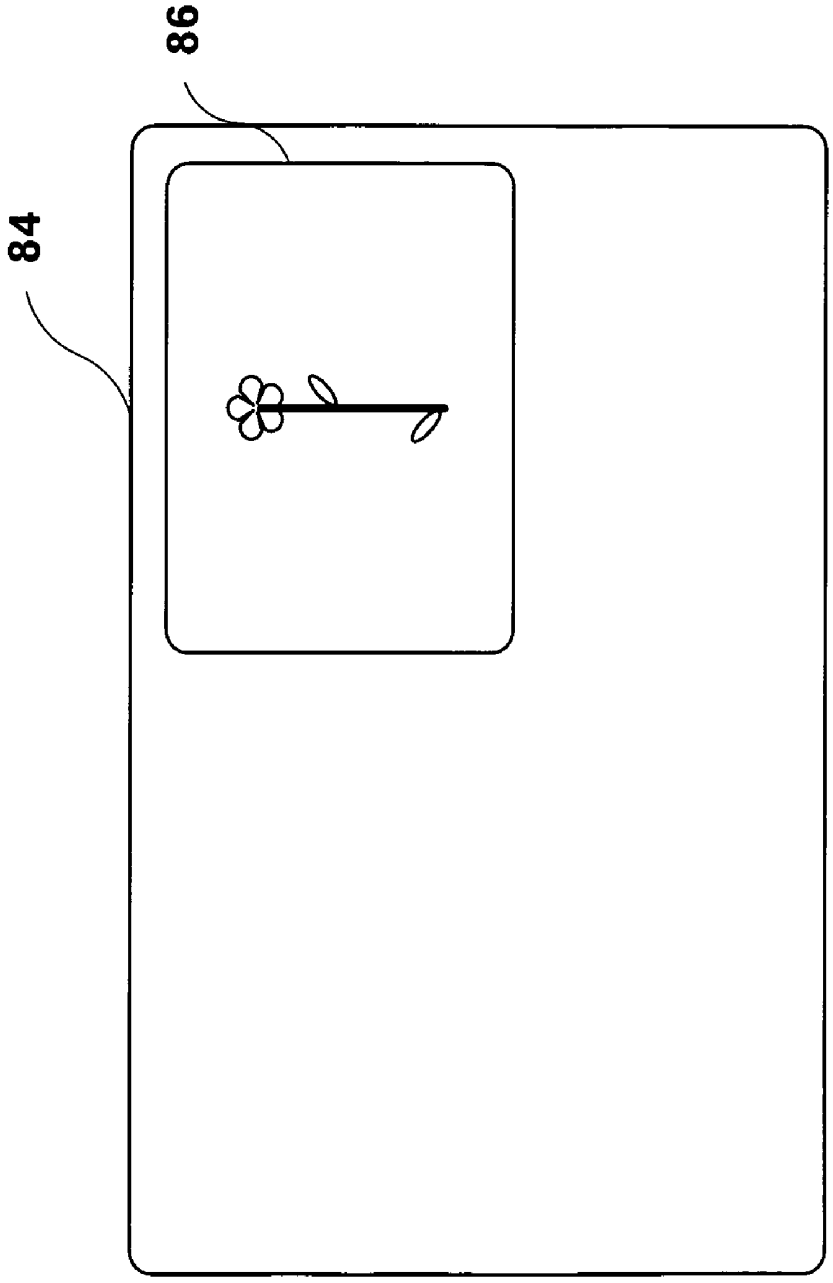


FIG. 11

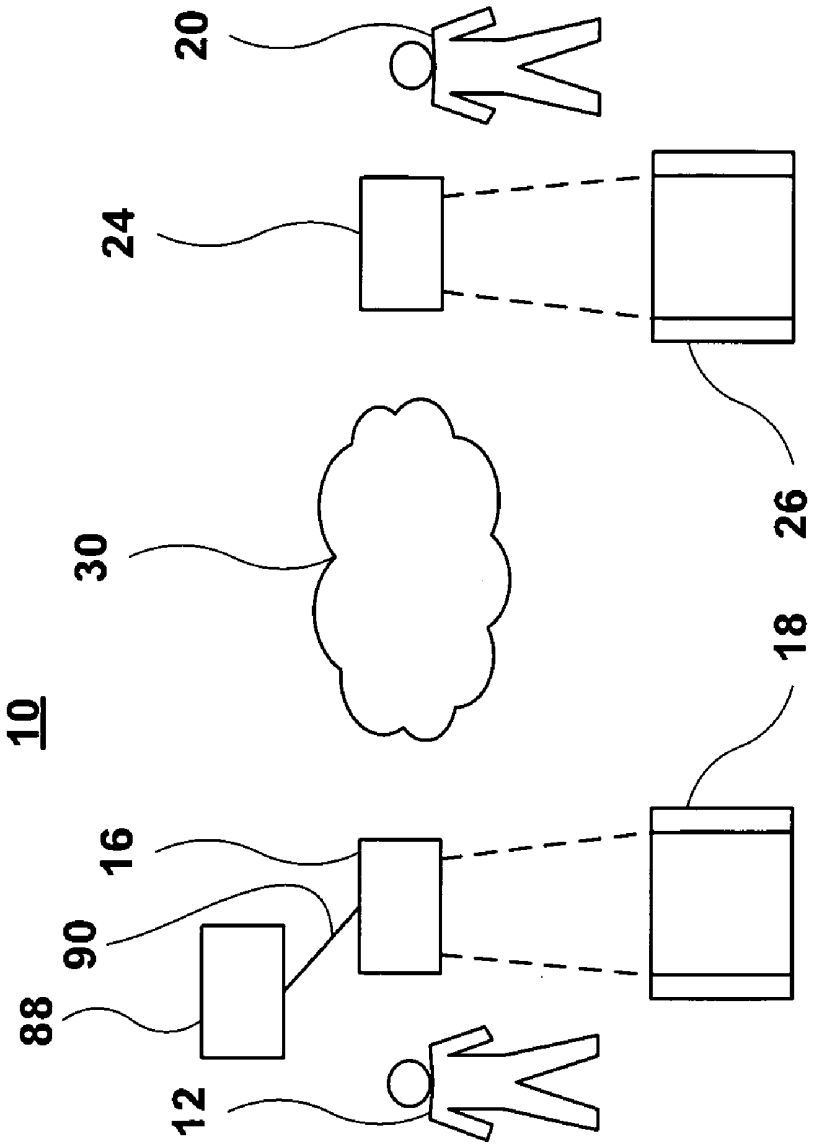


FIG. 12

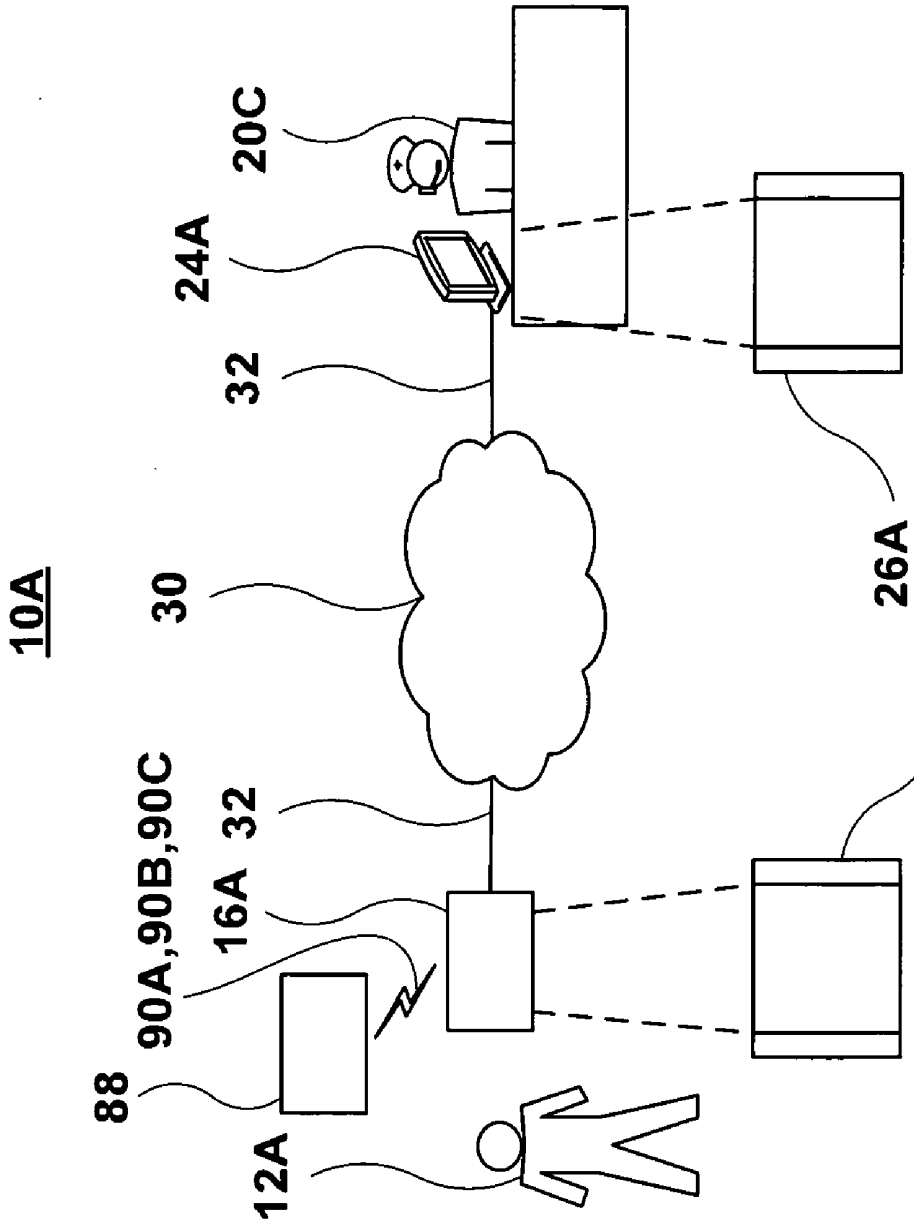


FIG. 13

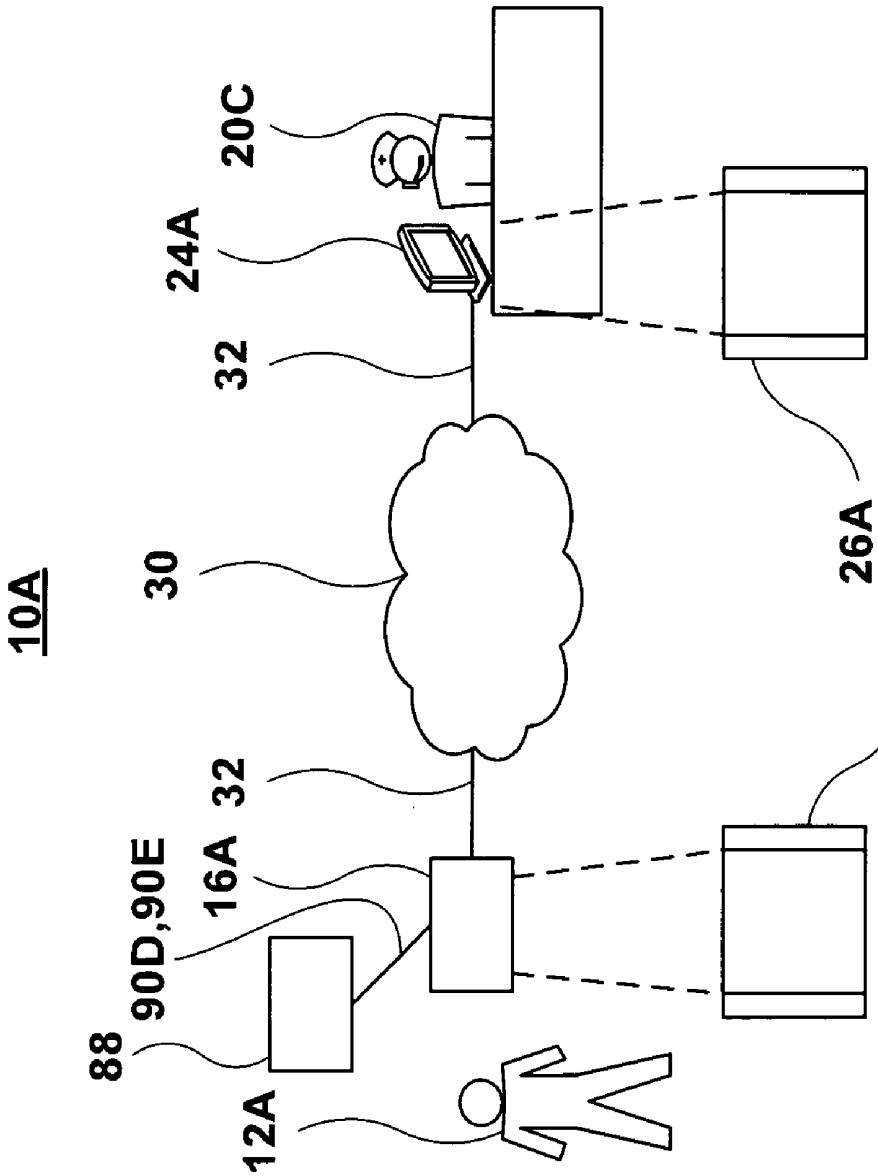


FIG. 14

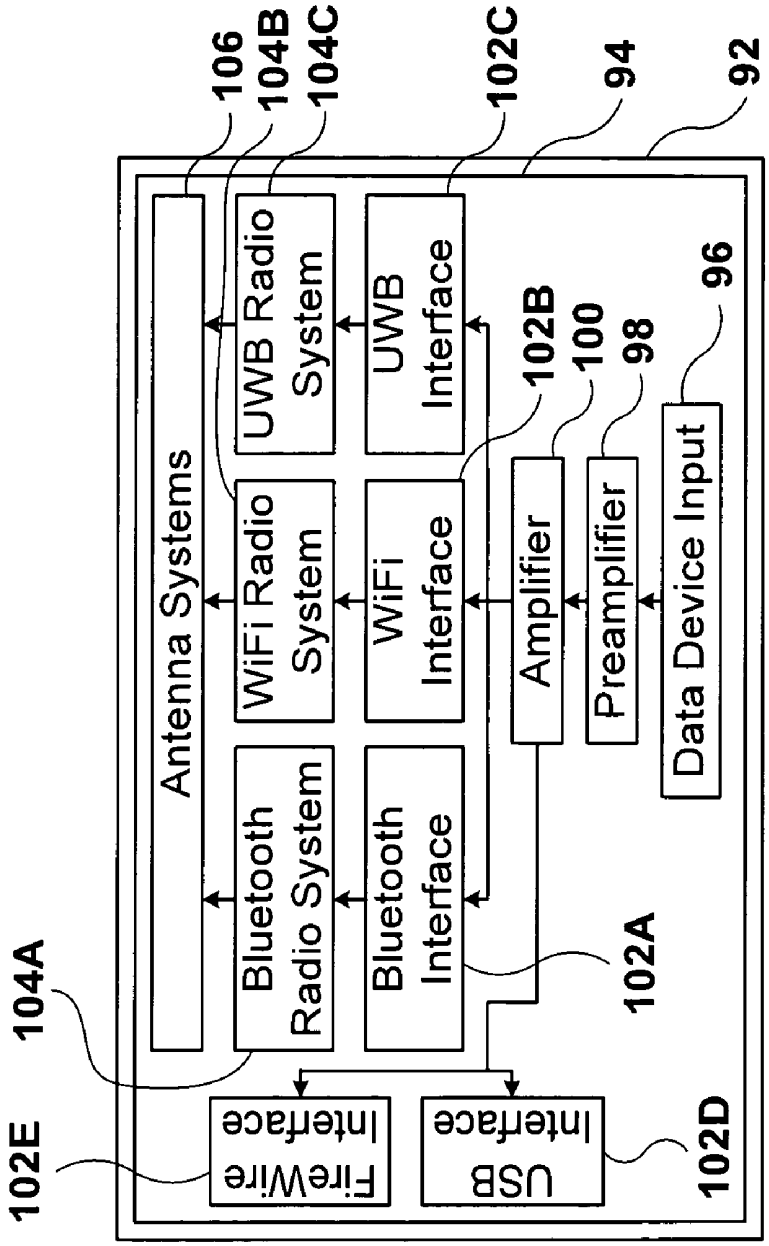

92
94
96
98
100
102A
102B
102C
102D
102E
104A
104B
104C
106
Antenna Systems
UWB Radio System
UWB Interface
WiFi Radio System
WiFi Interface
Amplifier
Preamplifier
Data Device Input
Bluetooth Radio System
Bluetooth Interface
FireWire Interface
USB Interface

FIG. 15

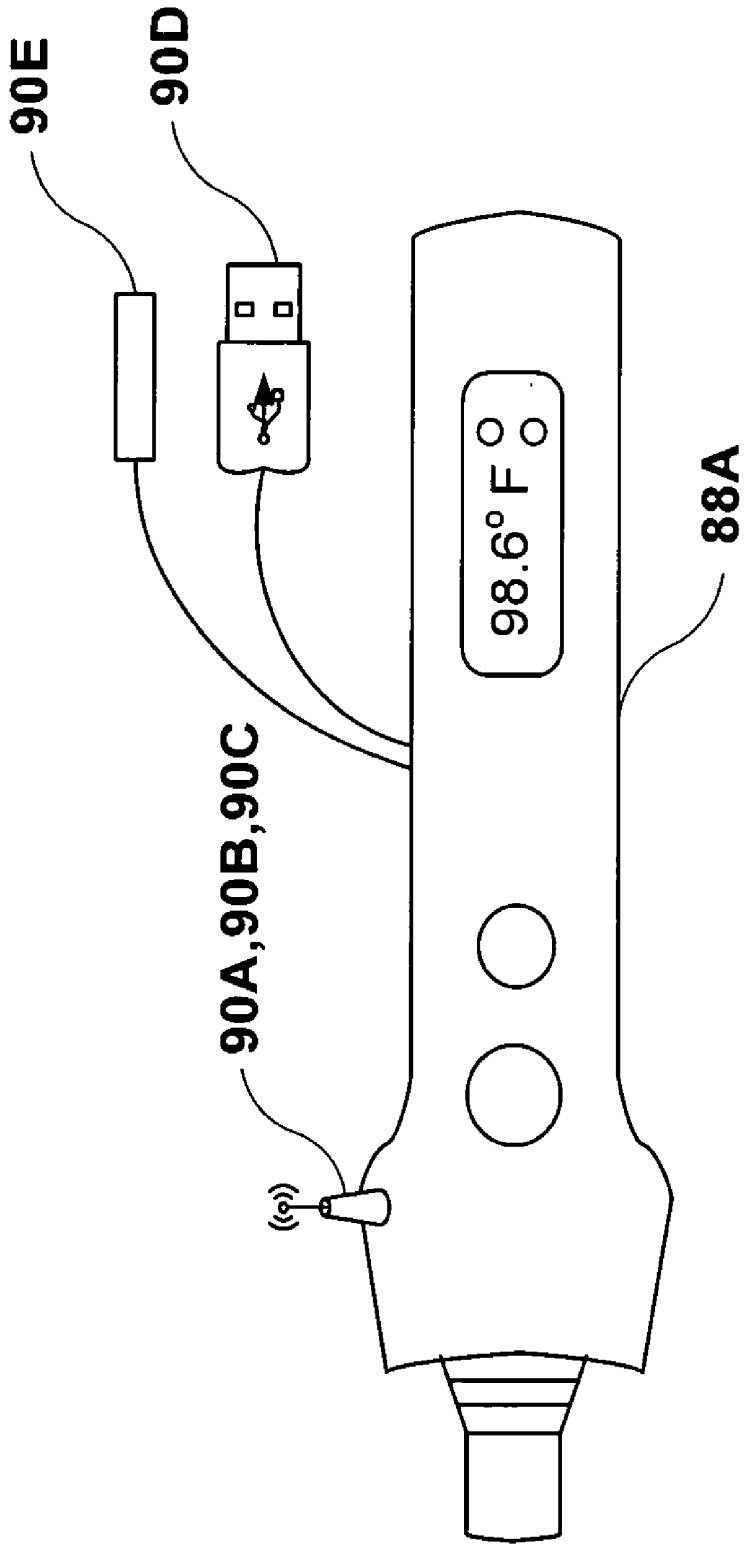


FIG. 16

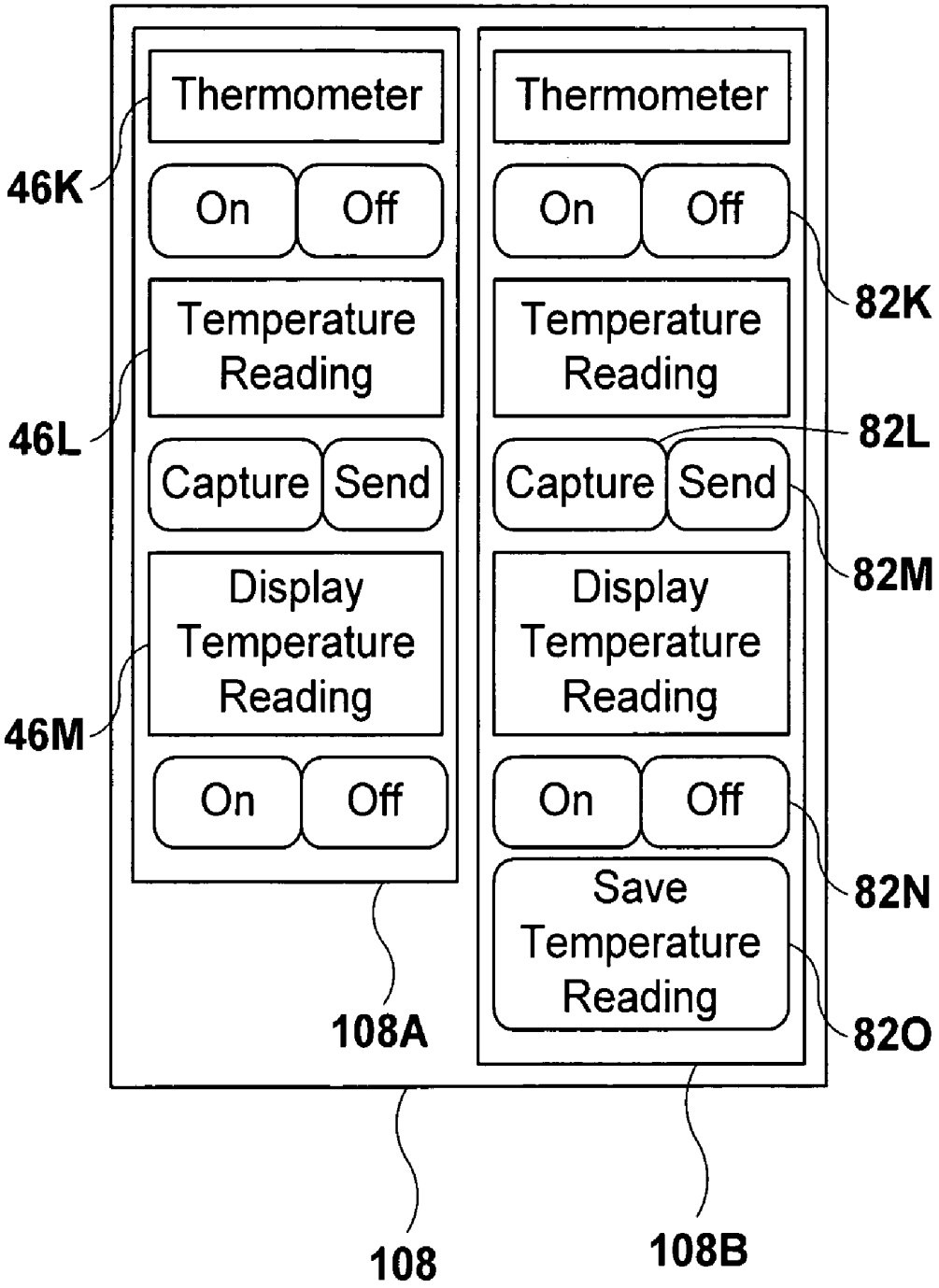

Thermometer
On
Off
Temperature Reading
Capture
Send
Display Temperature Reading
On
Off
Thermometer
On
Off
Temperature Reading
Capture
Send
Display Temperature Reading
On
Off
Save Temperature Reading
46K
46L
46M
82K
82L
82M
82N
82O
108A
108
108B

FIG. 17

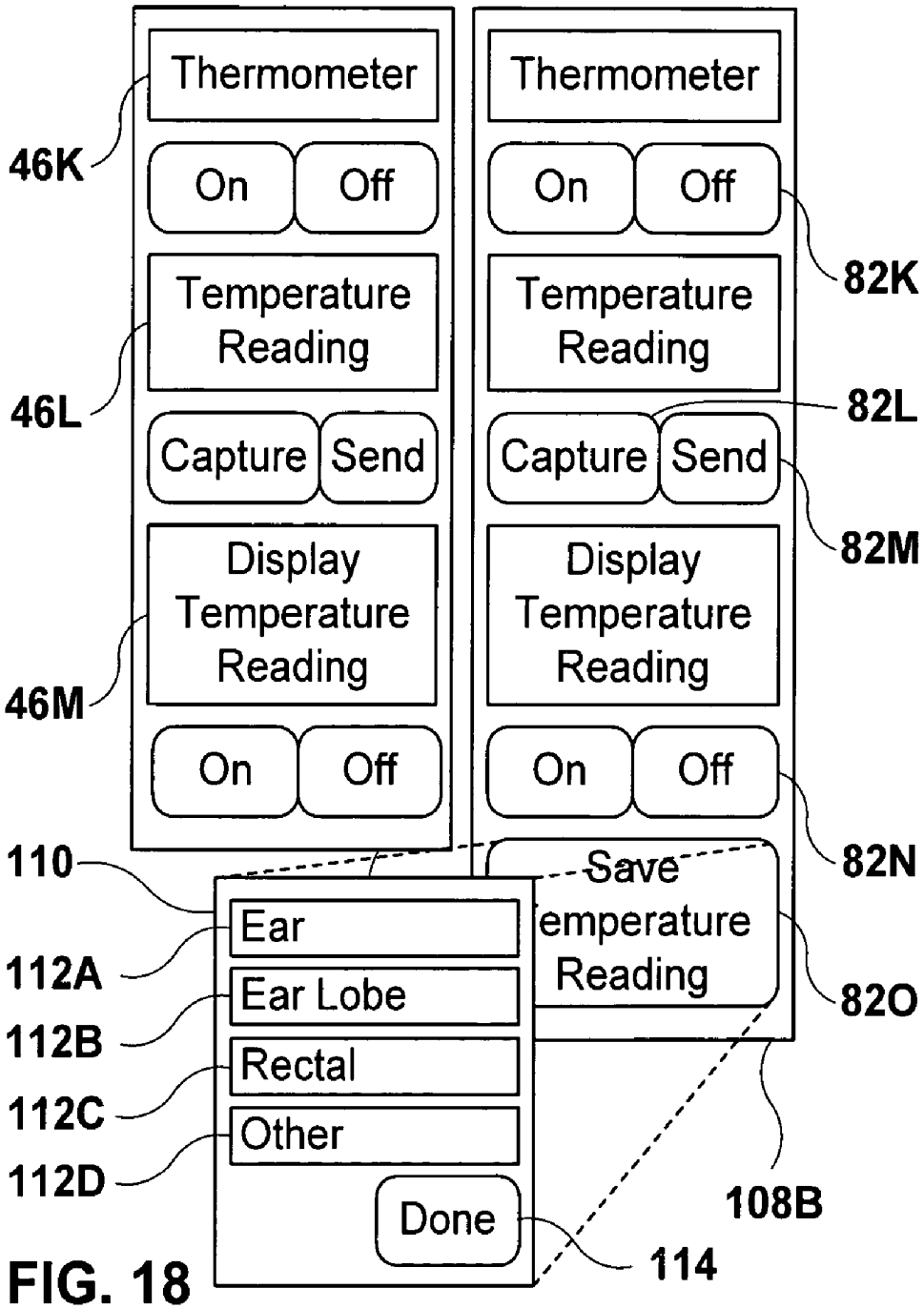

Thermometer
On
Off
Temperature Reading
Capture
Send
Display Temperature Reading
On
Off
Thermometer
On
Off
Temperature Reading
Capture
Send
Display Temperature Reading
On
Off
Save
emperature Reading
Ear
Ear Lobe
Rectal
Other
Done
46K
46L
46M
82K
82L
82M
82N
82O
110
112A
112B
112C
112D
108B
114

FIG. 18

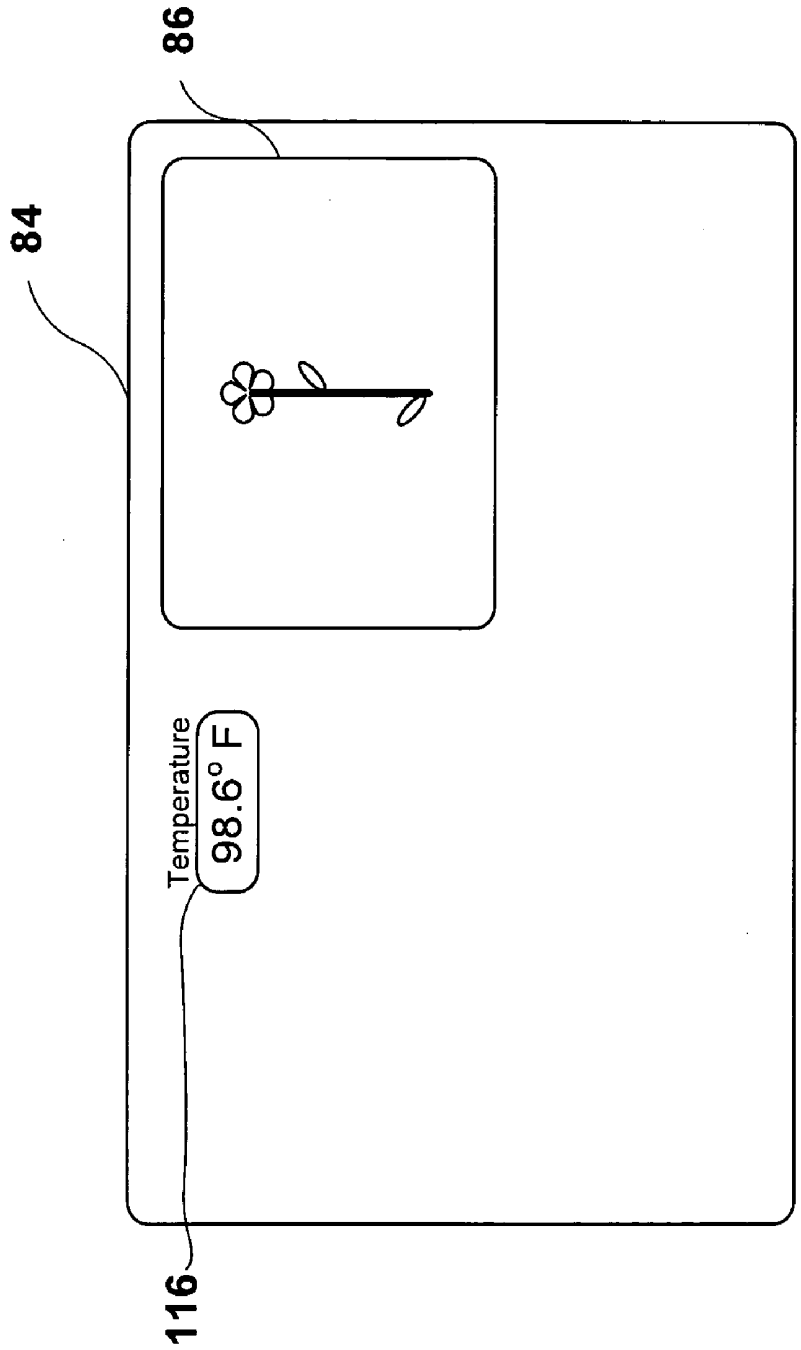


FIG. 19

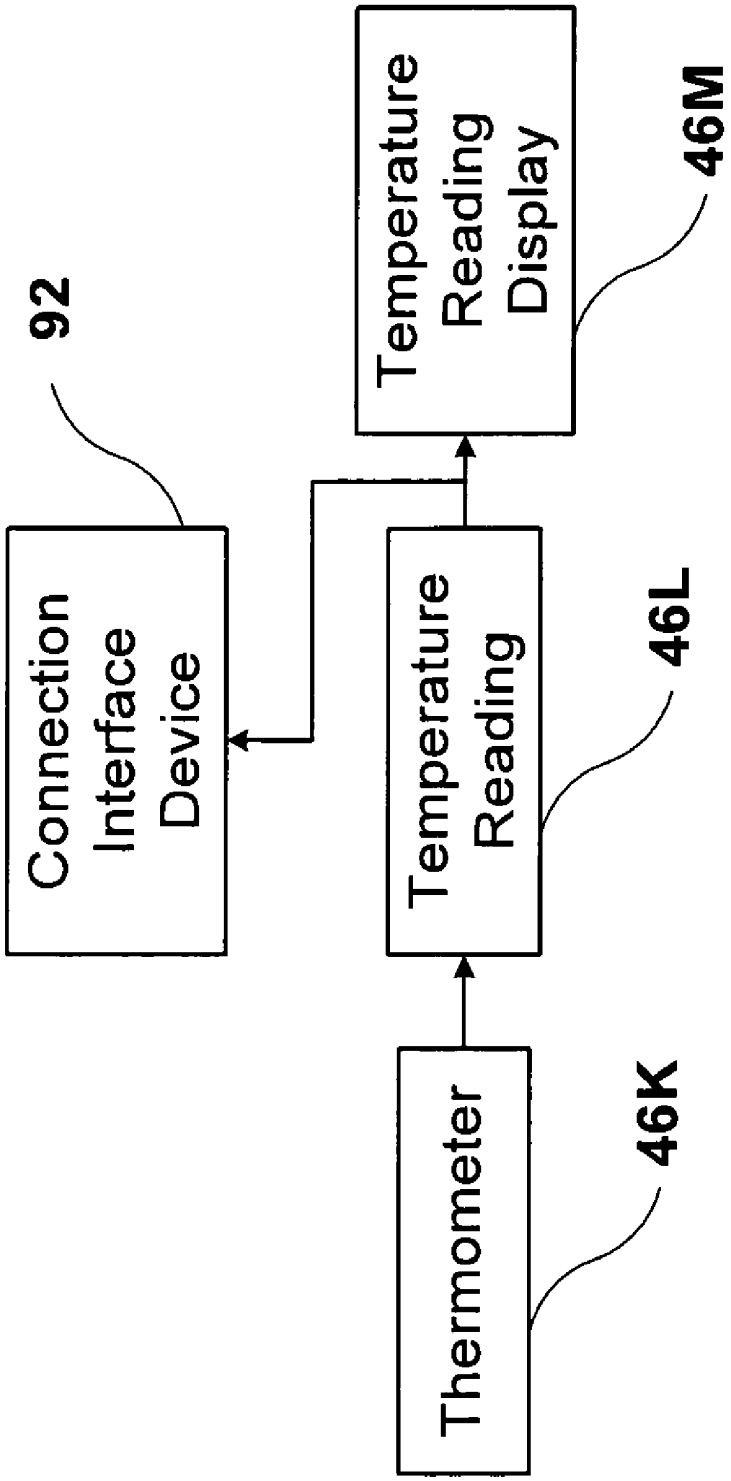

Temperature Reading Display
46M
92
Connection Interface Device
Temperature Reading
46L
Thermometer
46K

FIG. 20

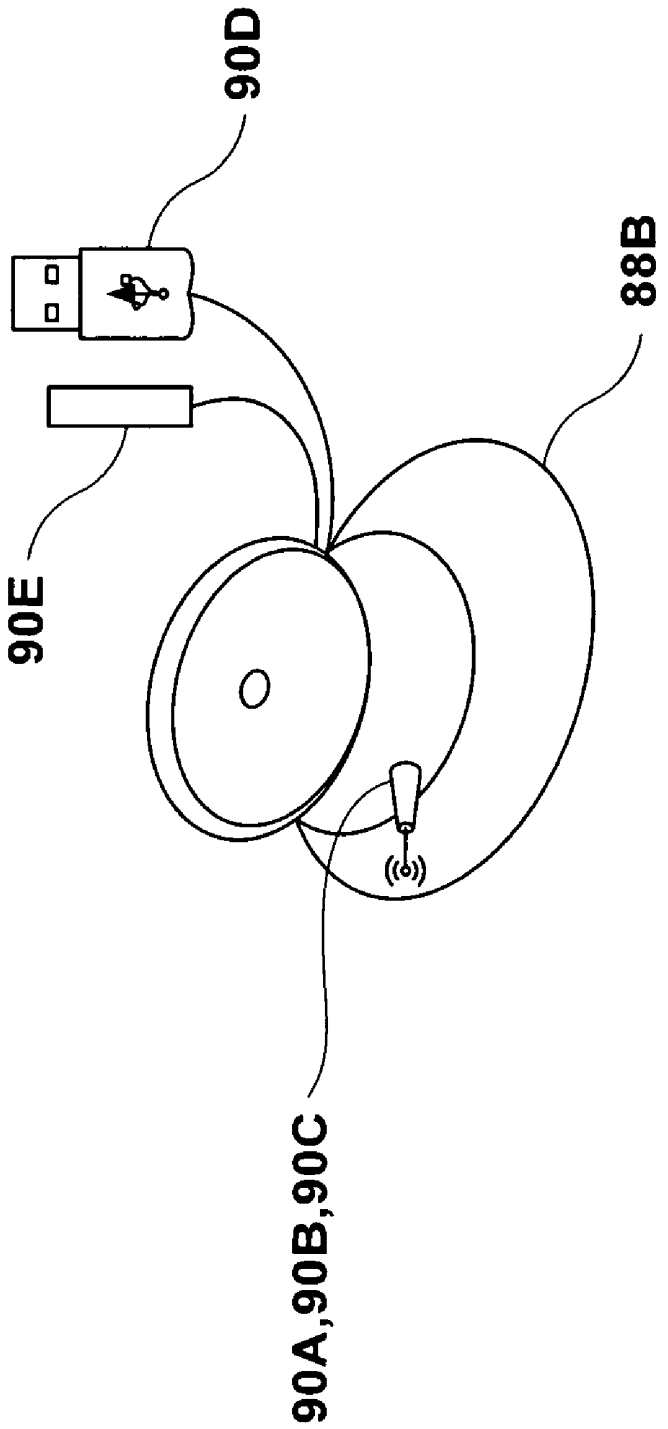


FIG. 21

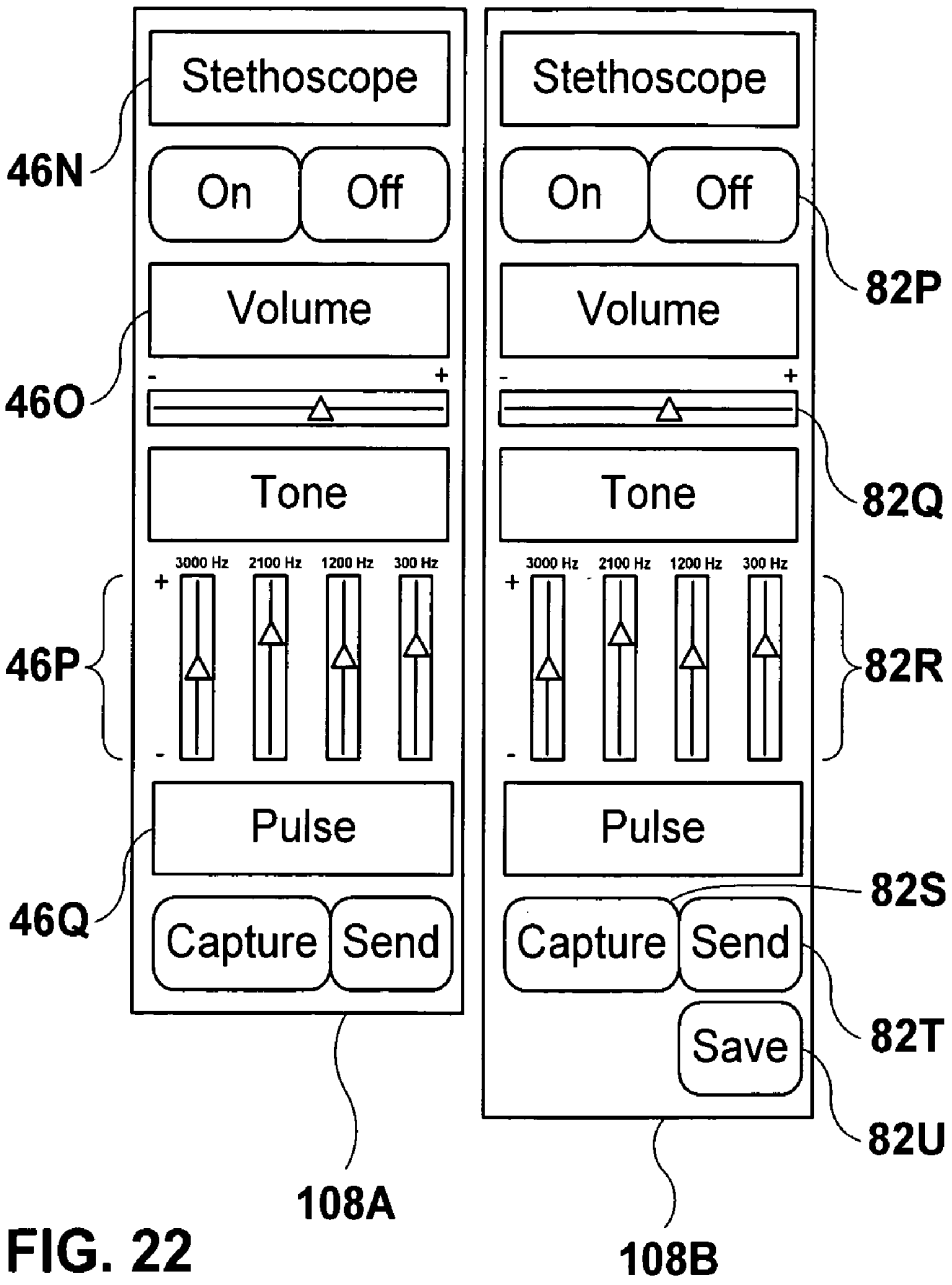

Stethoscope
On
Off
Volume
Tone
3000 Hz
2100 Hz
1200 Hz
300 Hz
Pulse
Capture
Send
Save
46N
46O
46P
46Q
82P
82Q
82R
82S
82T
82U
108A
108B

FIG. 22

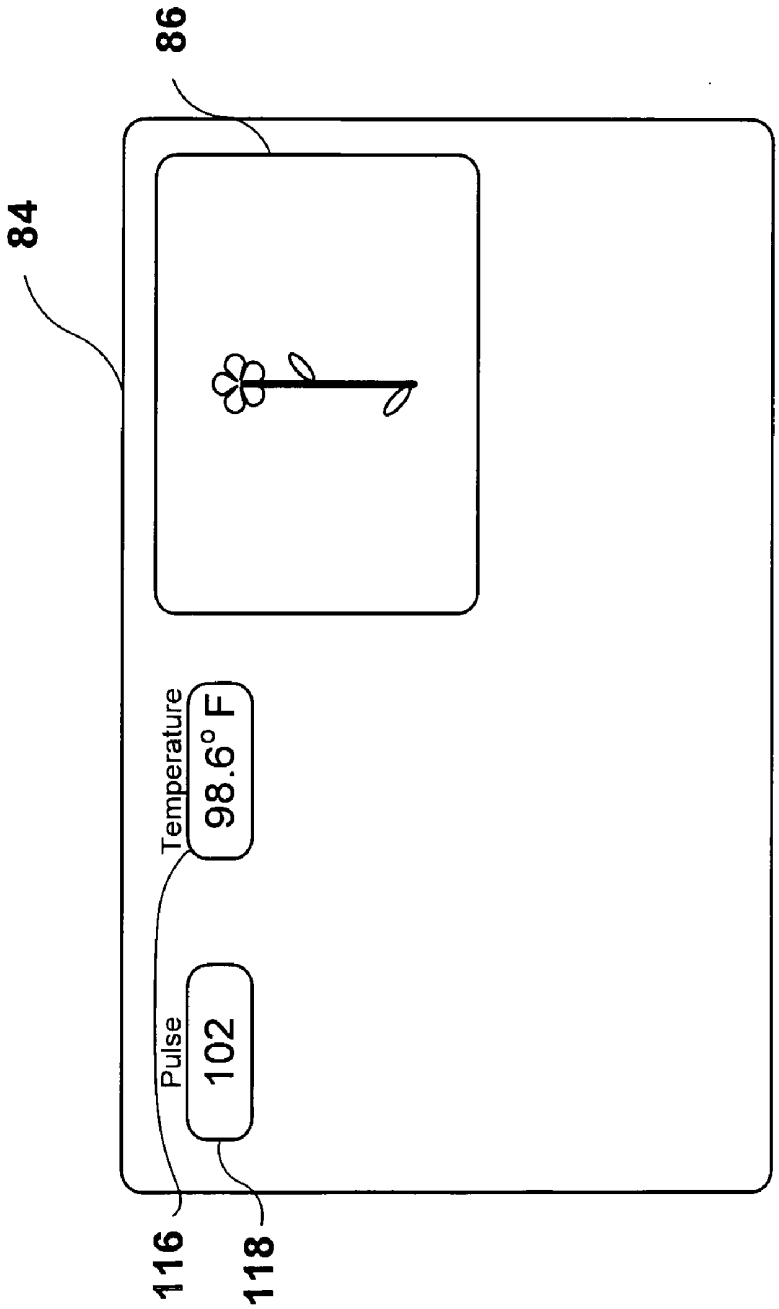


FIG. 23

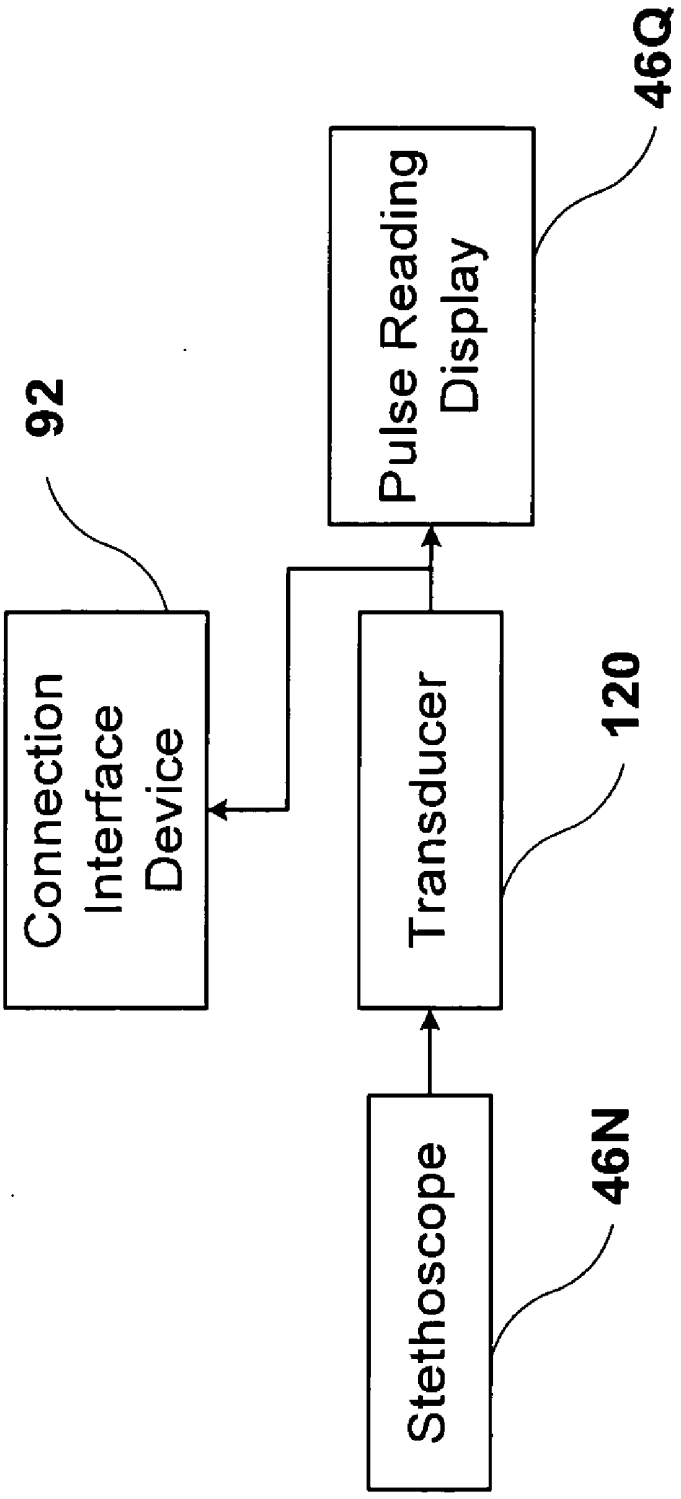

46Q
Pulse Reading Display
92
Connection Interface Device
Transducer
120
Stethoscope
46N

FIG. 24

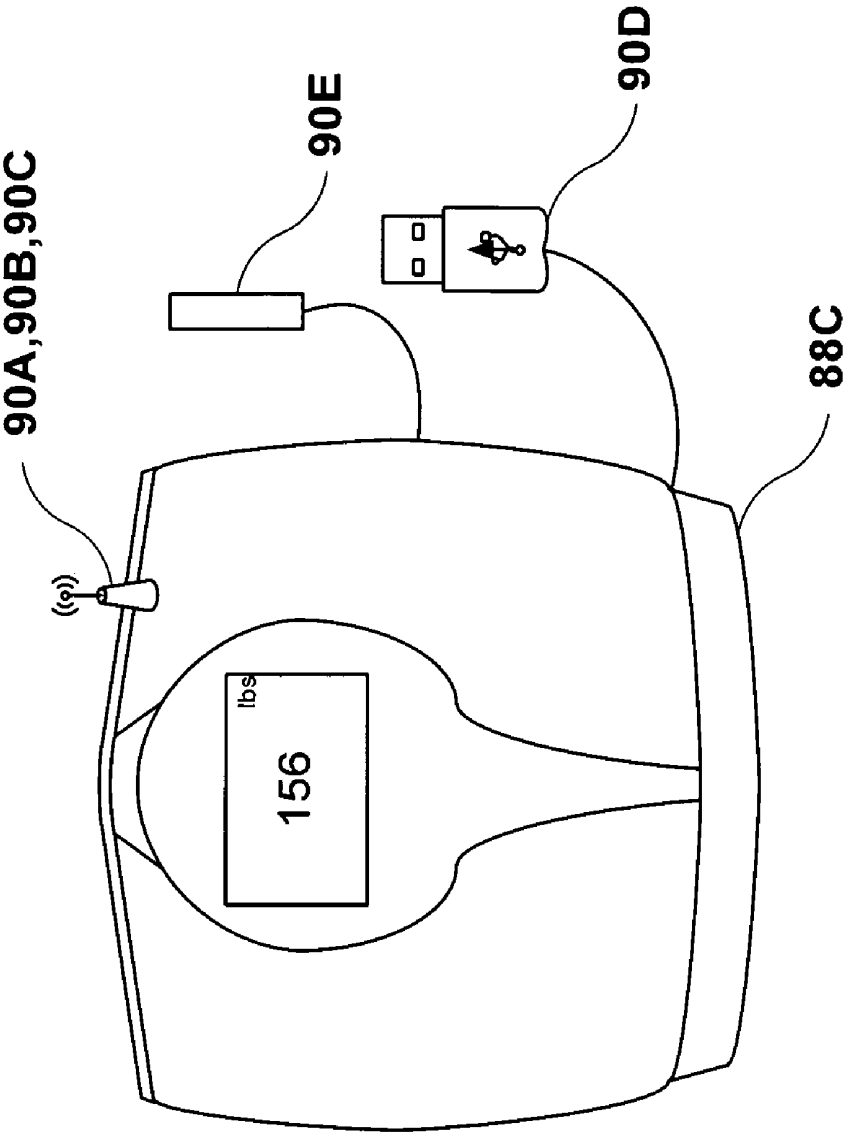


FIG. 25

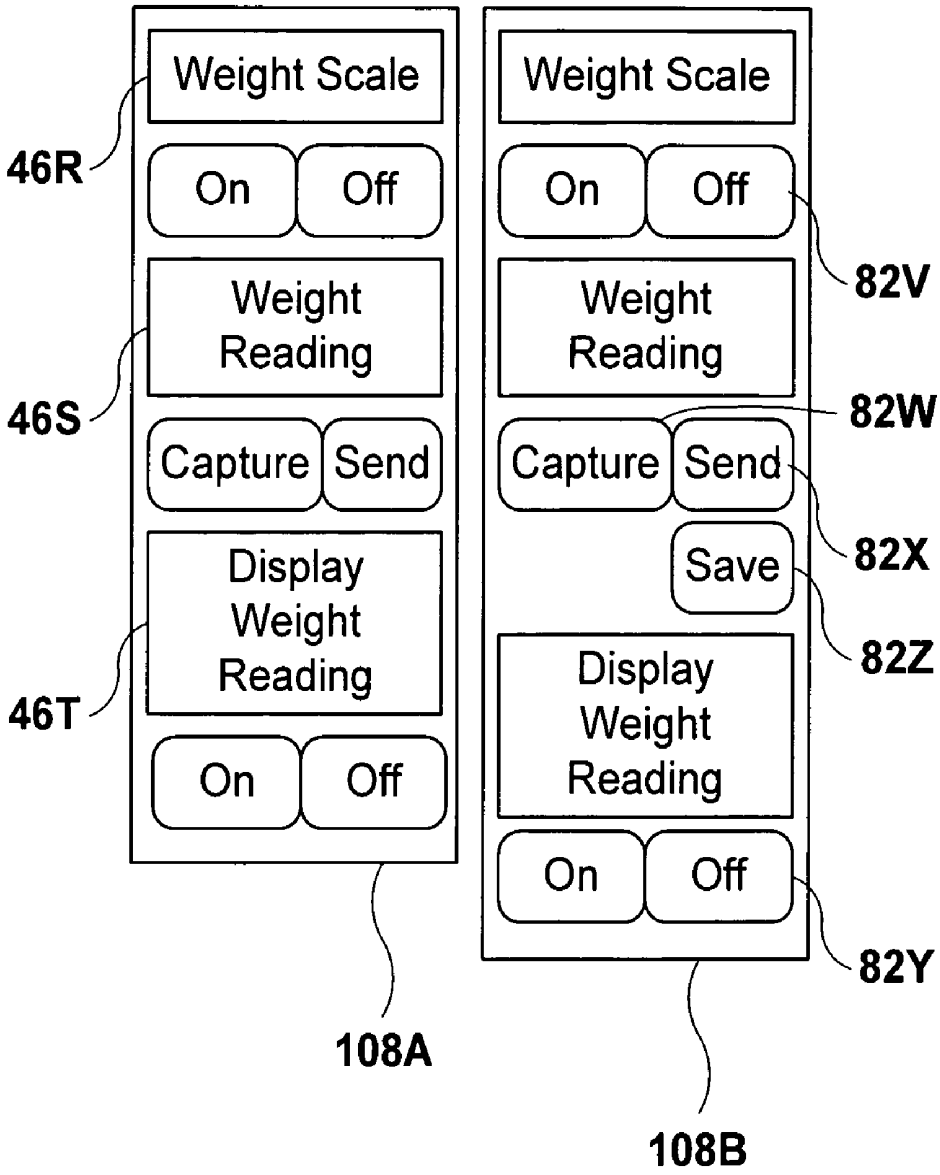

Weight Scale
On
Off
Weight Reading
Capture
Send
Display Weight Reading
On
Off
46R
46S
46T
108A
Weight Scale
On
Off
Weight Reading
Capture
Send
Save
Display Weight Reading
On
Off
82V
82W
82X
82Z
82Y
108B

FIG. 26

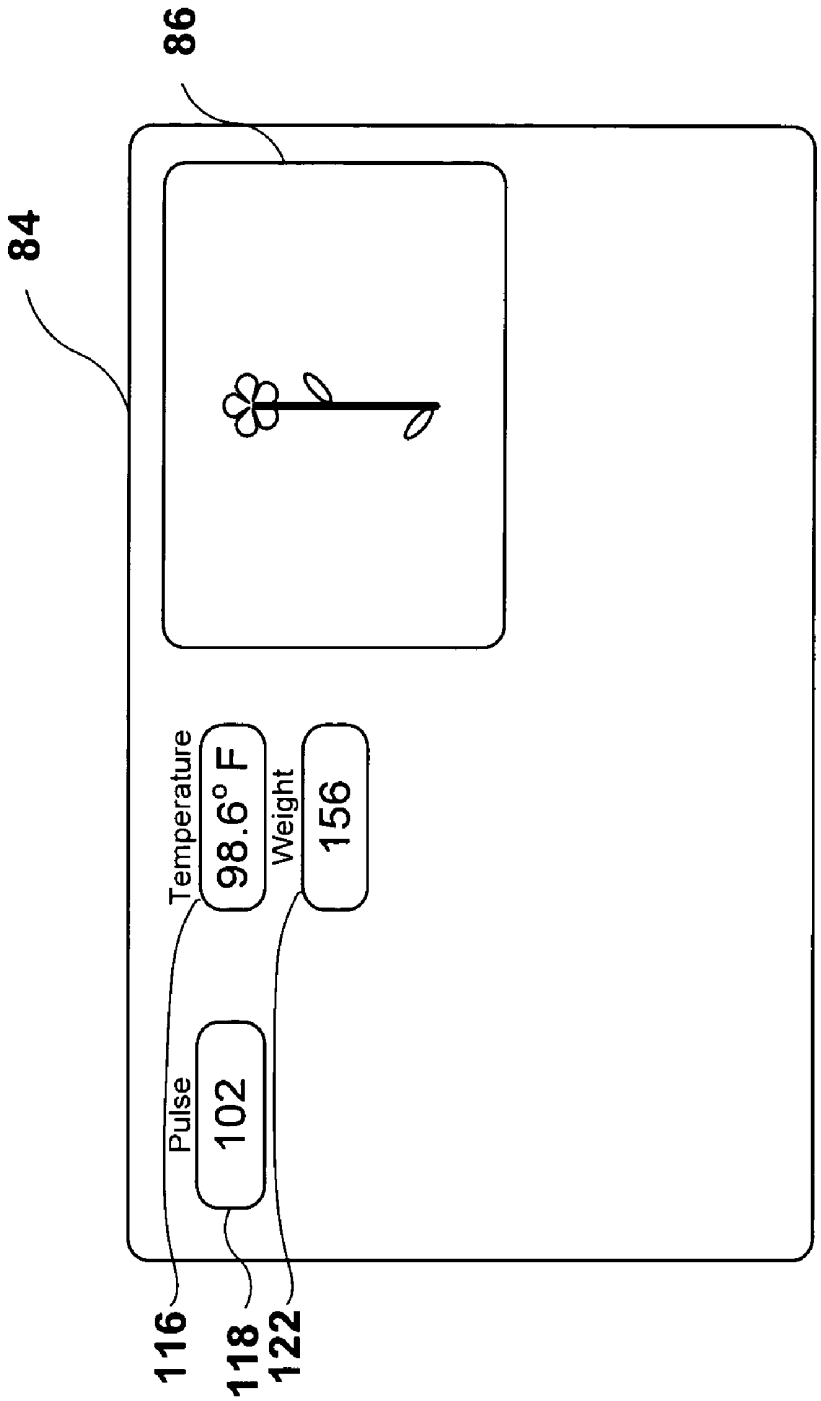


FIG. 27

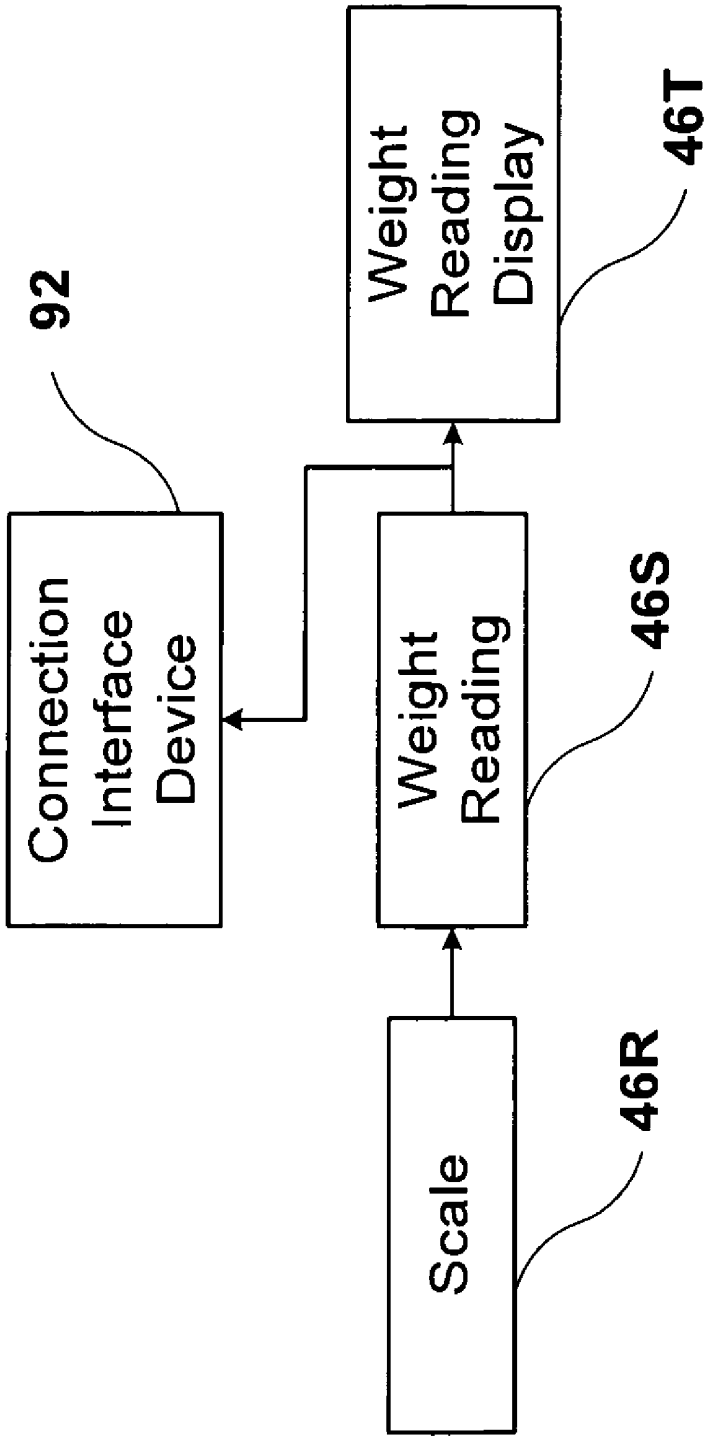

Weight Reading Display
46T
92
Connection Interface Device
Weight Reading
46S
Scale
46R

FIG. 28

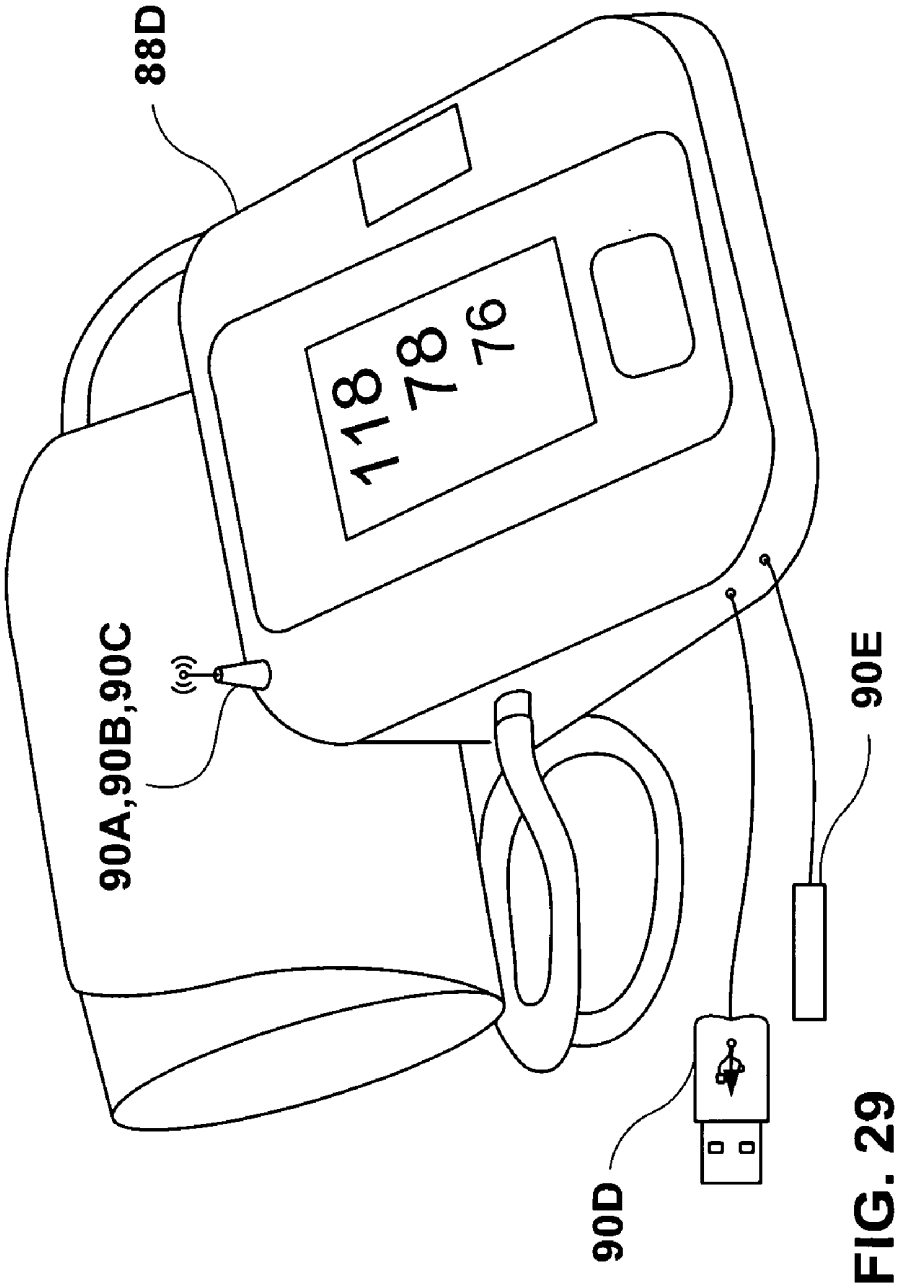


FIG. 29

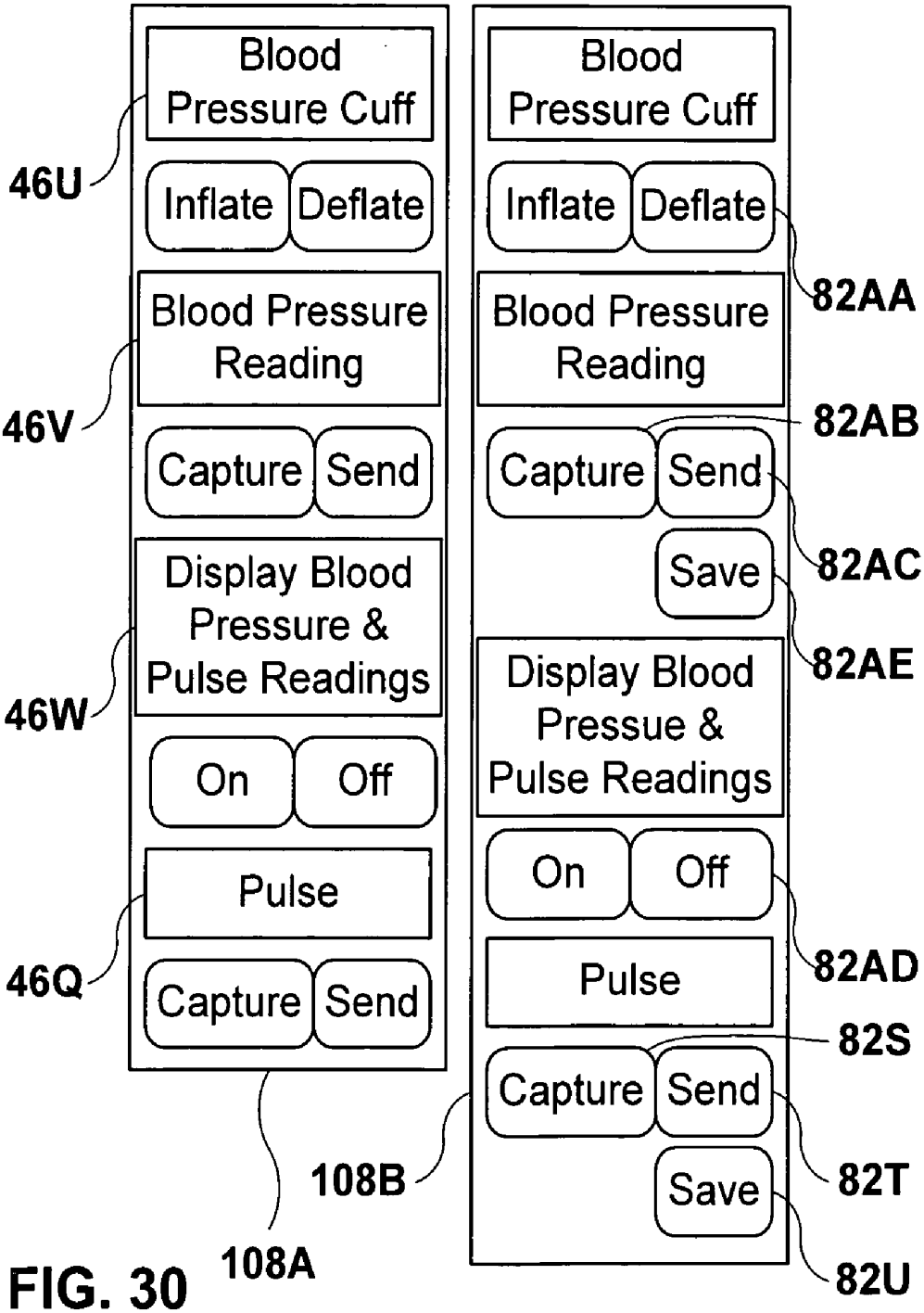

Blood Pressure Cuff
Inflate
Deflate
Blood Pressure Reading
Capture
Send
Display Blood Pressure & Pulse Readings
On
Off
Pulse
Capture
Send
Blood Pressure Cuff
Inflate
Deflate
Blood Pressure Reading
Capture
Send
Save
Display Blood Pressue & Pulse Readings
On
Off
Pulse
Capture
Send
Save
46U
46V
46W
46Q
108A
108B
82AA
82AB
82AC
82AE
82AD
82S
82T
82U

FIG. 30

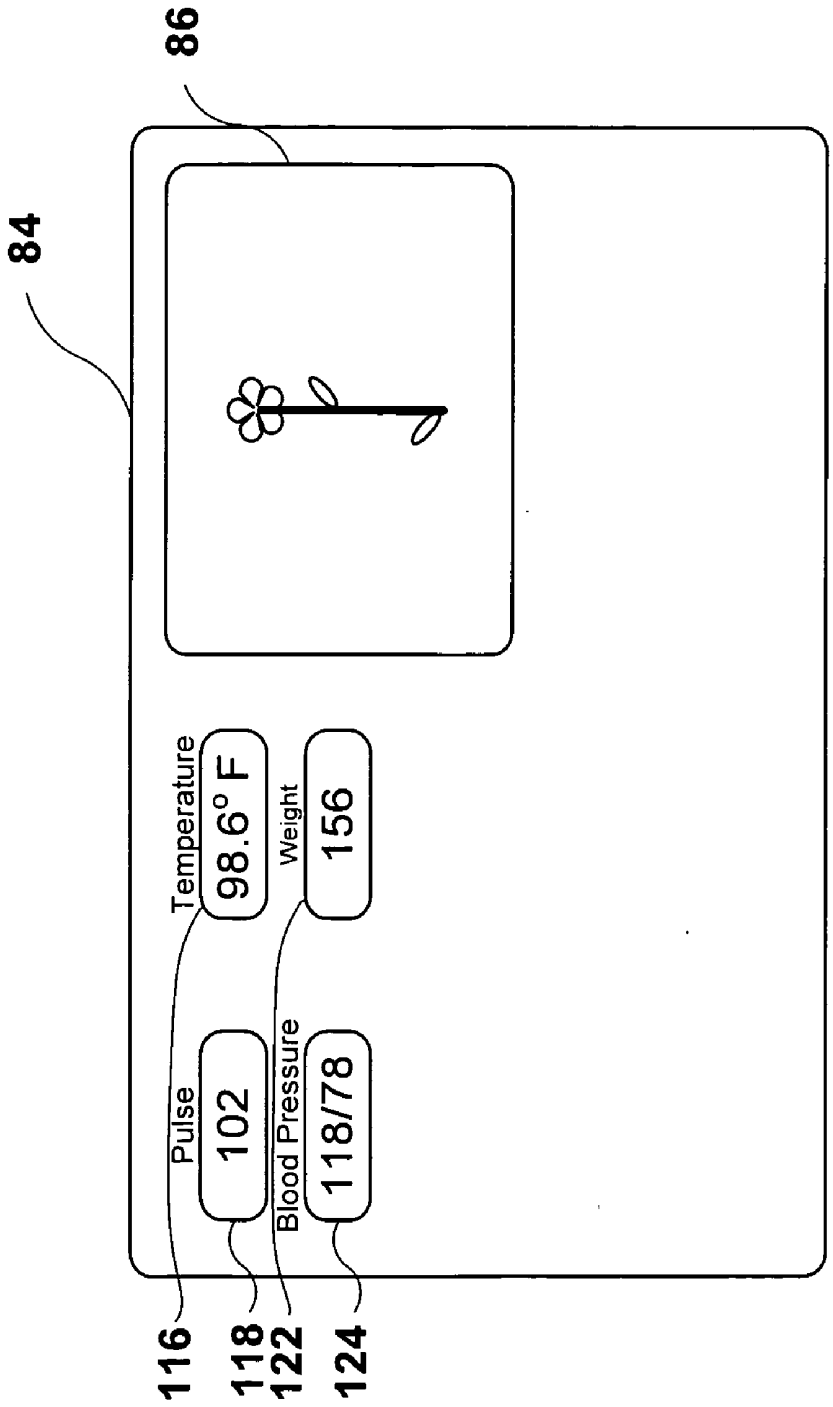

86
84
Temperature
98.6° F
Weight
156
Pulse
102
Blood Pressure
118/78
116
118
122
124

FIG. 31

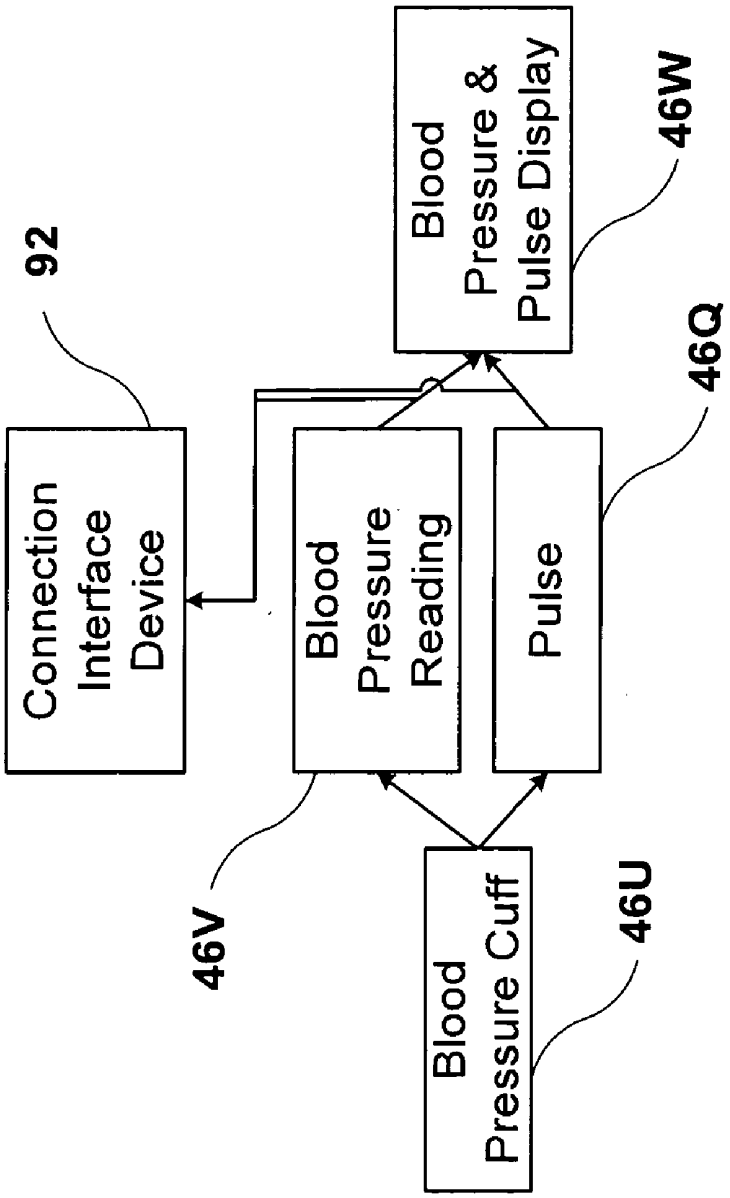

Blood Pressure & Pulse Display
46W
92
46Q
Connection Interface Device
Blood Pressure Reading
Pulse
46V
Blood Pressure Cuff
46U

FIG. 32

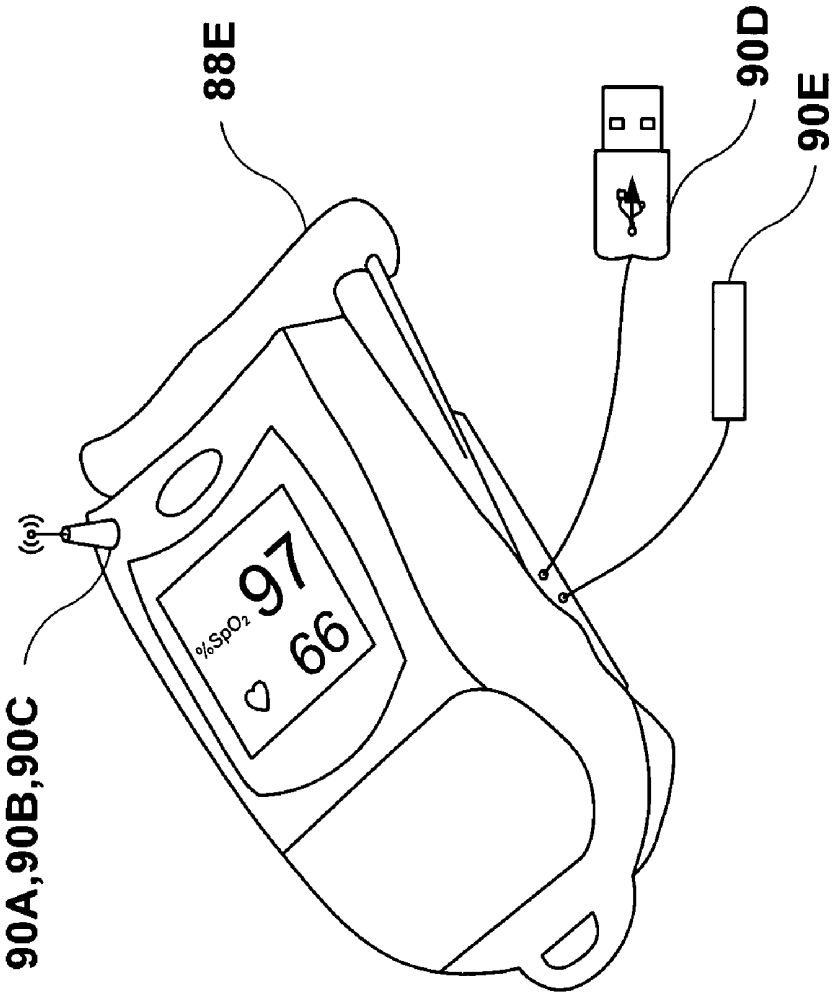


FIG. 33

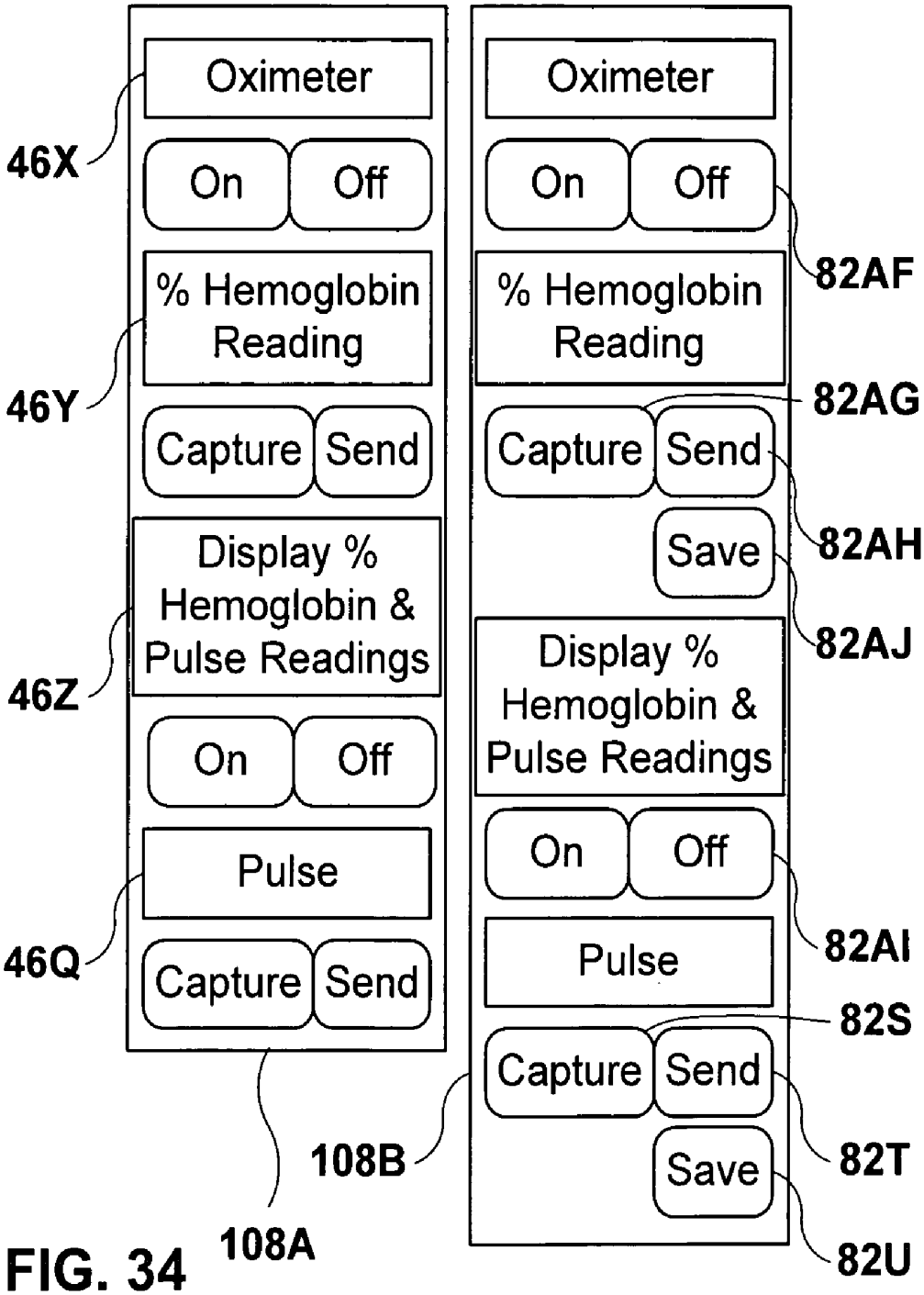

Oximeter
On
Off
% Hemoglobin Reading
Capture
Send
Display % Hemoglobin & Pulse Readings
On
Off
Pulse
Capture
Send
46X
46Y
46Z
46Q
108A
Oximeter
On
Off
% Hemoglobin Reading
Capture
Send
Save
Display % Hemoglobin & Pulse Readings
On
Off
Pulse
Capture
Send
Save
108B
82AF
82AG
82AH
82AJ
82AI
82S
82T
82U

FIG. 34

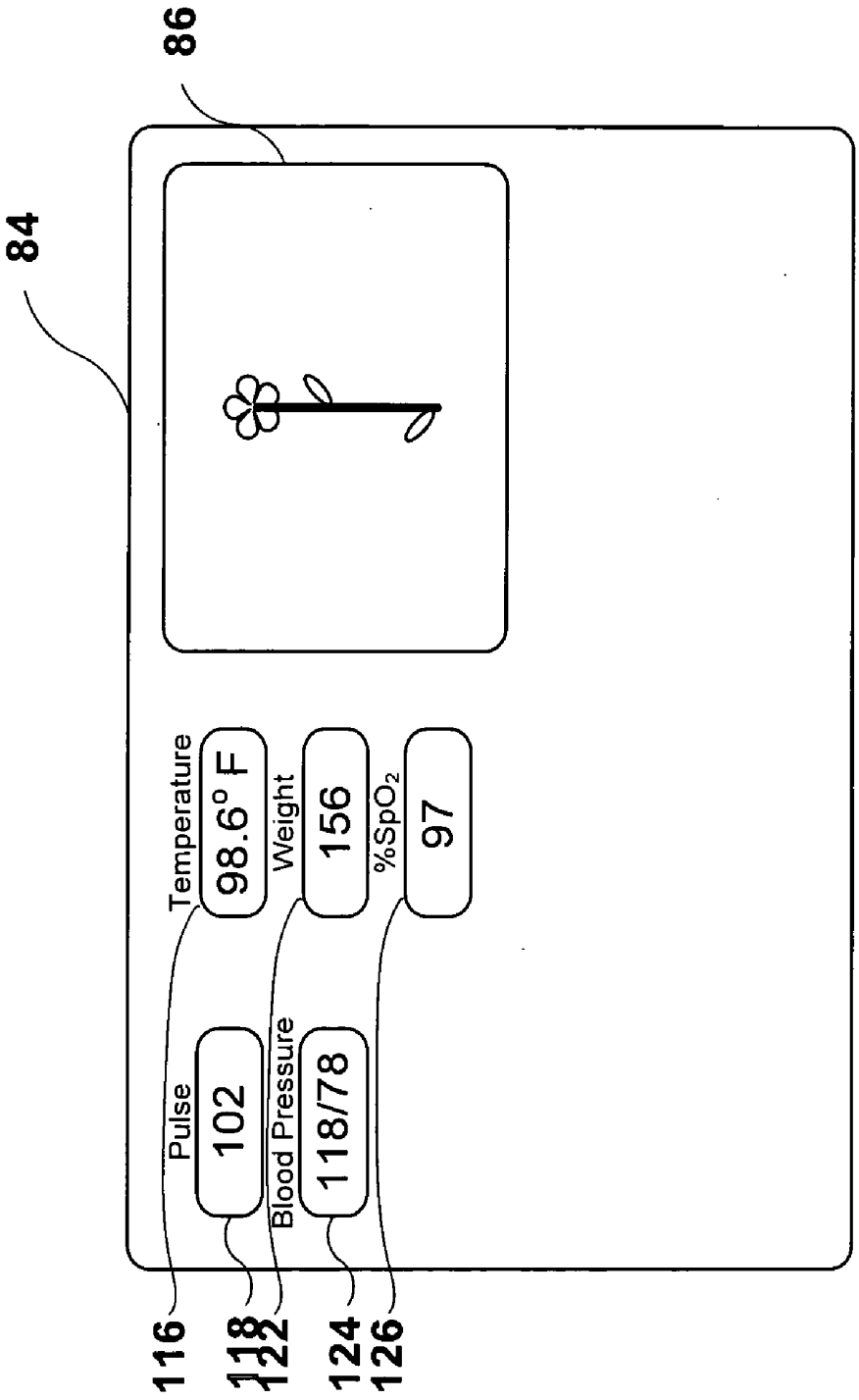

86
84
Temperature
98.6° F
Weight
156
%SpO2
97
Pulse
102
Blood Pressure
118/78
116
118
122
124
126

FIG. 35

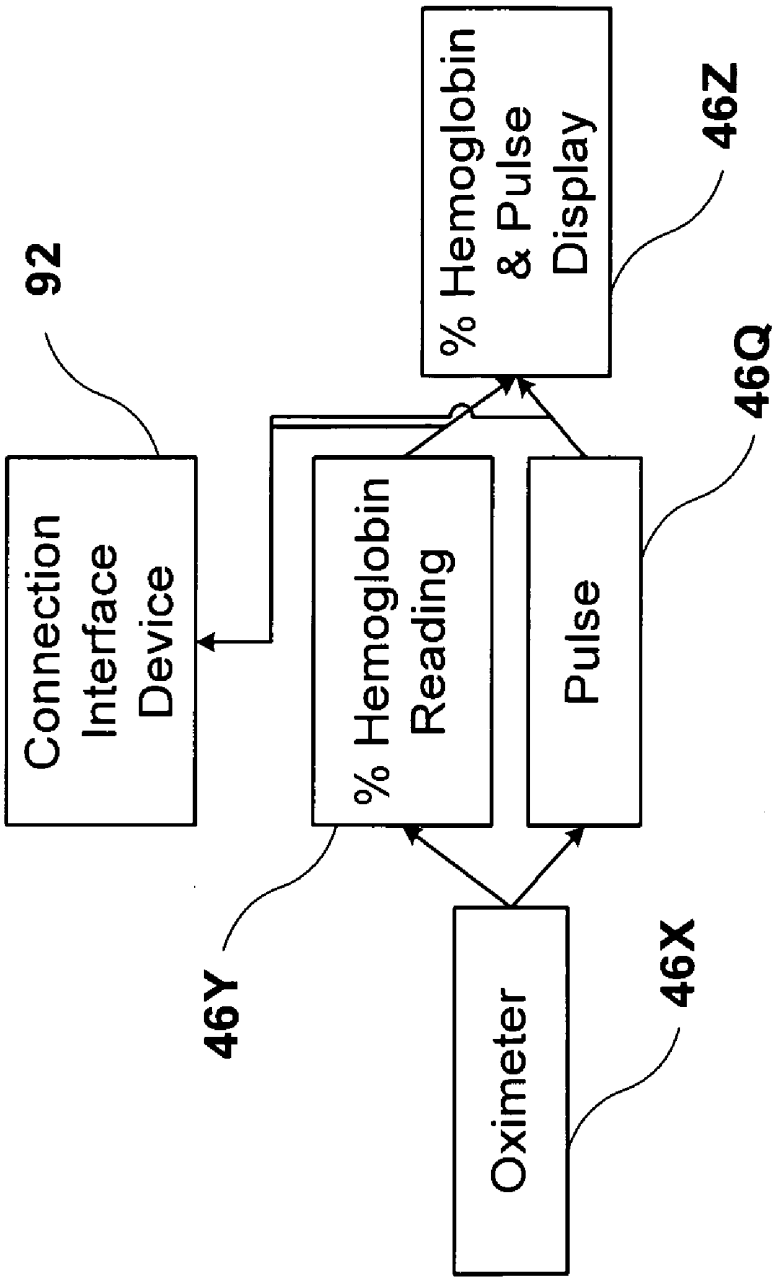

92
Connection Interface Device
% Hemoglobin Reading
Pulse
% Hemoglobin & Pulse Display
46Z
46Q
46Y
Oximeter
46X

FIG. 36

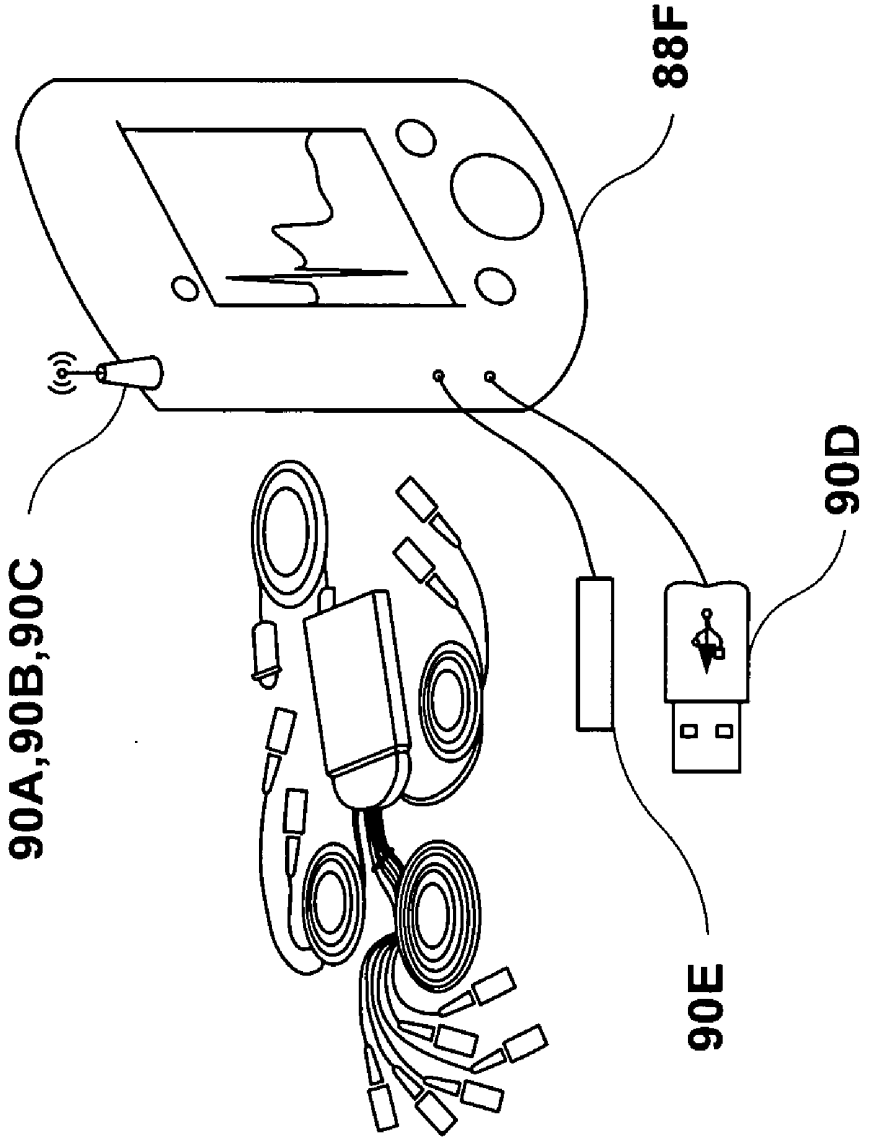


FIG. 37

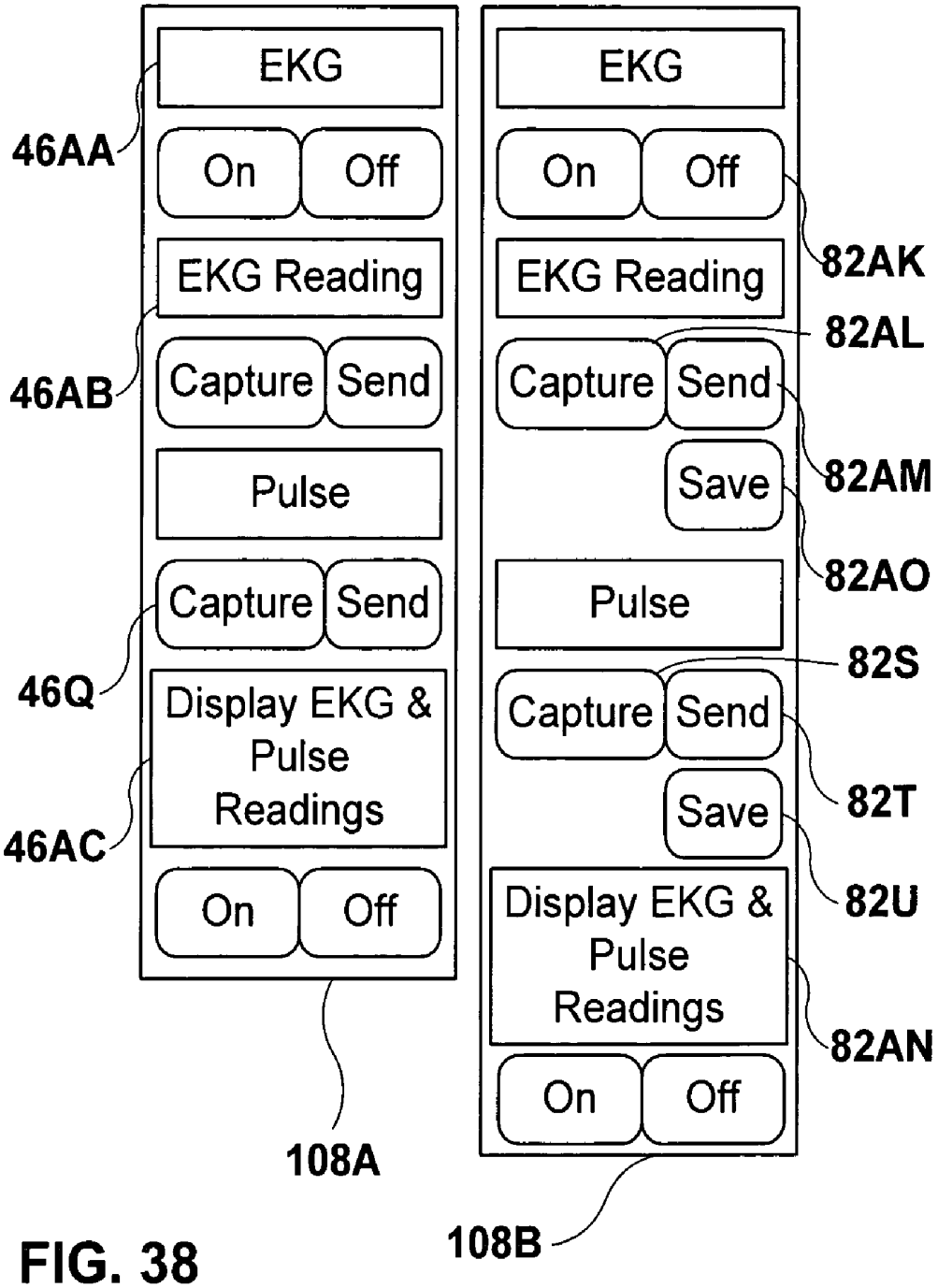

EKG
On
Off
EKG Reading
Capture
Send
Pulse
Capture
Send
Display EKG & Pulse Readings
On
Off
46AA
46AB
46Q
46AC
108A
EKG
On
Off
EKG Reading
Capture
Send
Save
Pulse
Capture
Send
Save
Display EKG & Pulse Readings
On
Off
82AK
82AL
82AM
82AO
82S
82T
82U
82AN
108B

FIG. 38

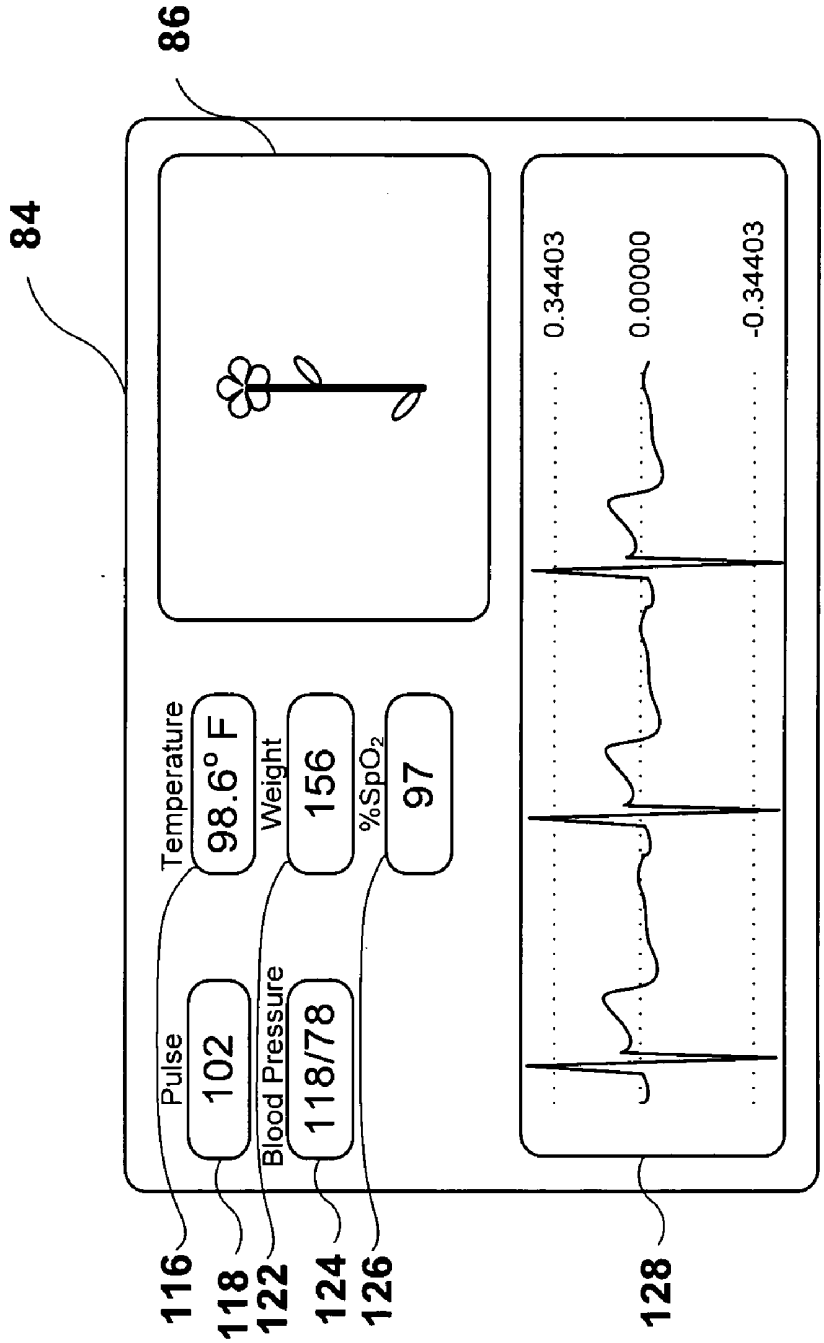

86
84
Temperature
98.6° F
Weight
156
%SpO2
97
Pulse
102
Blood Pressure
118/78
0.34403
0.00000
-0.34403
116
118
122
124
126
128

FIG. 39

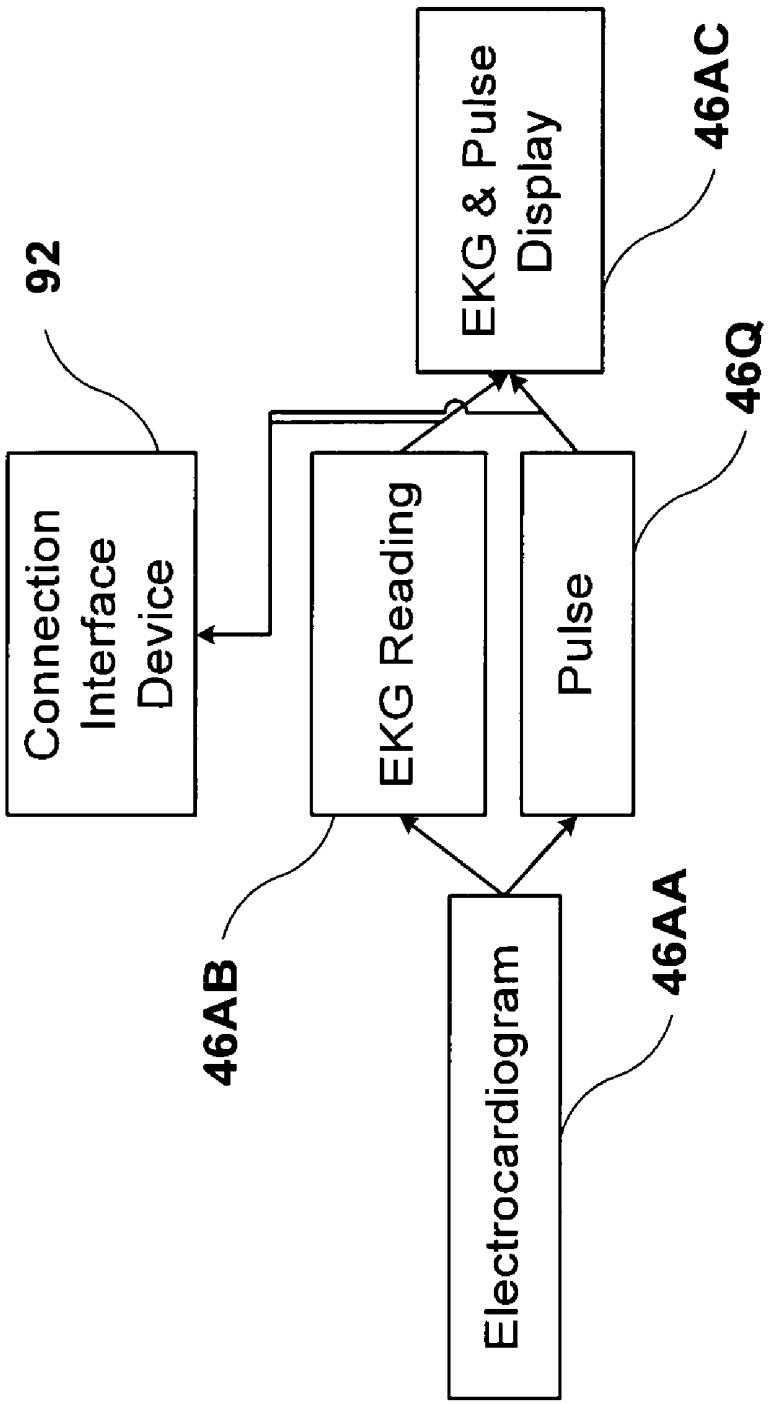

92
Connection Interface Device
EKG Reading
Pulse
EKG & Pulse Display
Electrocardiogram
46AB
46Q
46AC
46AA

FIG. 40

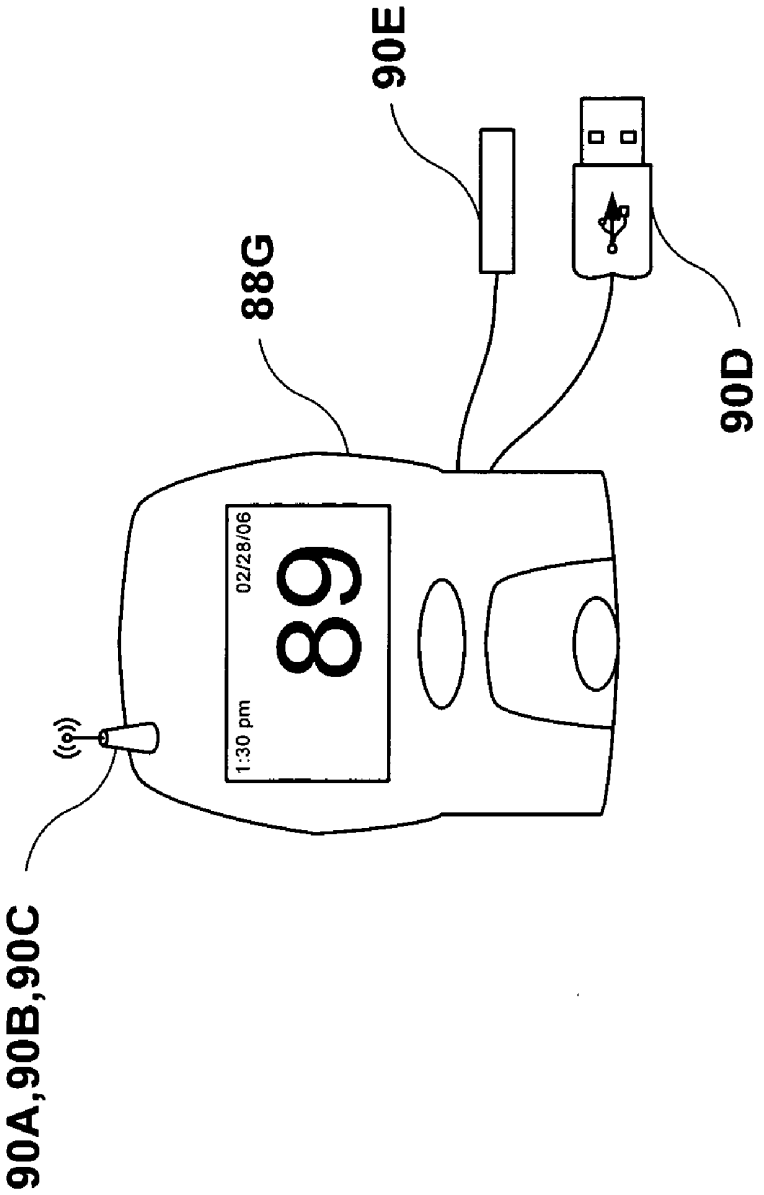


FIG. 41

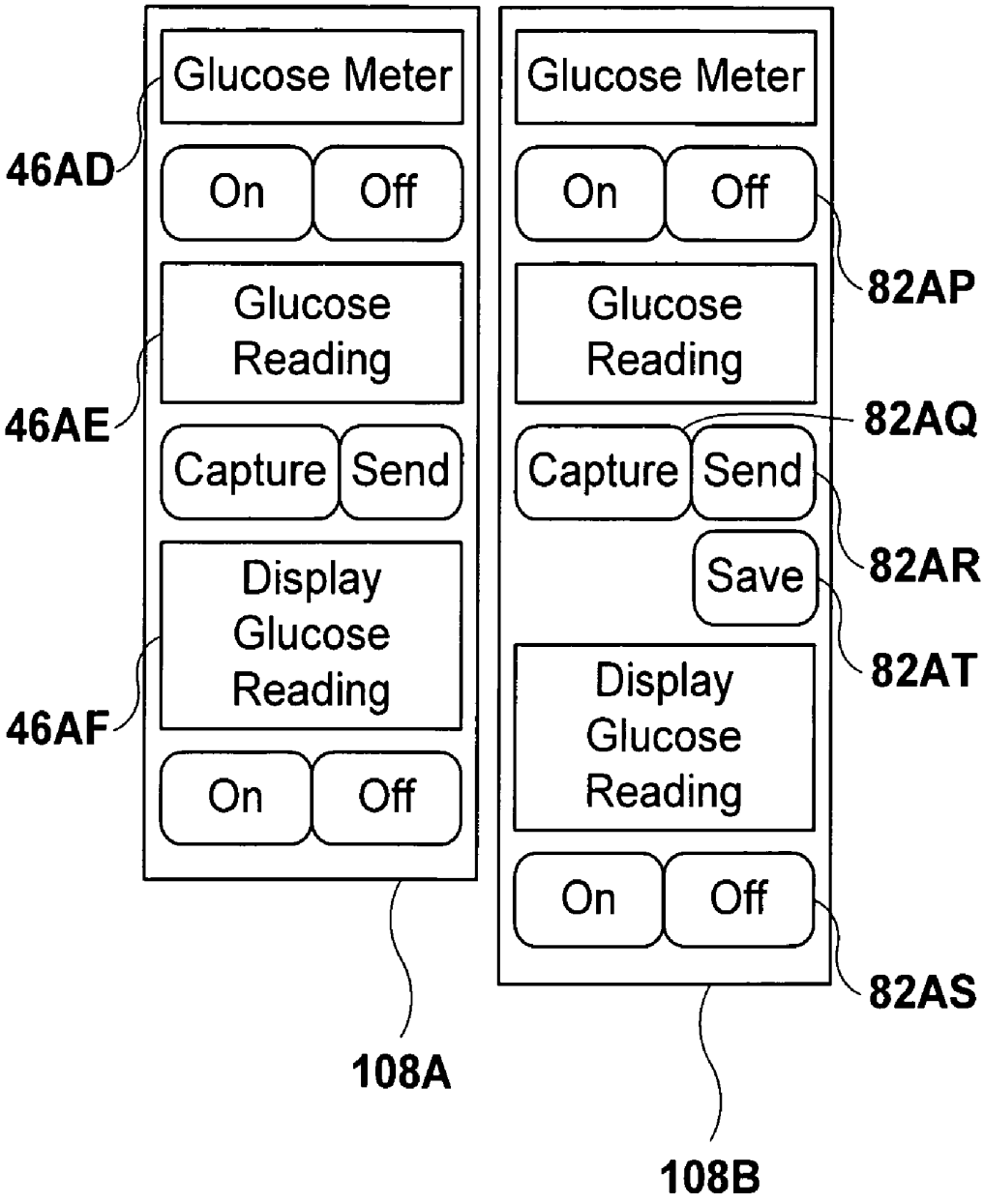

Glucose Meter
On
Off
Glucose Reading
Capture
Send
Display Glucose Reading
On
Off
46AD
46AE
46AF
108A
Glucose Meter
On
Off
Glucose Reading
Capture
Send
Save
Display Glucose Reading
On
Off
82AP
82AQ
82AR
82AT
82AS
108B

FIG. 42

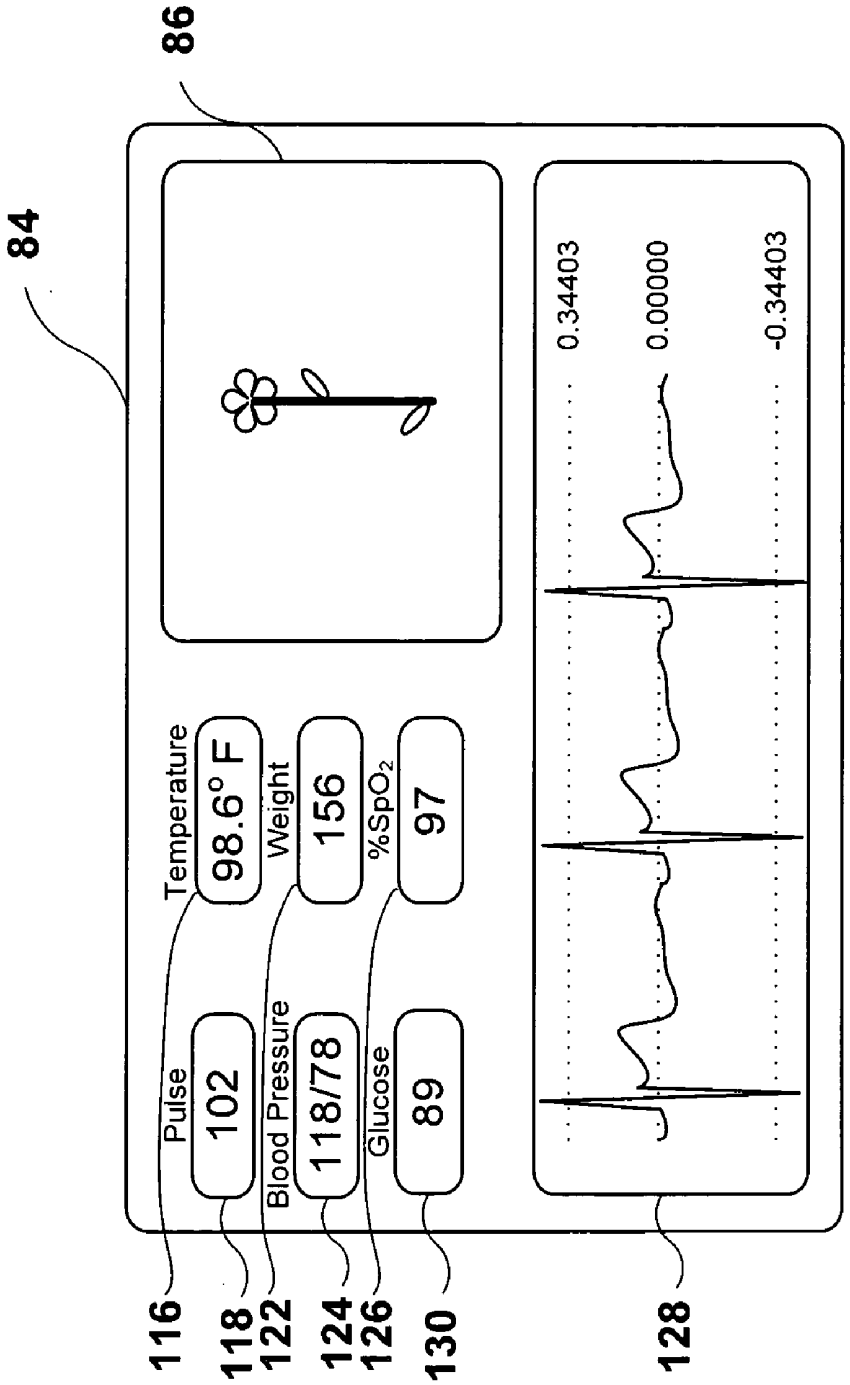

84
86
Temperature
98.6° F
Weight
156
%SpO2
97
Pulse
102
Blood Pressure
118/78
Glucose
89
0.34403
0.00000
-0.34403
116
118
122
124
126
130
128

FIG. 43

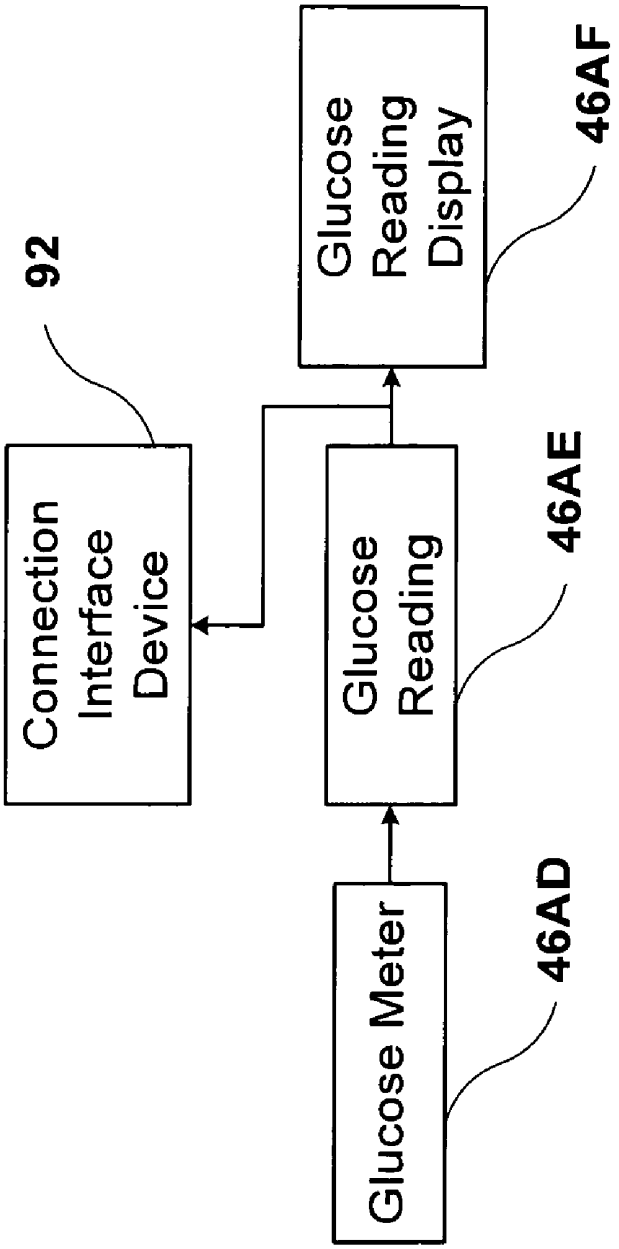

Glucose Reading Display
46AF
92
Connection Interface Device
Glucose Reading
46AE
Glucose Meter
46AD

FIG. 44

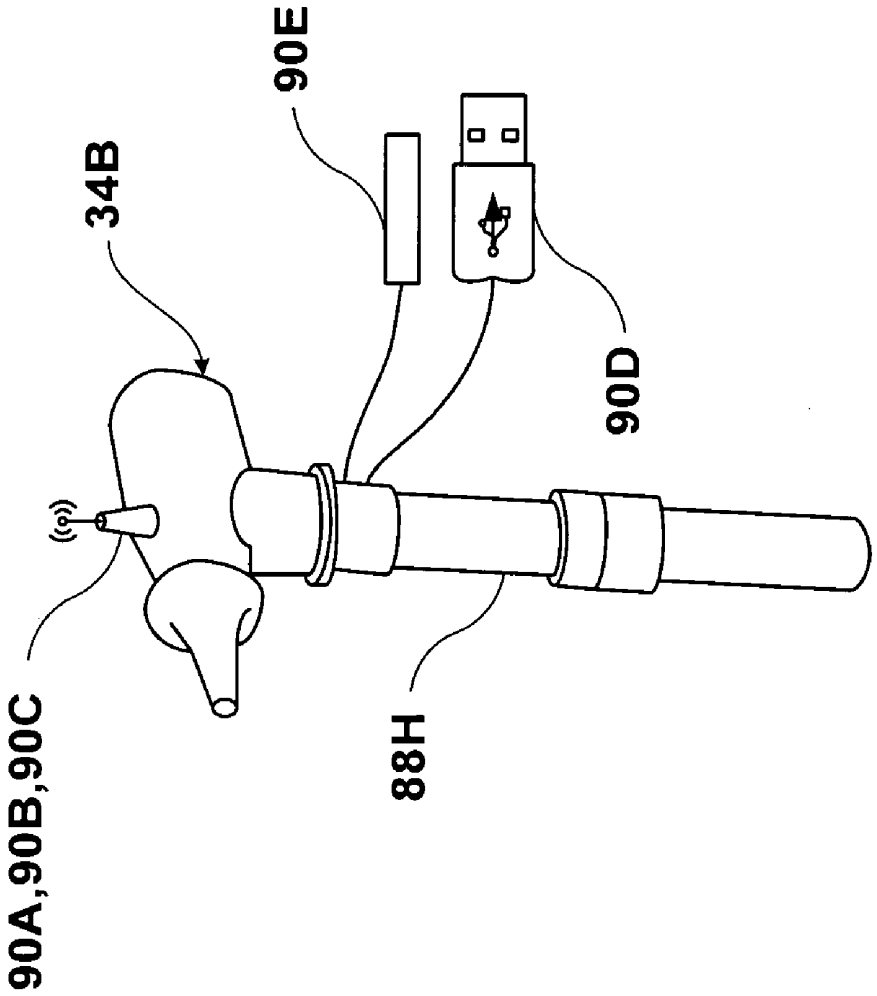


FIG. 45

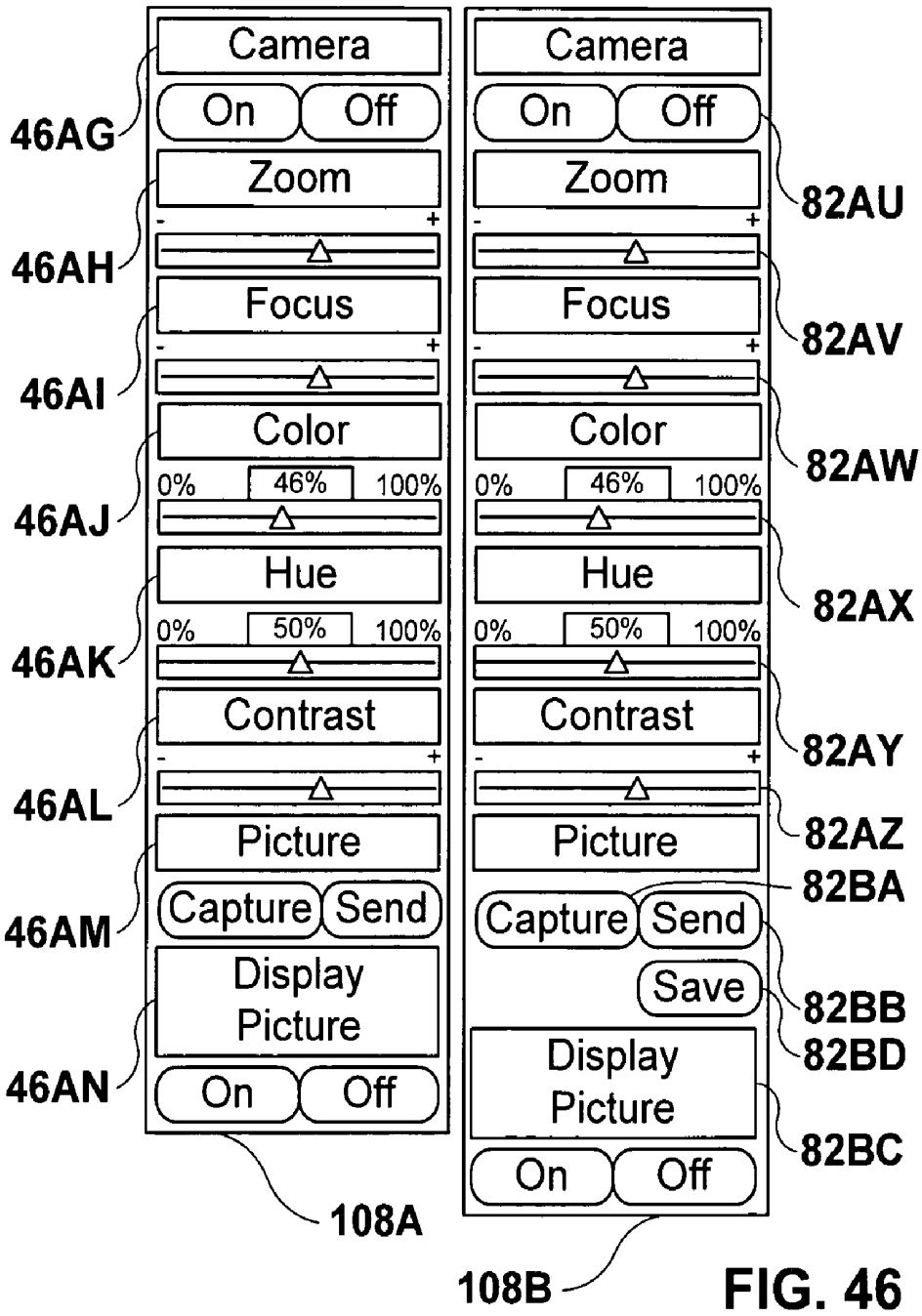

Camera
On
Off
Zoom
-
+
Focus
Color
0%
46%
100%
Hue
50%
Contrast
Picture
Capture
Send
Save
Display Picture
46AG
46AH
46AI
46AJ
46AK
46AL
46AM
46AN
82AU
82AV
82AW
82AX
82AY
82AZ
82BA
82BB
82BD
82BC
108A
108B

FIG. 46

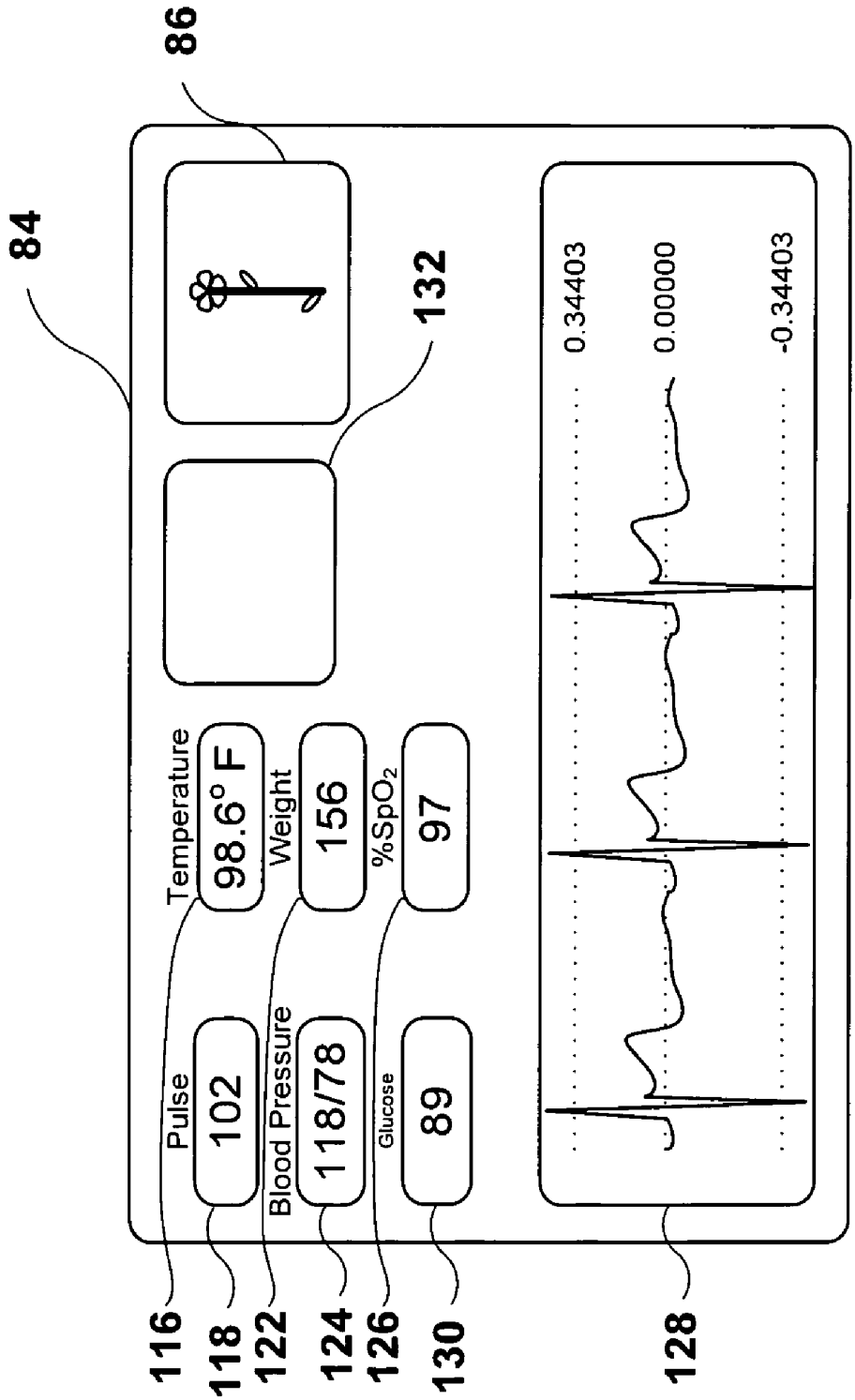

84
86
132
Temperature
98.6° F
Weight
156
%SpO2
97
Pulse
102
Blood Pressure
118/78
Glucose
89
0.34403
0.00000
-0.34403
116
118
122
124
126
130
128

FIG. 47

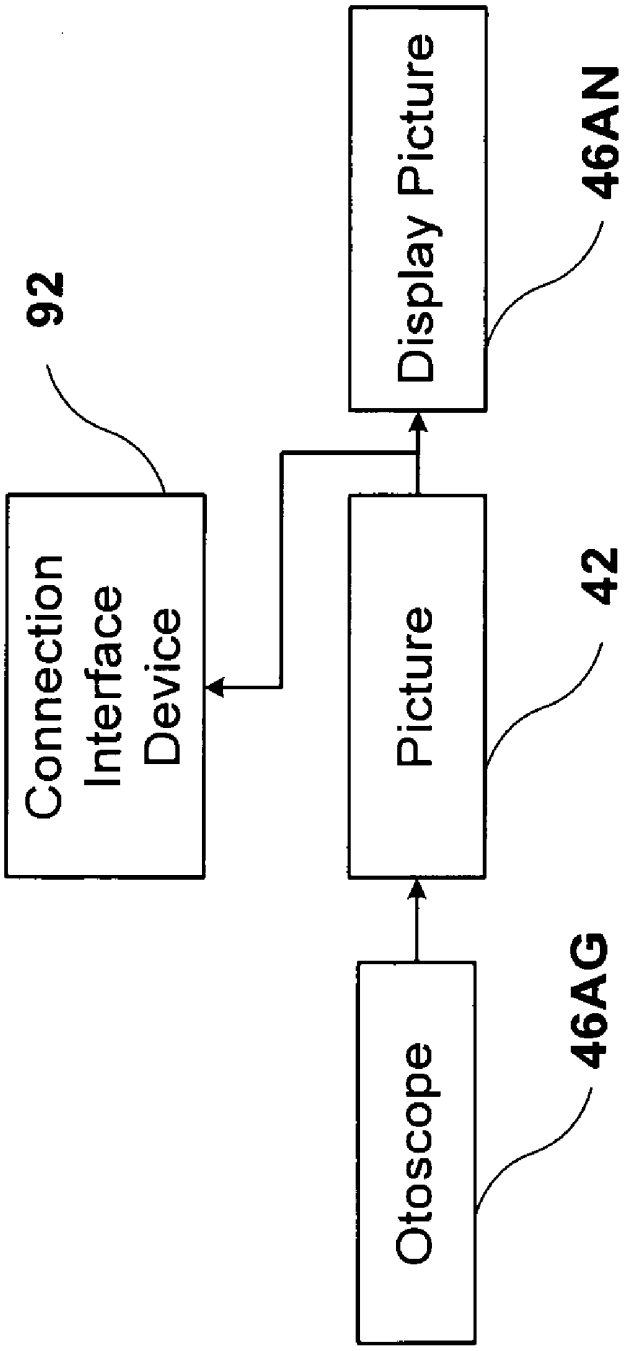

Display Picture
46AN
92
Connection Interface Device
Picture
42
Otoscope
46AG

FIG. 48

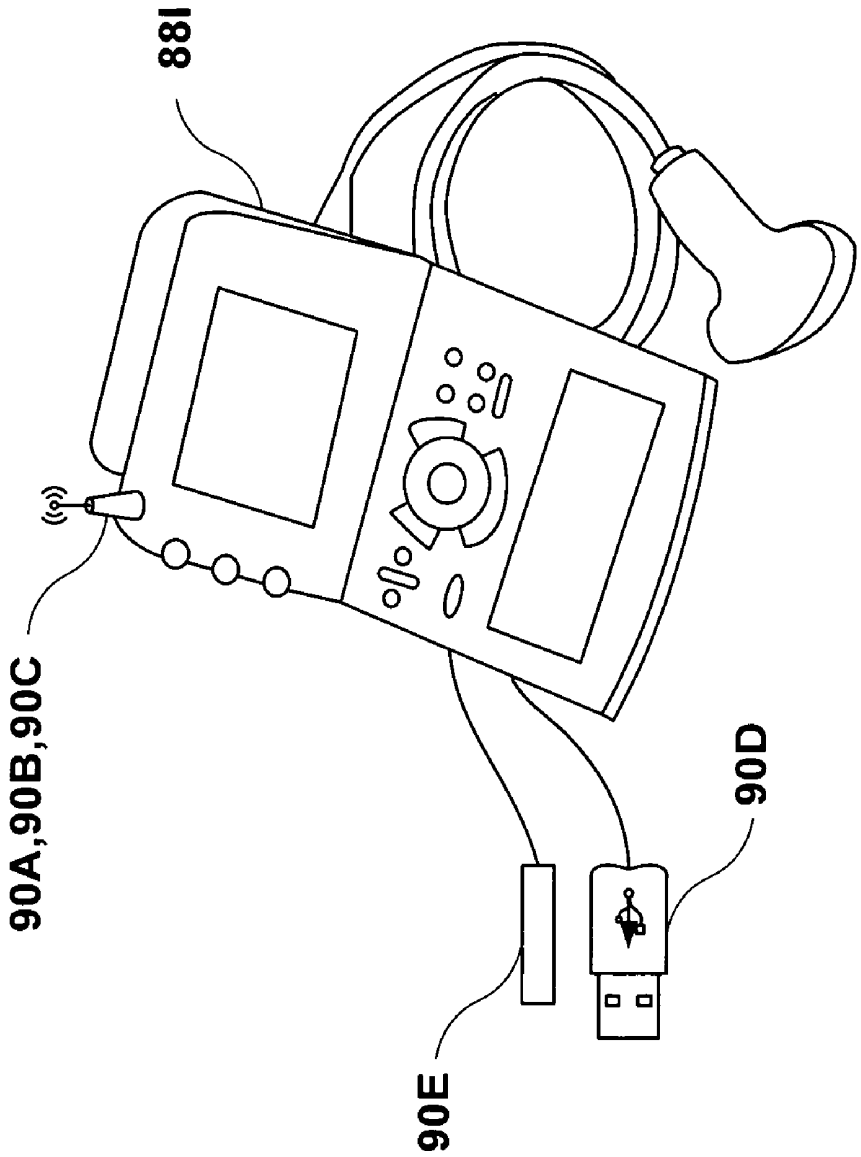


FIG. 49

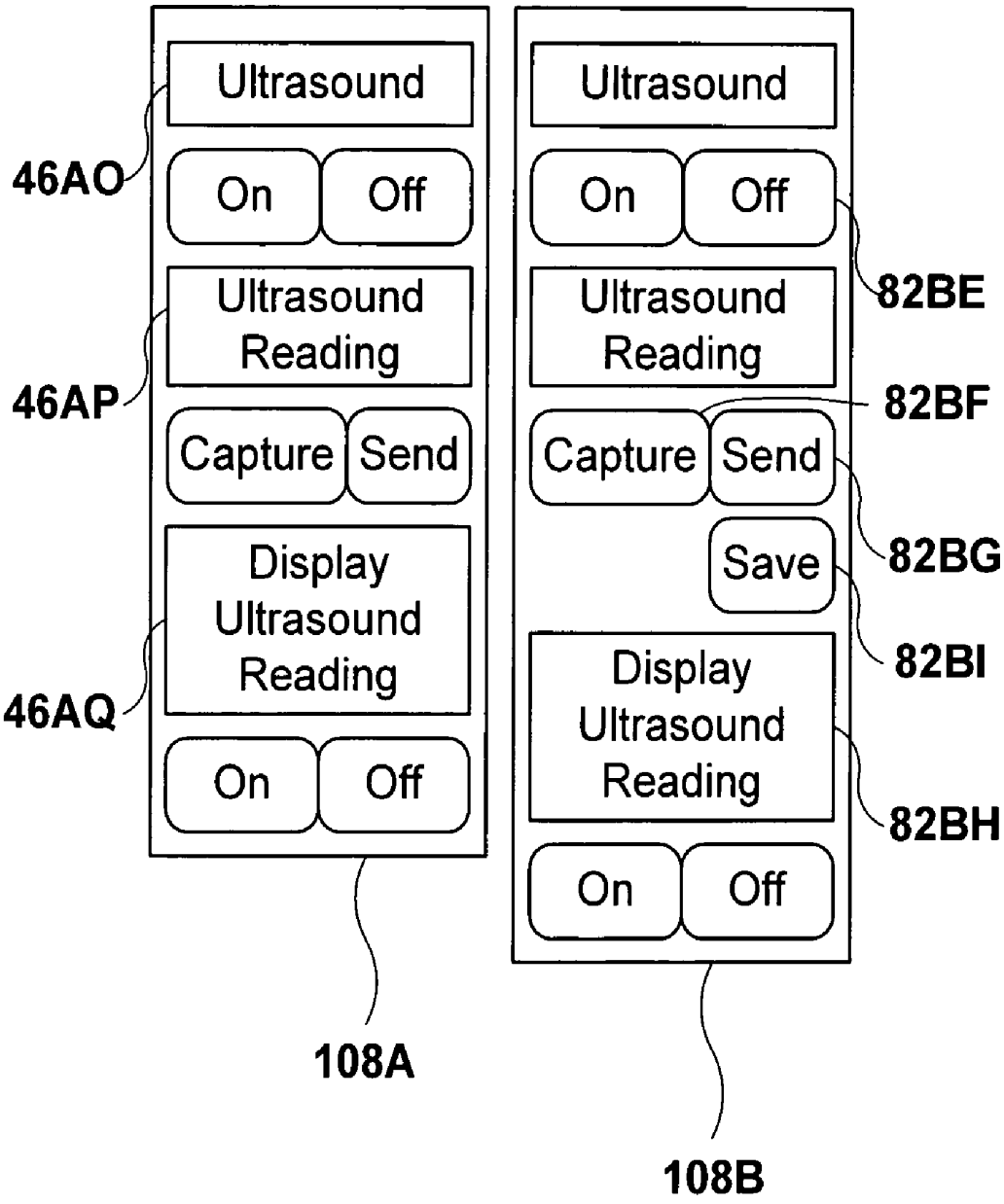

Ultrasound
On
Off
Ultrasound Reading
Capture
Send
Display Ultrasound Reading
On
Off
46AO
46AP
46AQ
108A
Ultrasound
On
Off
Ultrasound Reading
Capture
Send
Save
Display Ultrasound Reading
On
Off
82BE
82BF
82BG
82BI
82BH
108B

FIG. 50

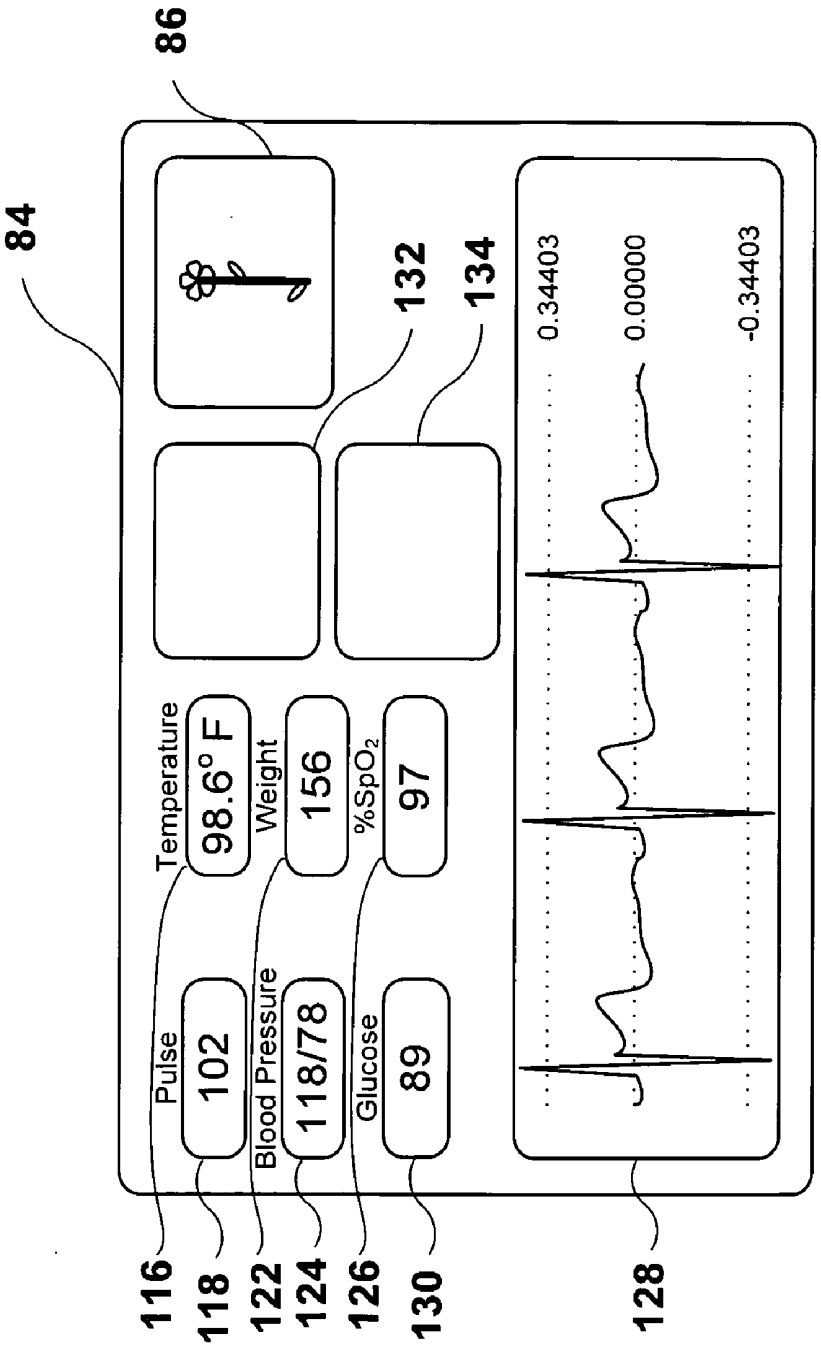

84
86
132
134
Temperature
98.6° F
Weight
156
%SpO2
97
Pulse
102
Blood Pressure
118/78
Glucose
89
0.34403
0.00000
-0.34403
116
118
122
124
126
130
128

FIG. 51

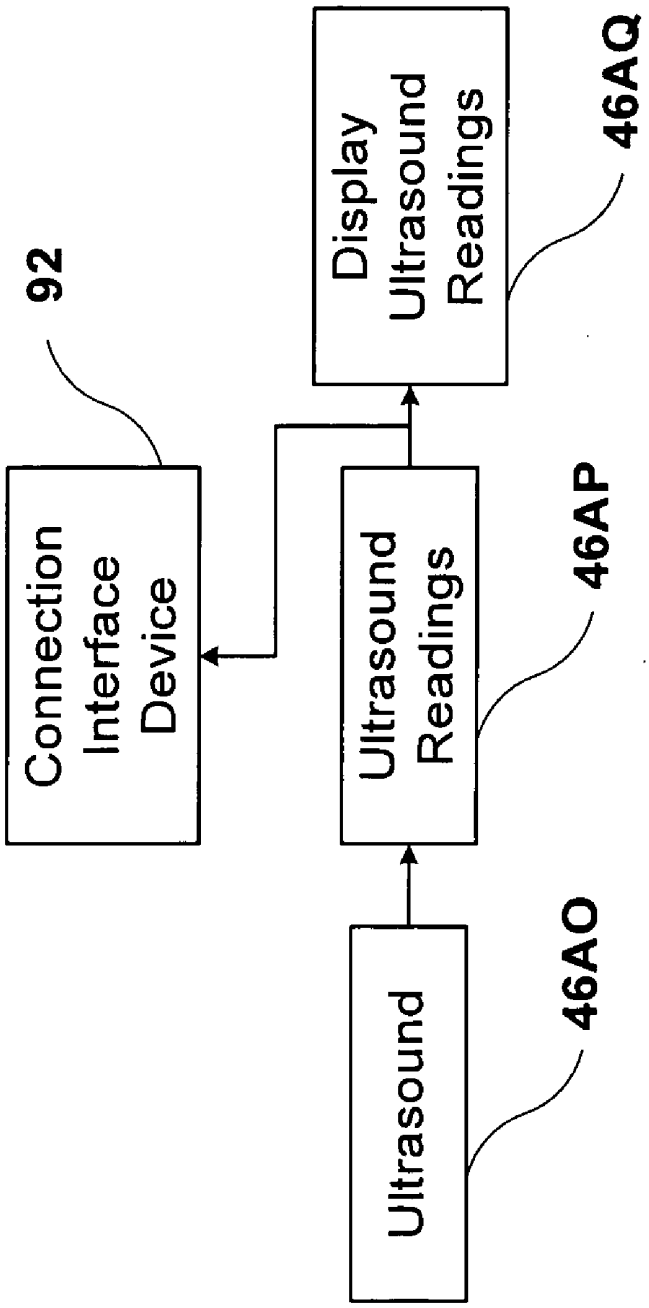

Display Ultrasound Readings
46AQ
92
Connection Interface Device
Ultrasound Readings
46AP
Ultrasound
46AO

FIG. 52

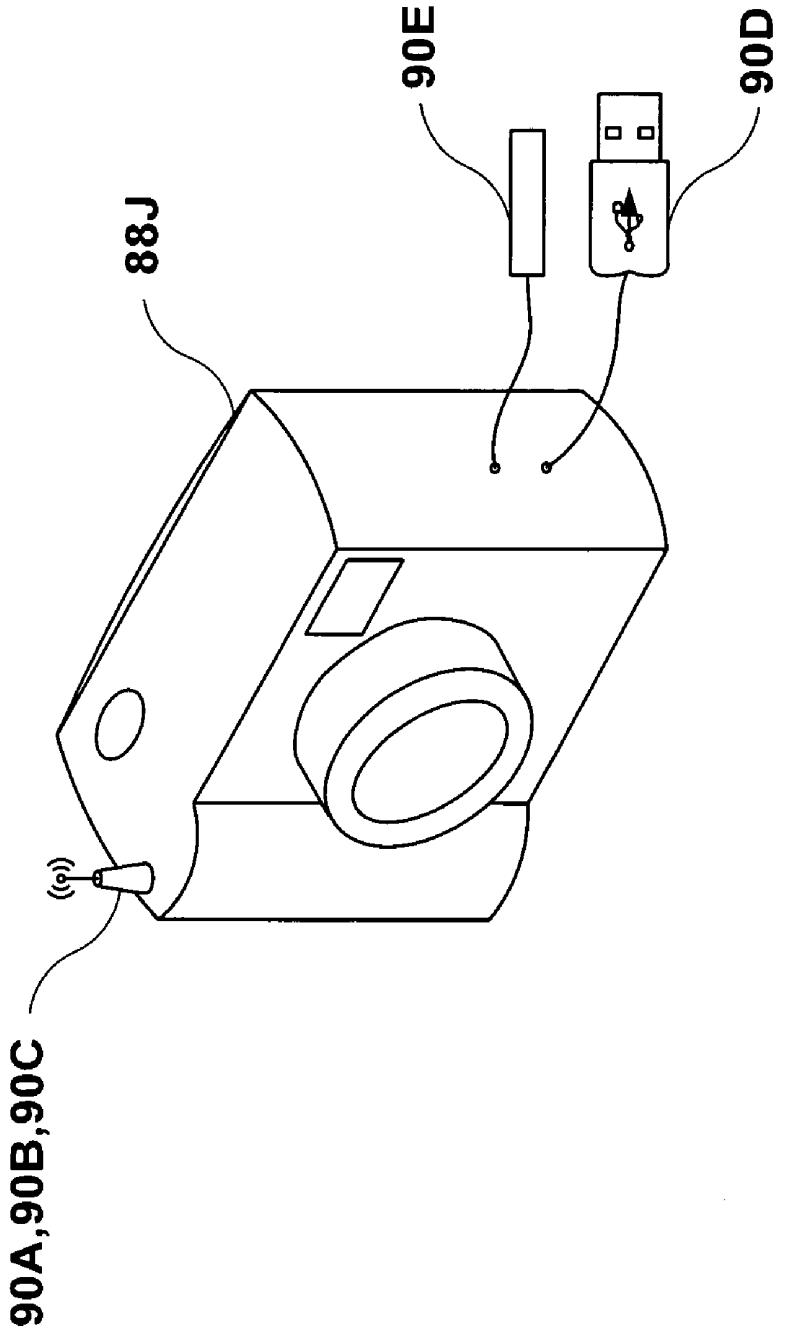


FIG. 53

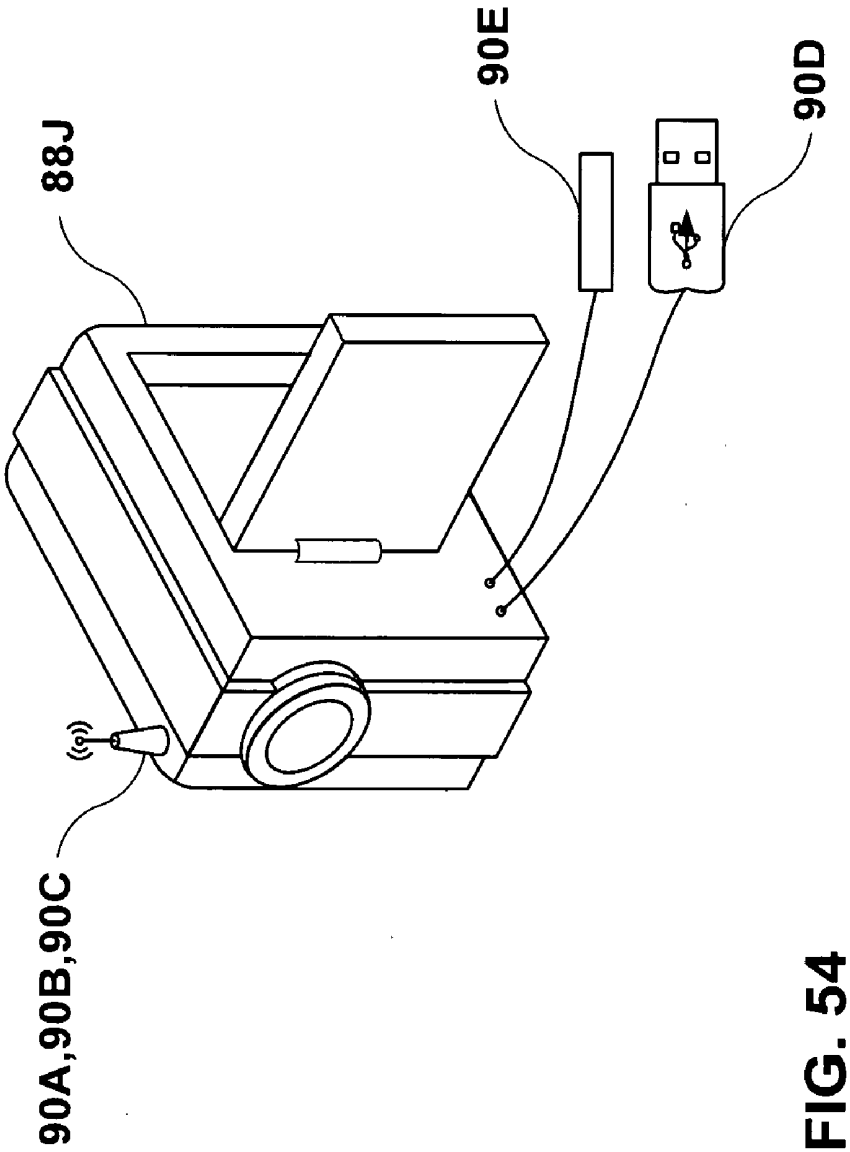


FIG. 54

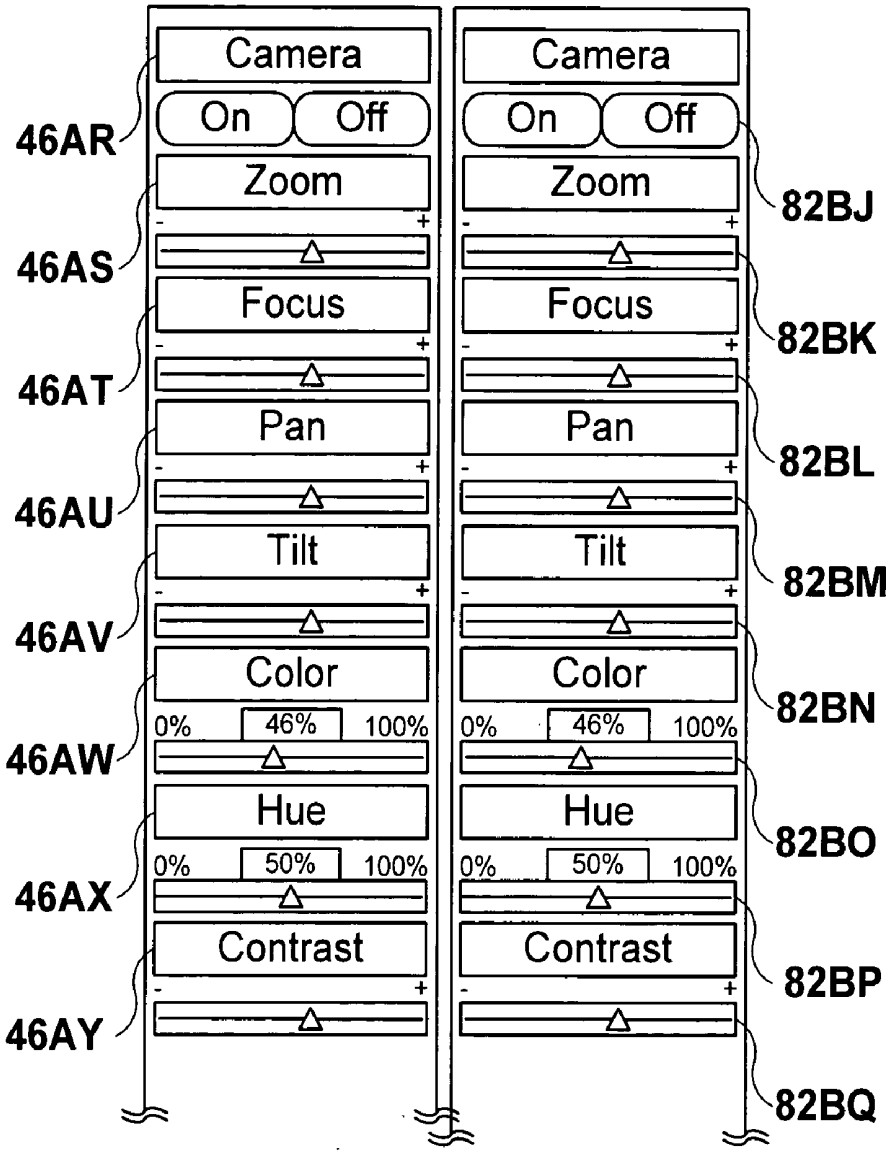

Camera
On
Off
Zoom
Focus
Pan
Tilt
Color
0%
46%
100%
Hue
0%
50%
100%
Contrast
46AR
46AS
46AT
46AU
46AV
46AW
46AX
46AY
82BJ
82BK
82BL
82BM
82BN
82BO
82BP
82BQ

FIG. 55A

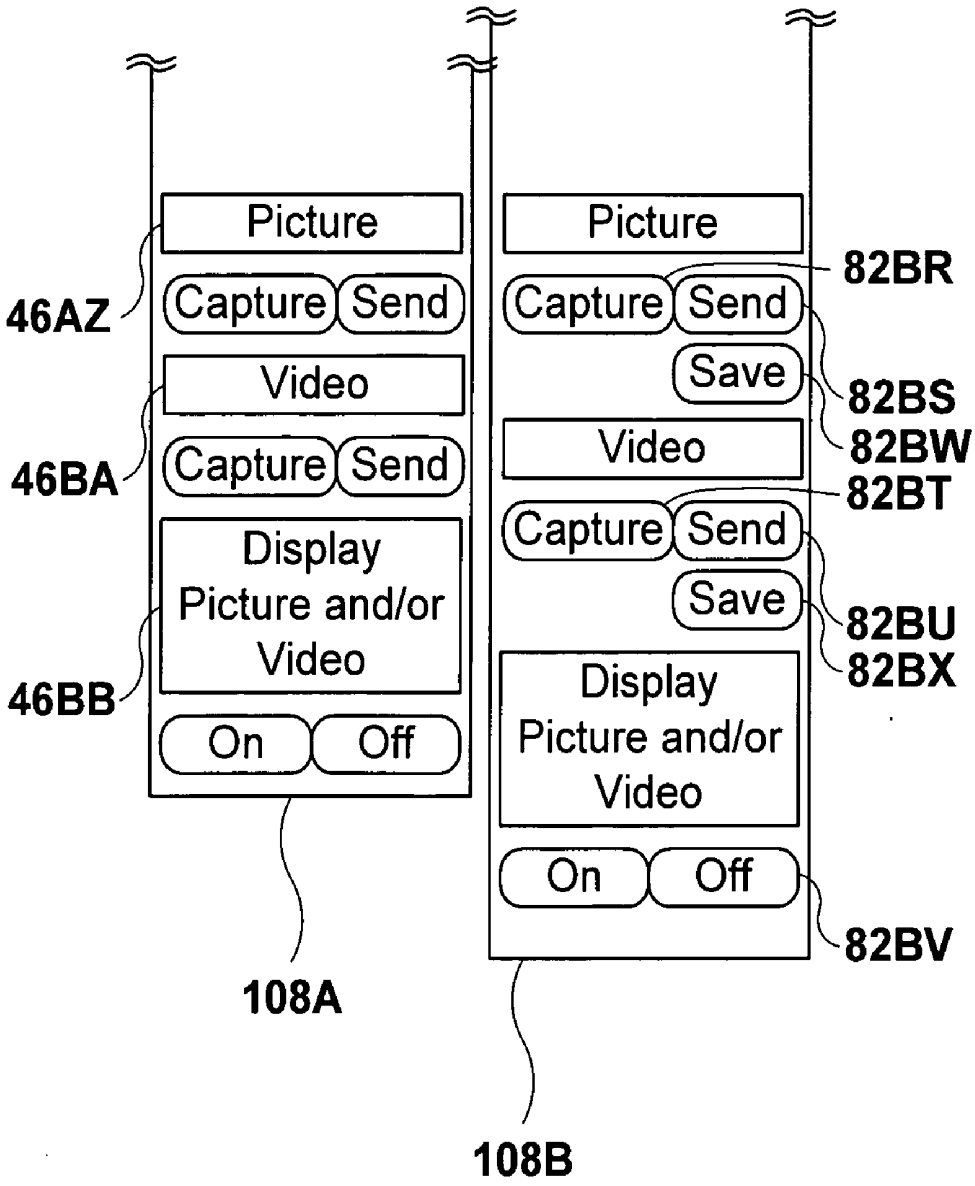

Picture
Capture
Send
Video
Capture
Send
Display Picture and/or Video
On
Off
46AZ
46BA
46BB
108A
Picture
Capture
Send
Save
Video
Capture
Send
Save
Display Picture and/or Video
On
Off
82BR
82BS
82BW
82BT
82BU
82BX
82BV
108B

FIG. 55B

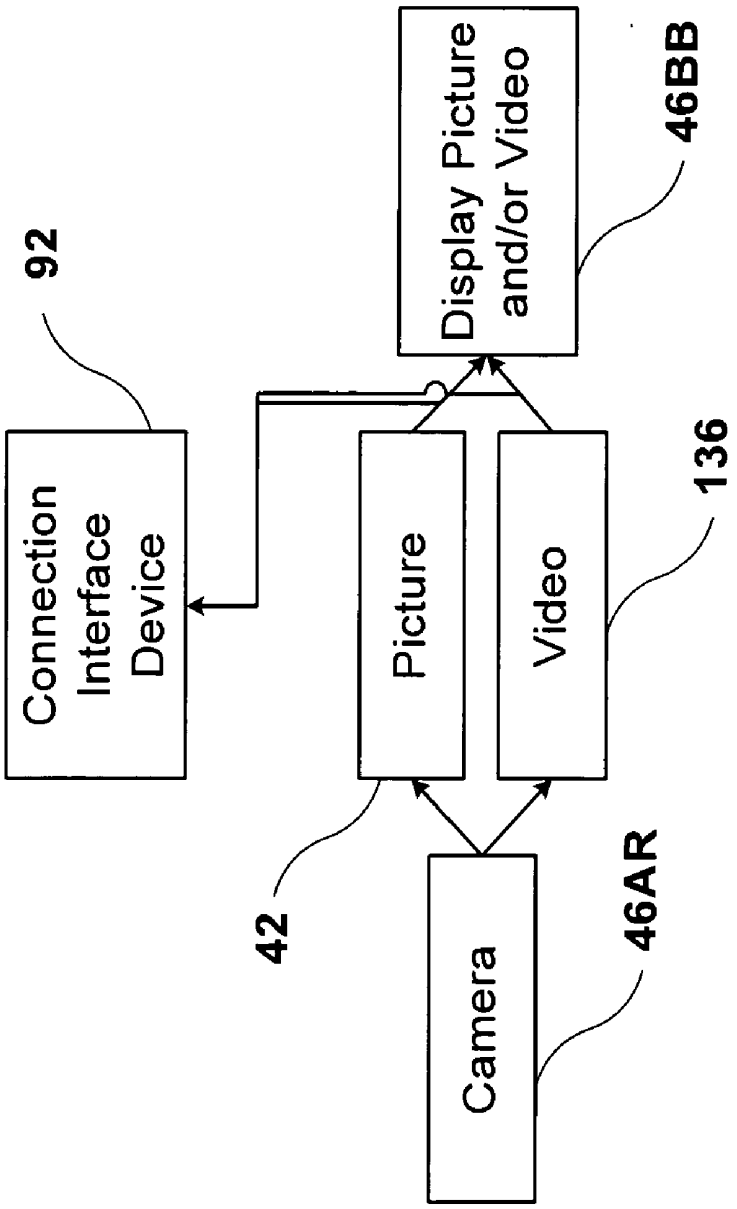

Display Picture and/or Video
46BB
92
Connection Interface Device
Picture
Video
136
42
Camera
46AR

FIG. 56

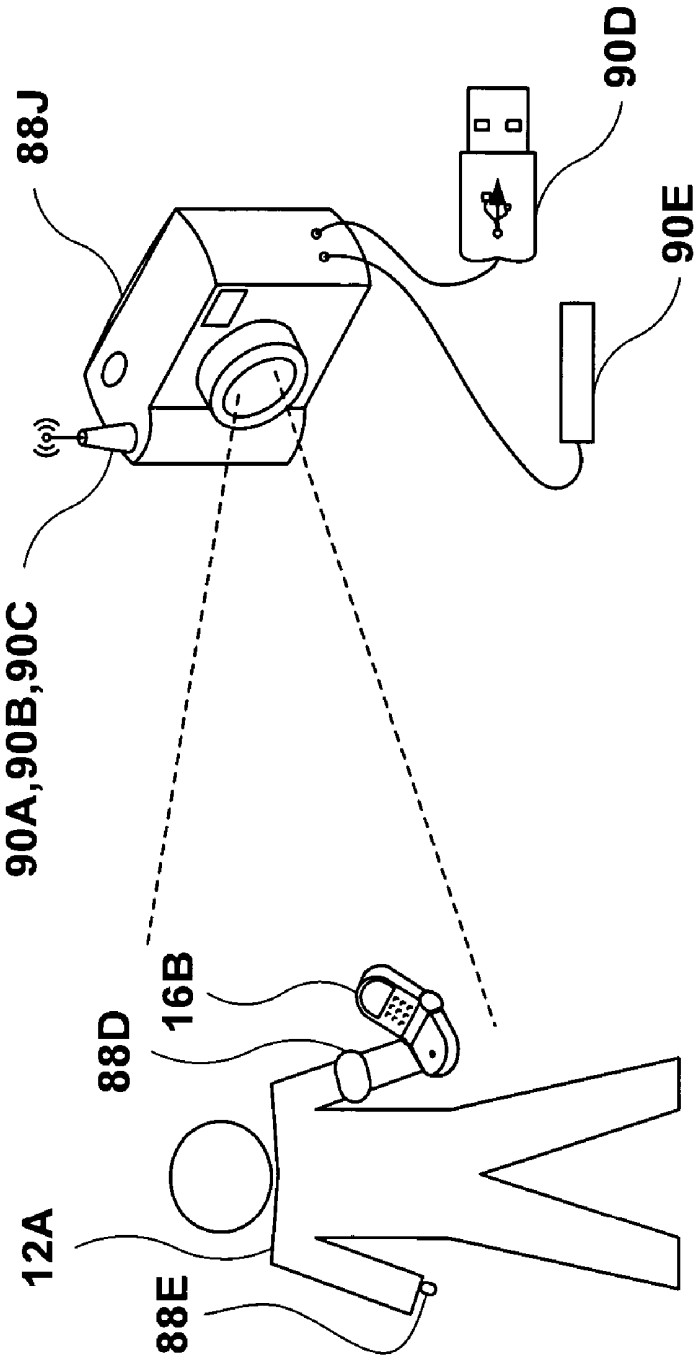


FIG. 57

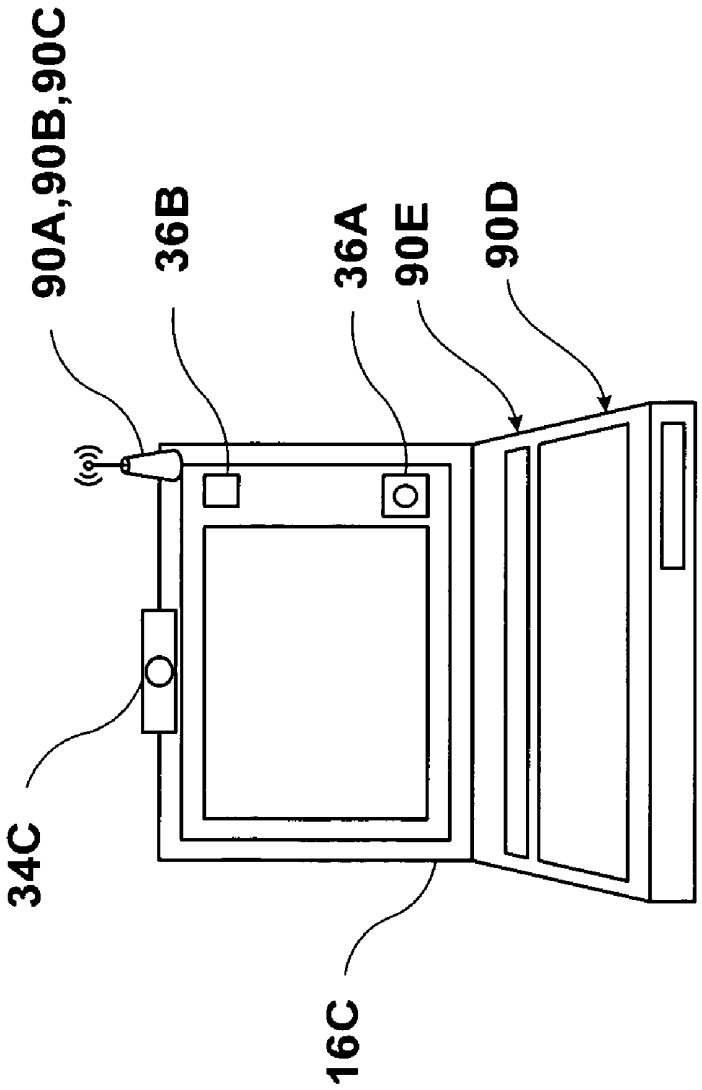


FIG. 58

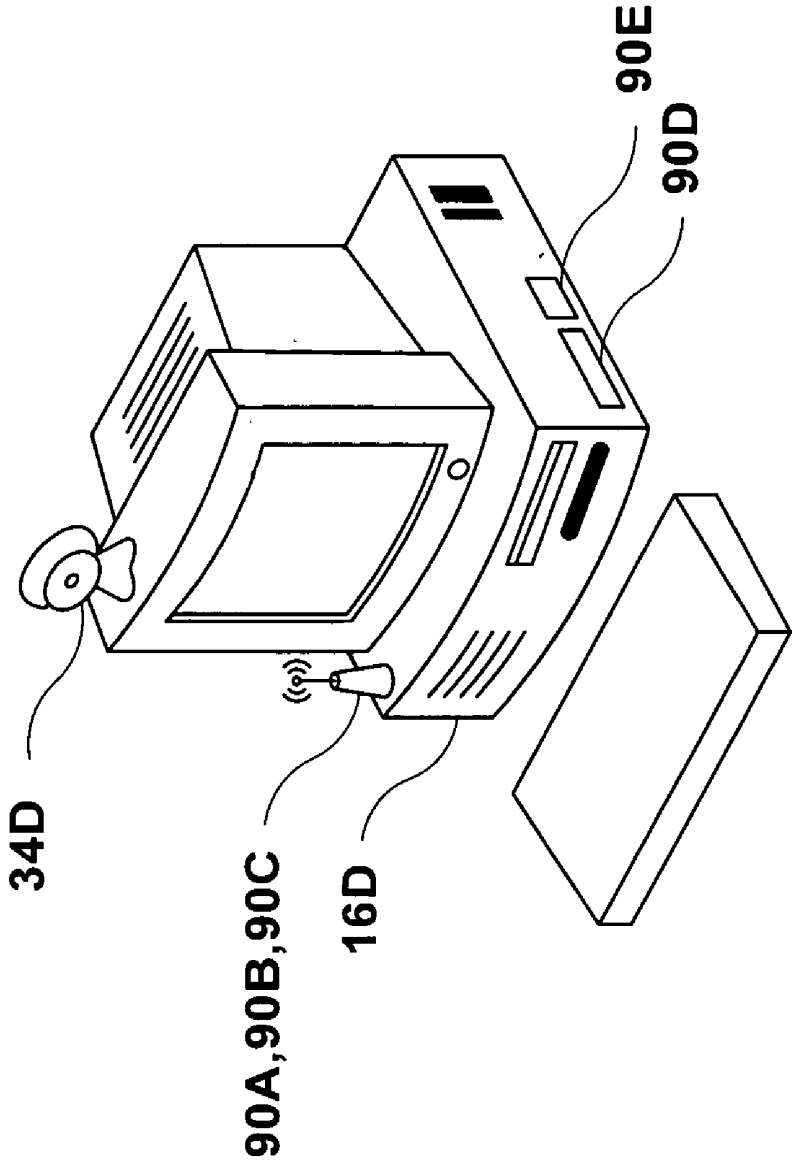


FIG. 59

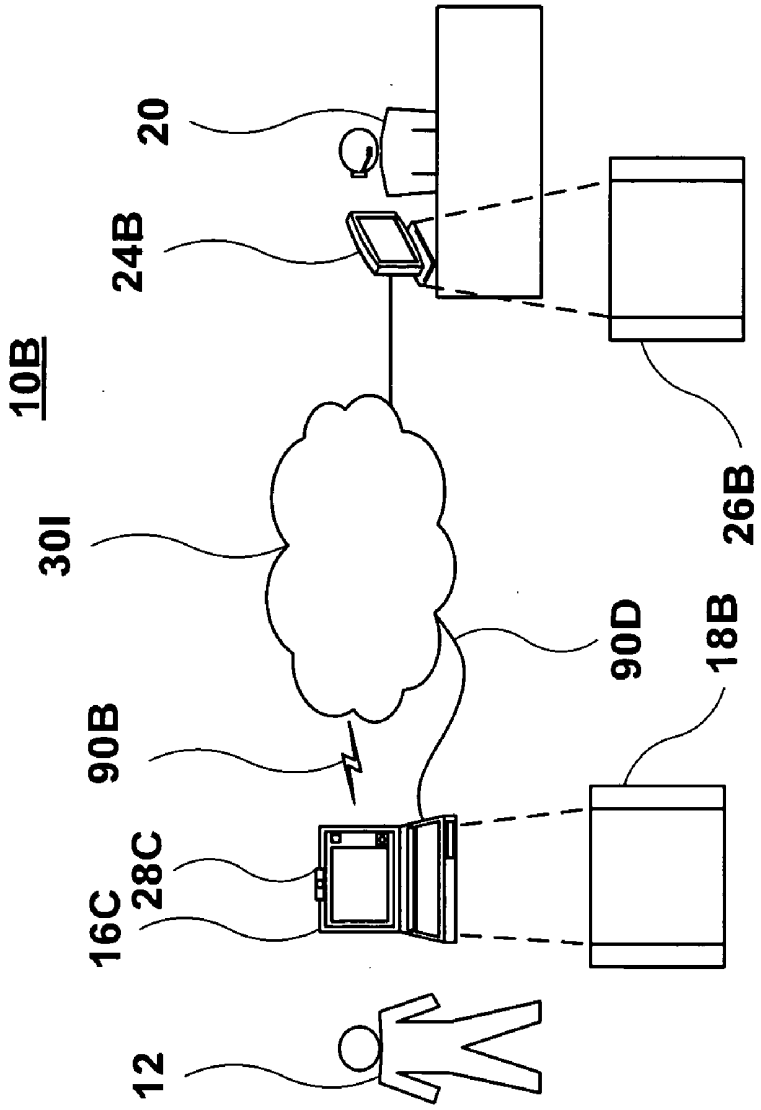


FIG. 60

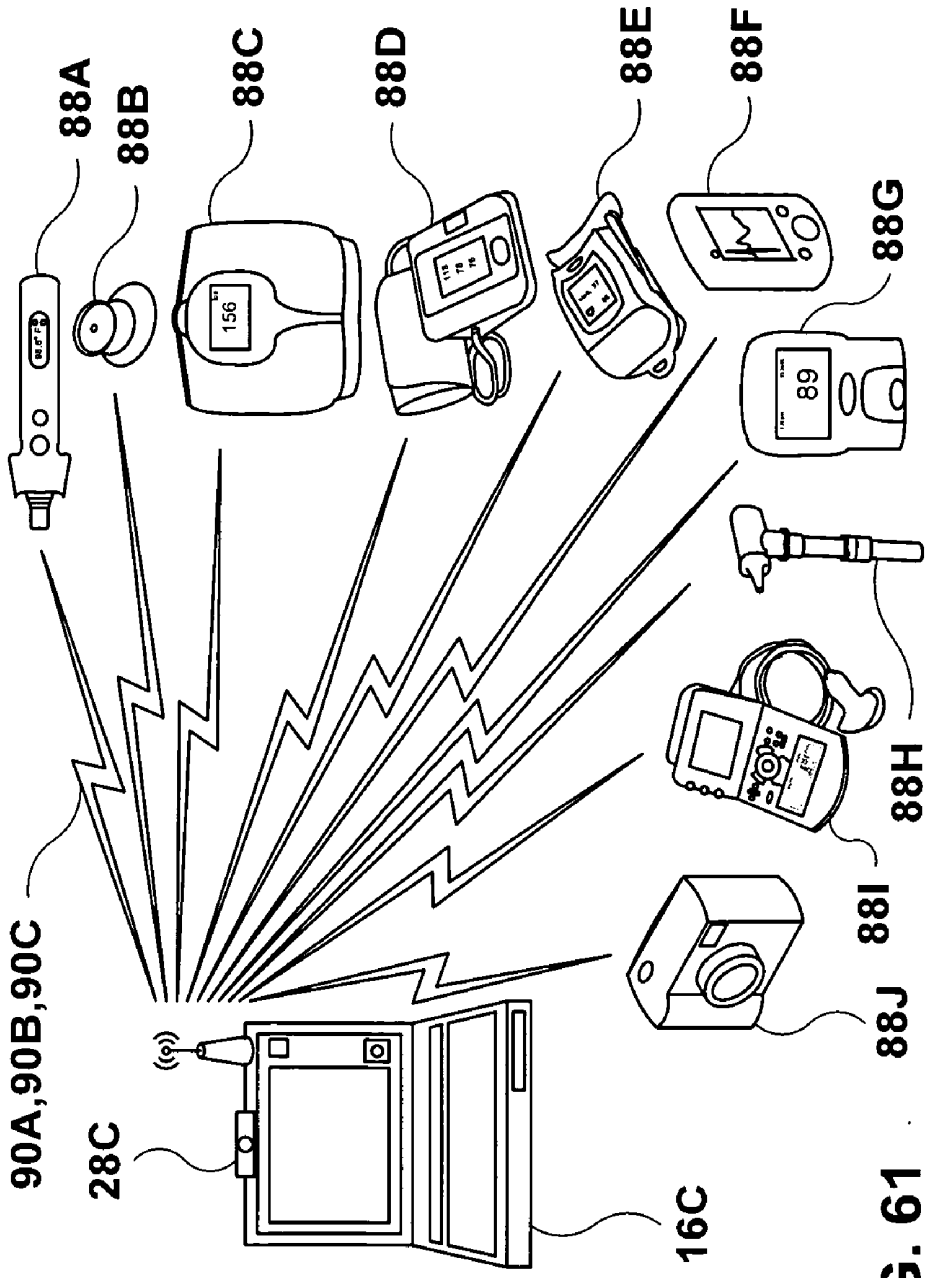

88A
88B
88C
88D
88E
88F
88G
88H
88I
88J
90A,90B,90C
28C
16C
156
89

FIG. 61

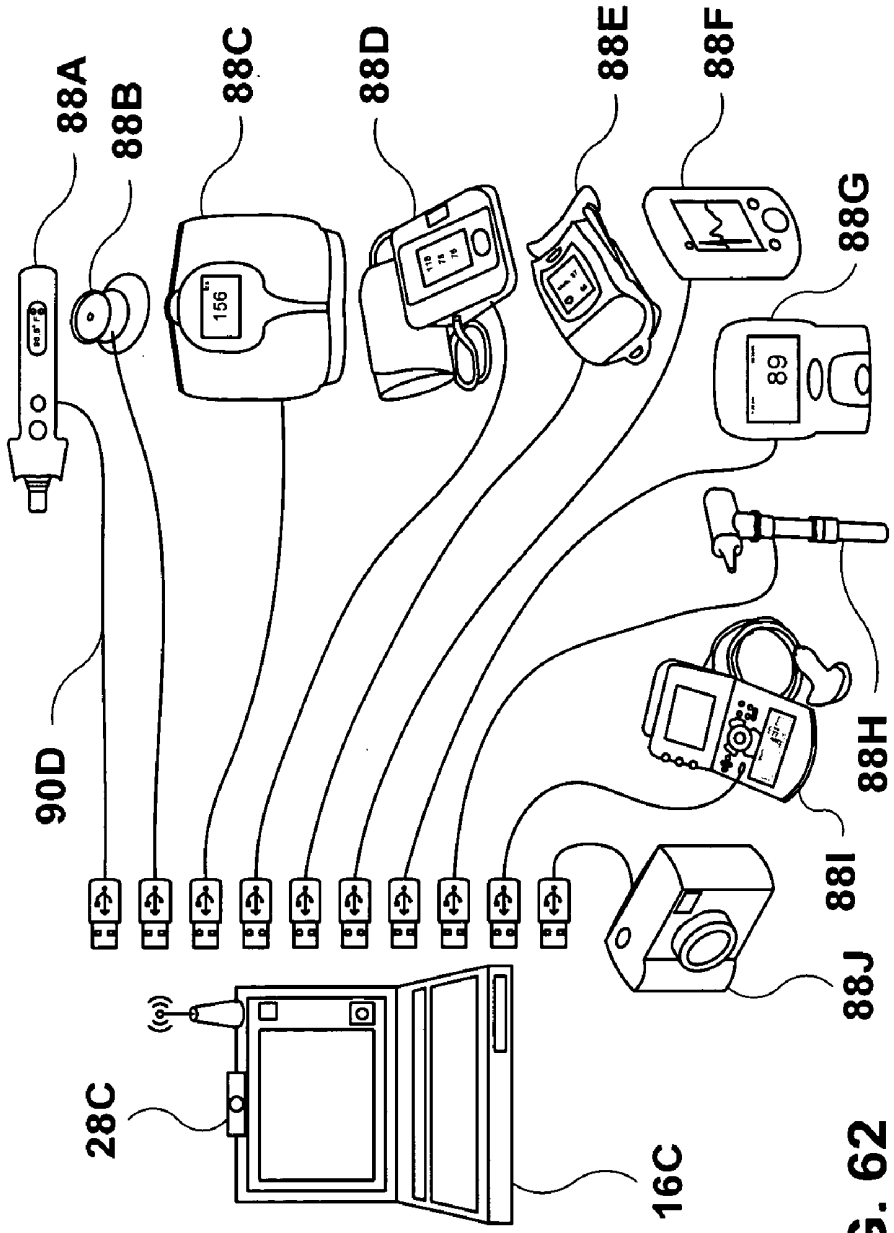


FIG. 62

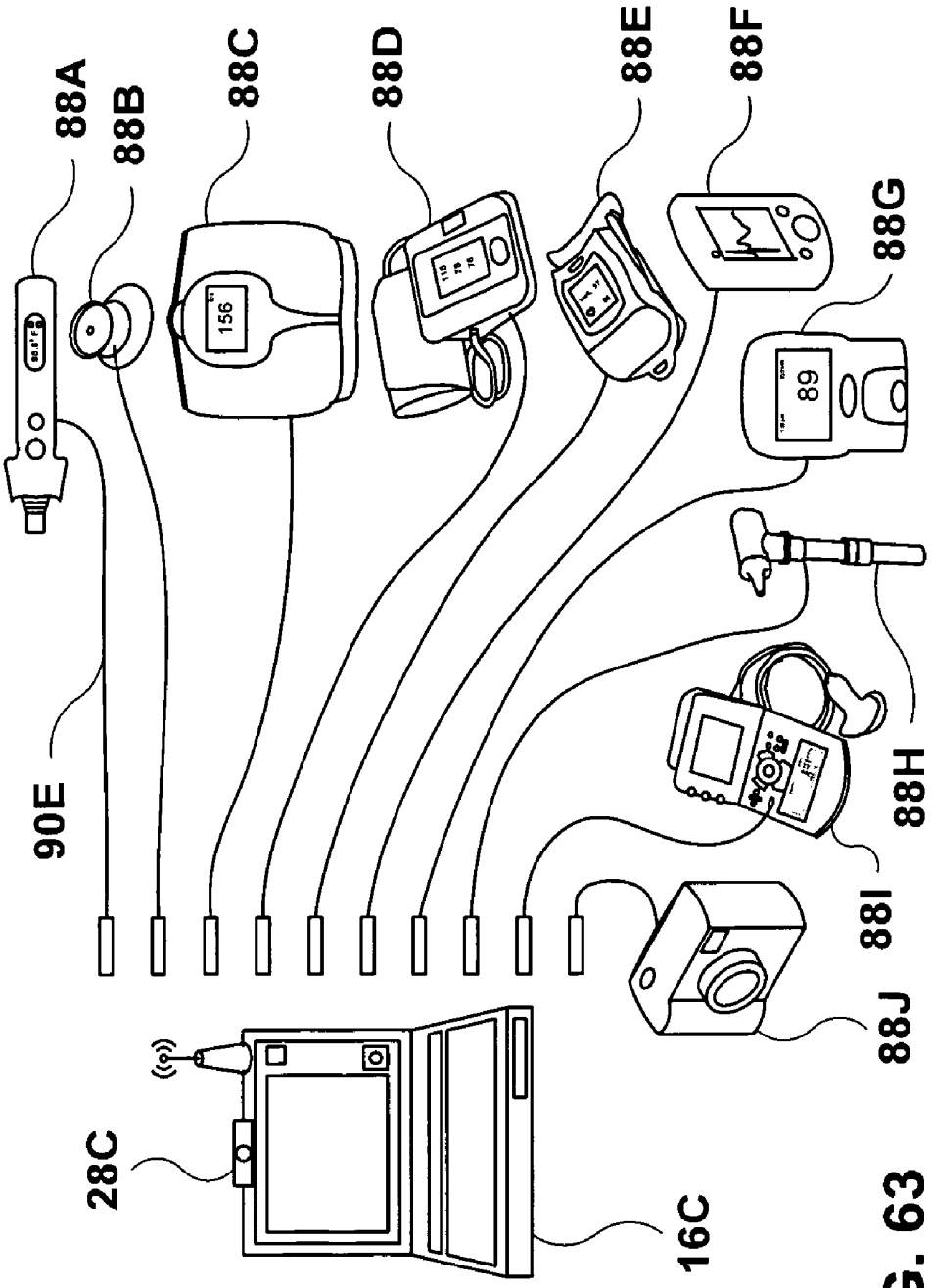


FIG. 63

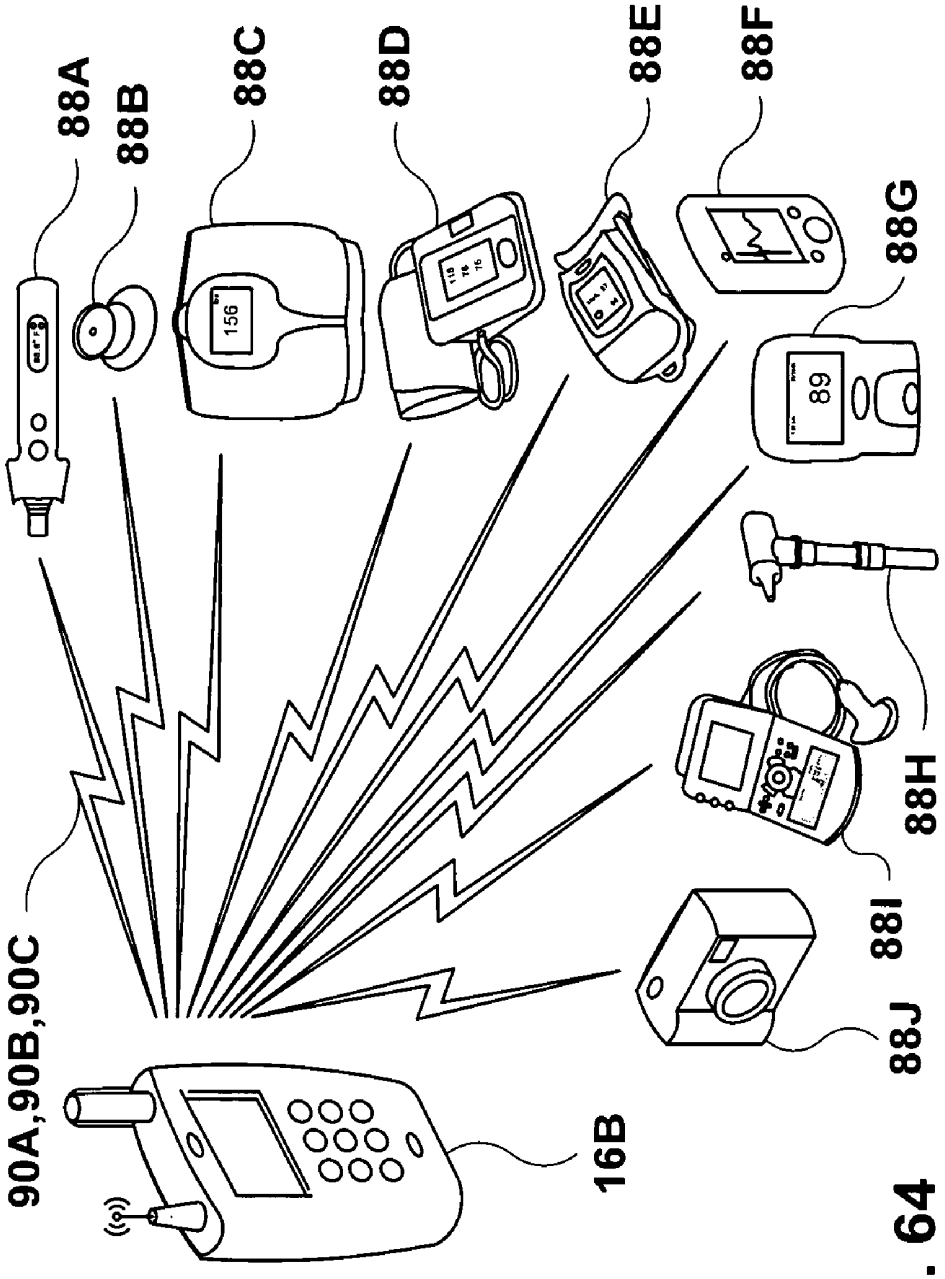


FIG. 64

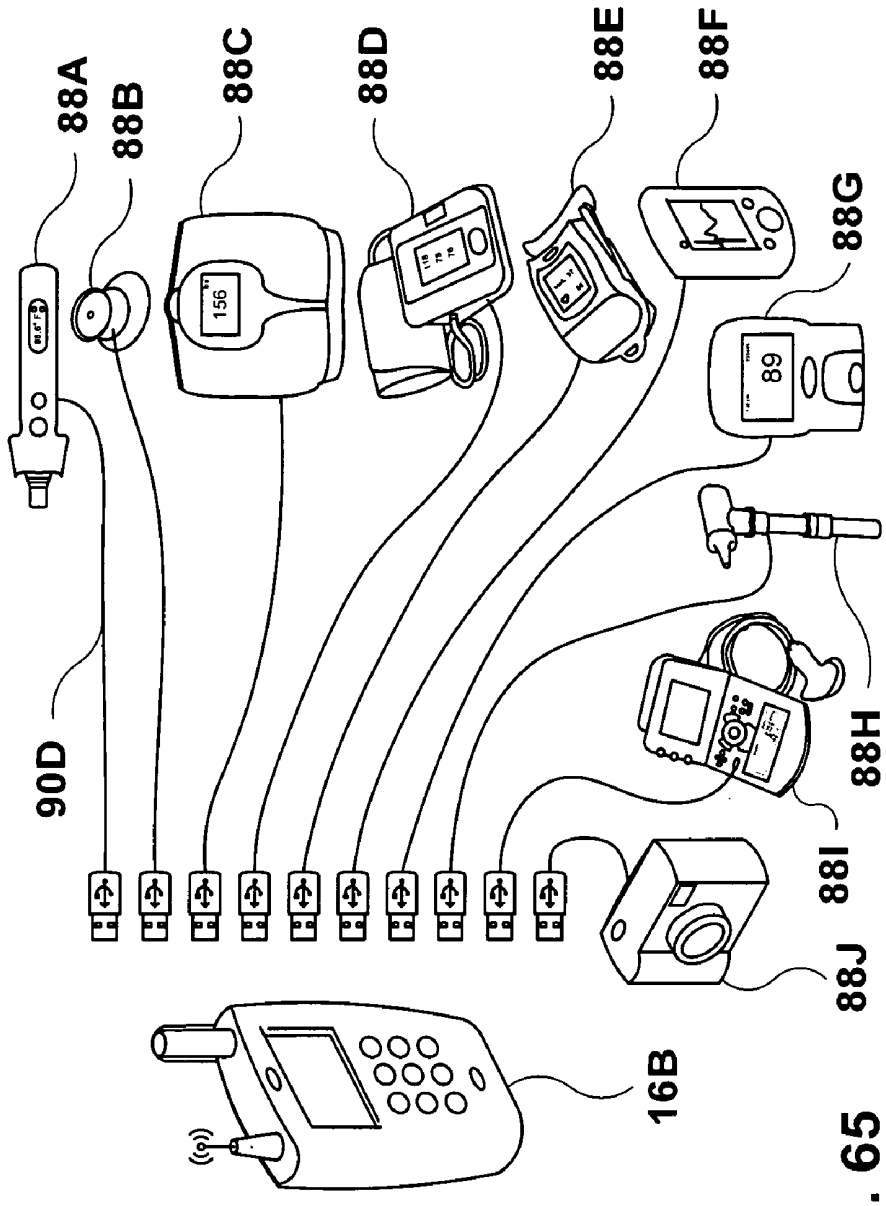


FIG. 65

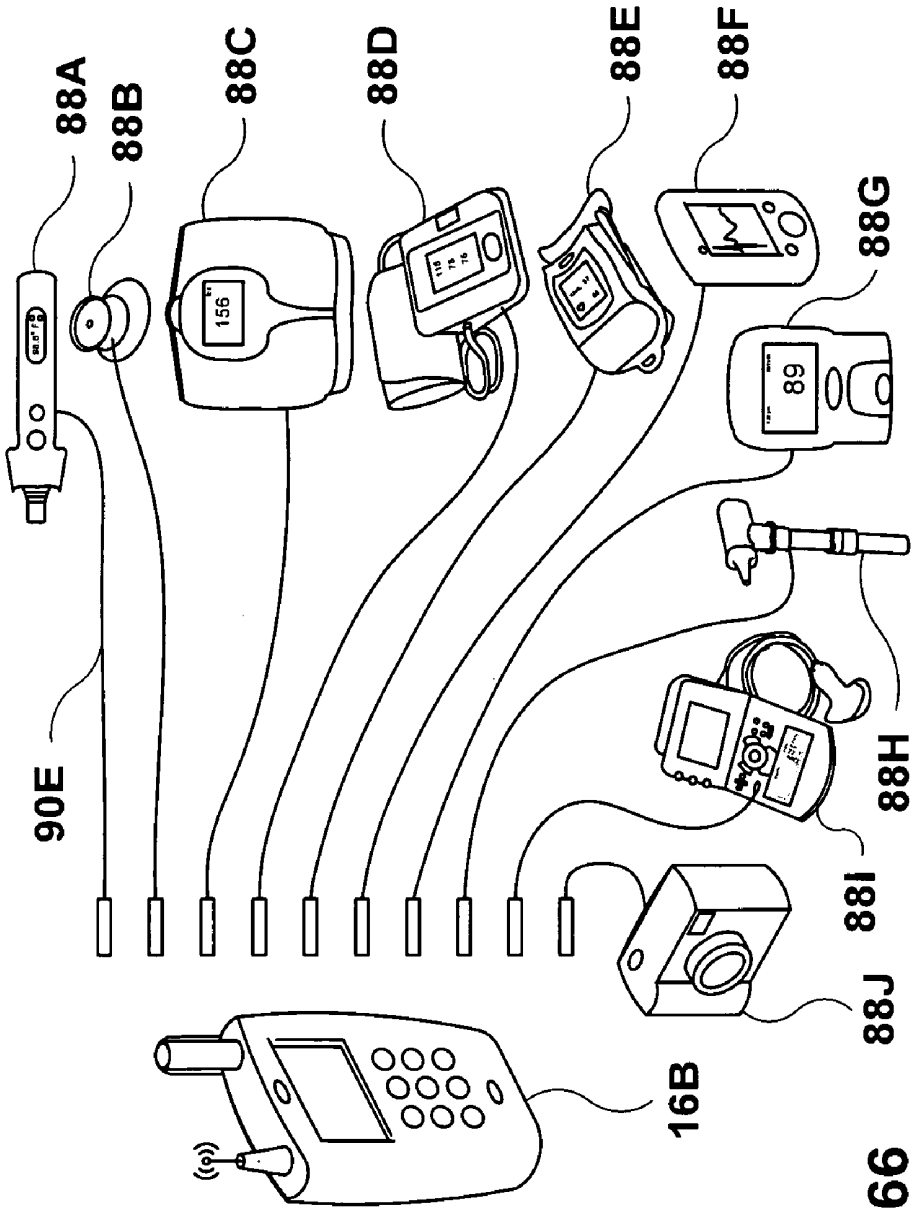


FIG. 66

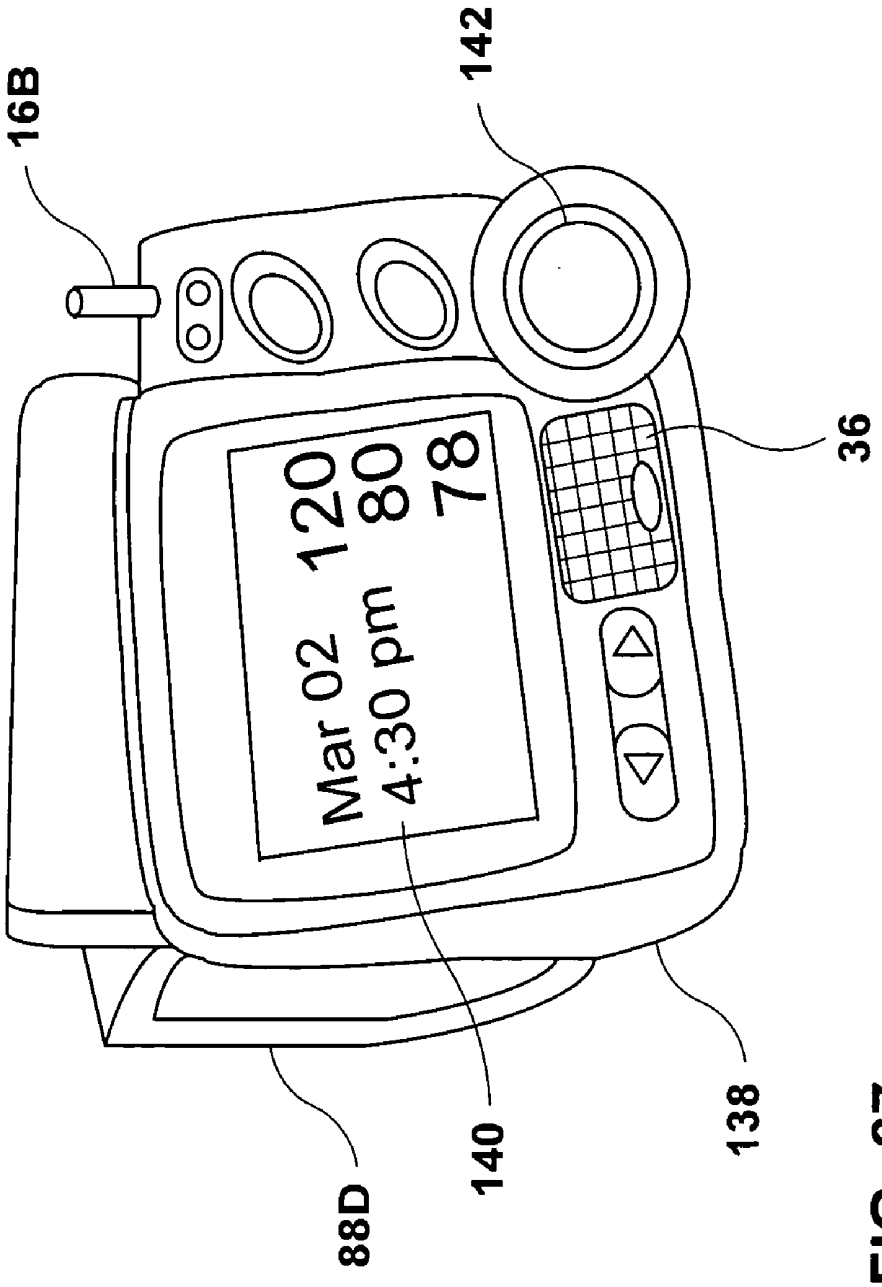


FIG. 67

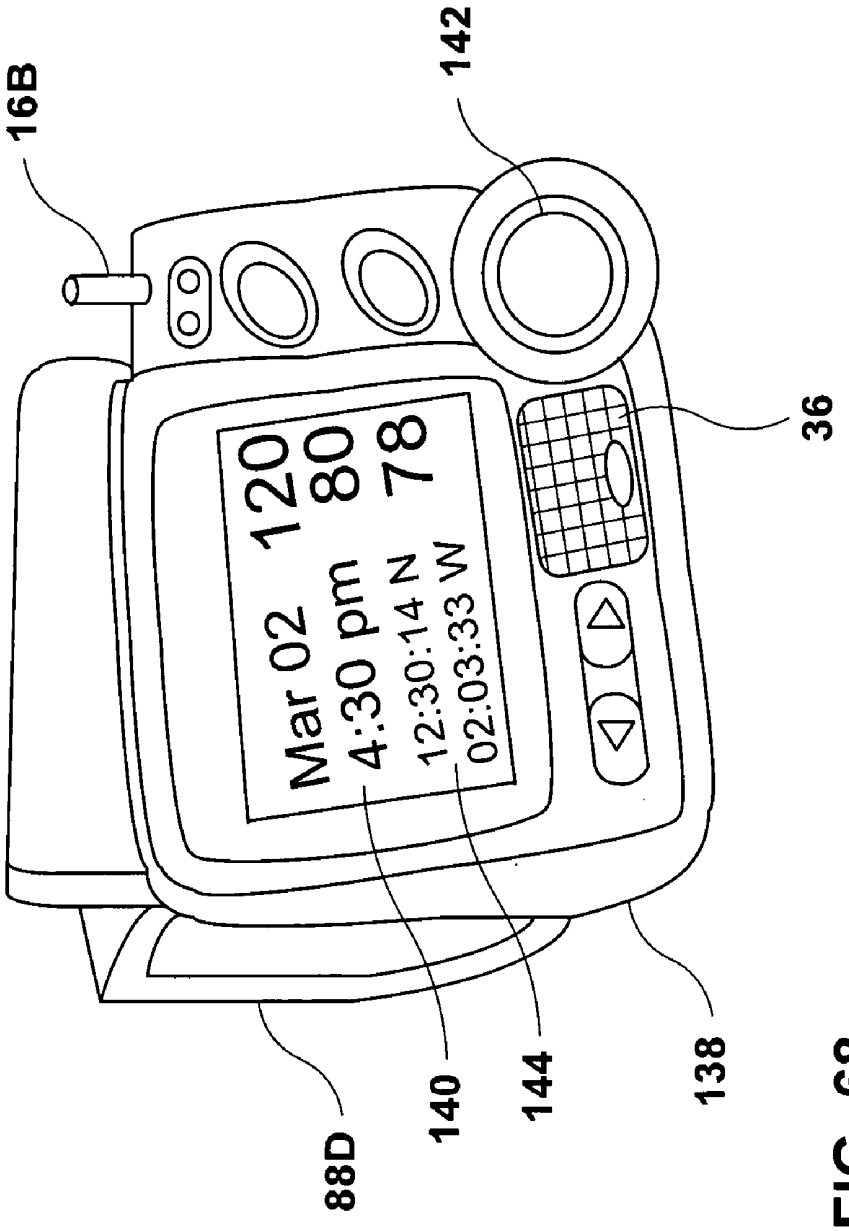

16B
142
36
120
80
78
Mar 02
4:30 pm
12:30:14 N
02:03:33 W
88D
140
144
138

FIG. 68

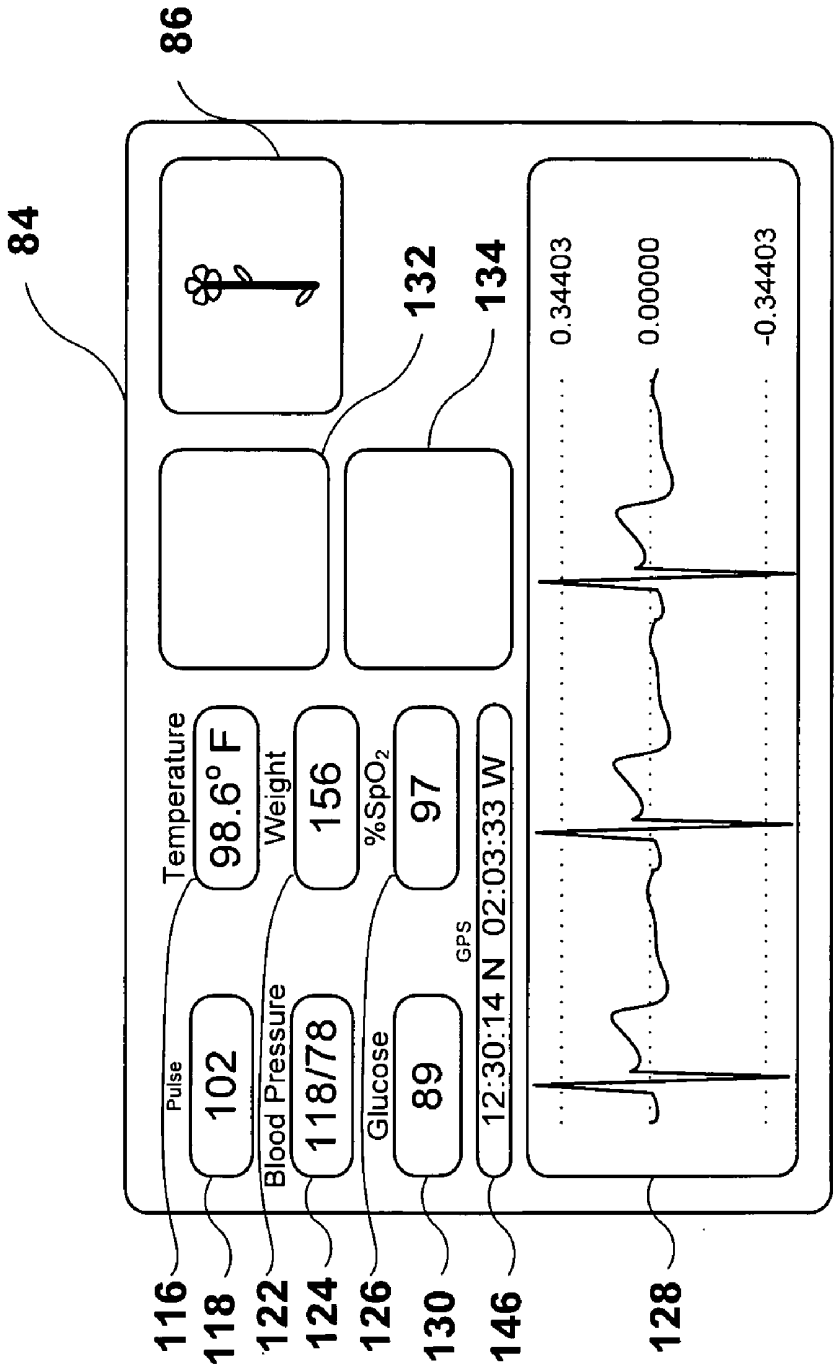

84
86
132
134
Temperature
98.6° F
Weight
156
%SpO2
97
Pulse
102
Blood Pressure
118/78
Glucose
89
GPS
12:30:14 N 02:03:33 W
0.34403
0.00000
-0.34403
116
118
122
124
126
130
146
128

FIG. 69

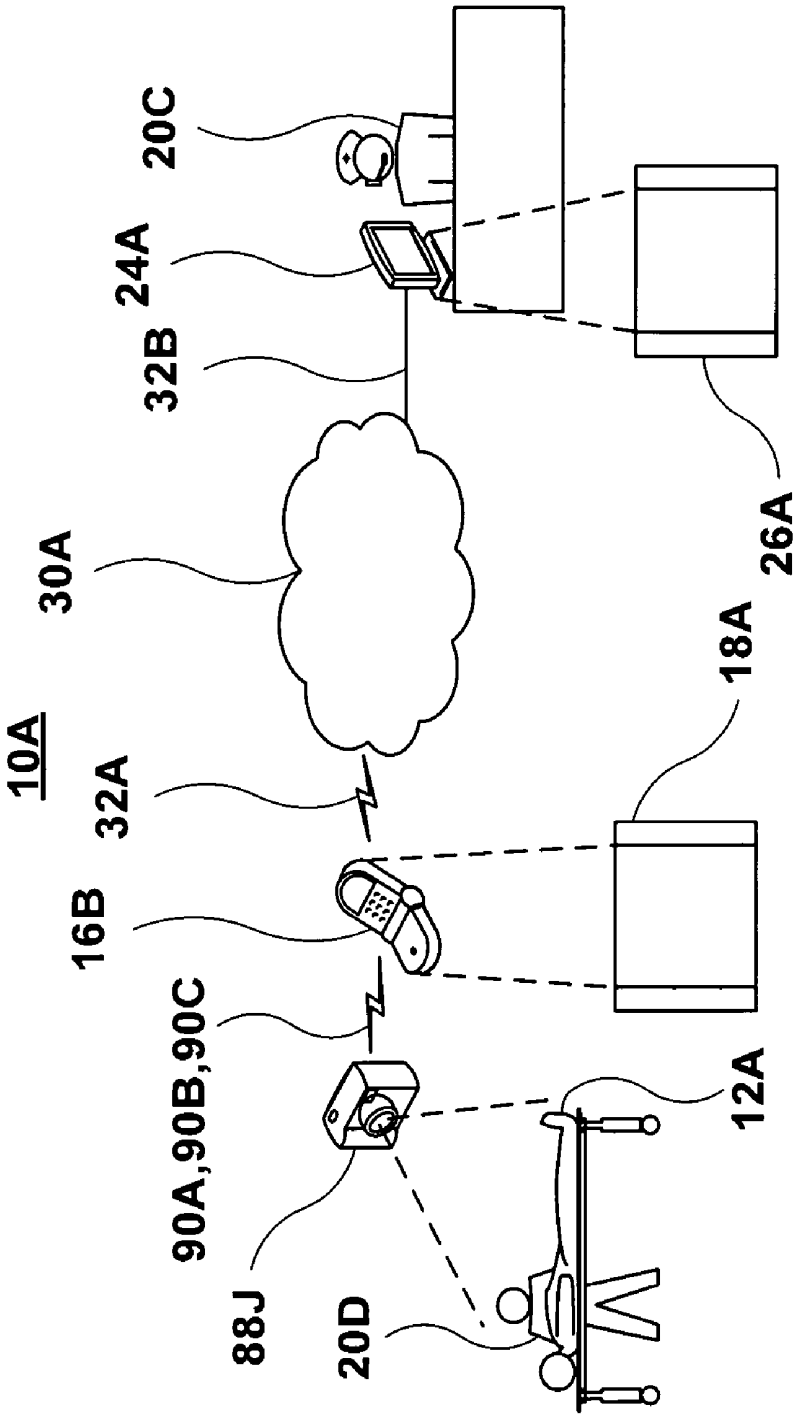


FIG. 70

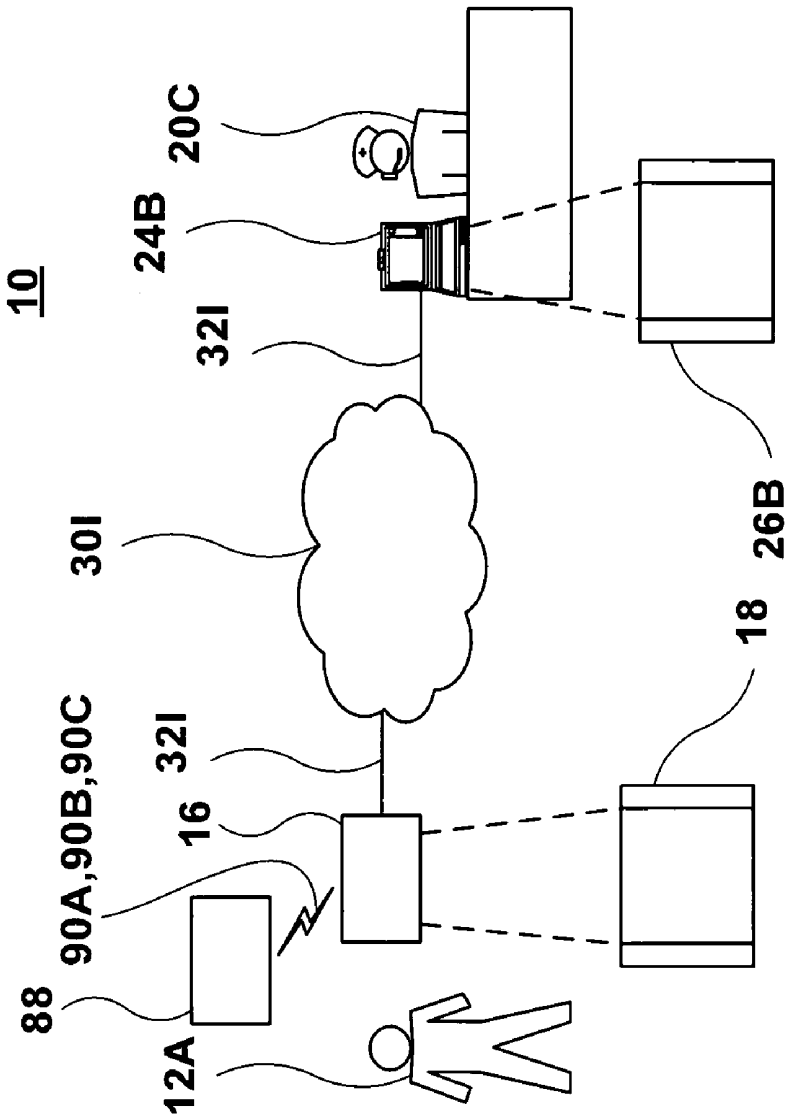


FIG. 71

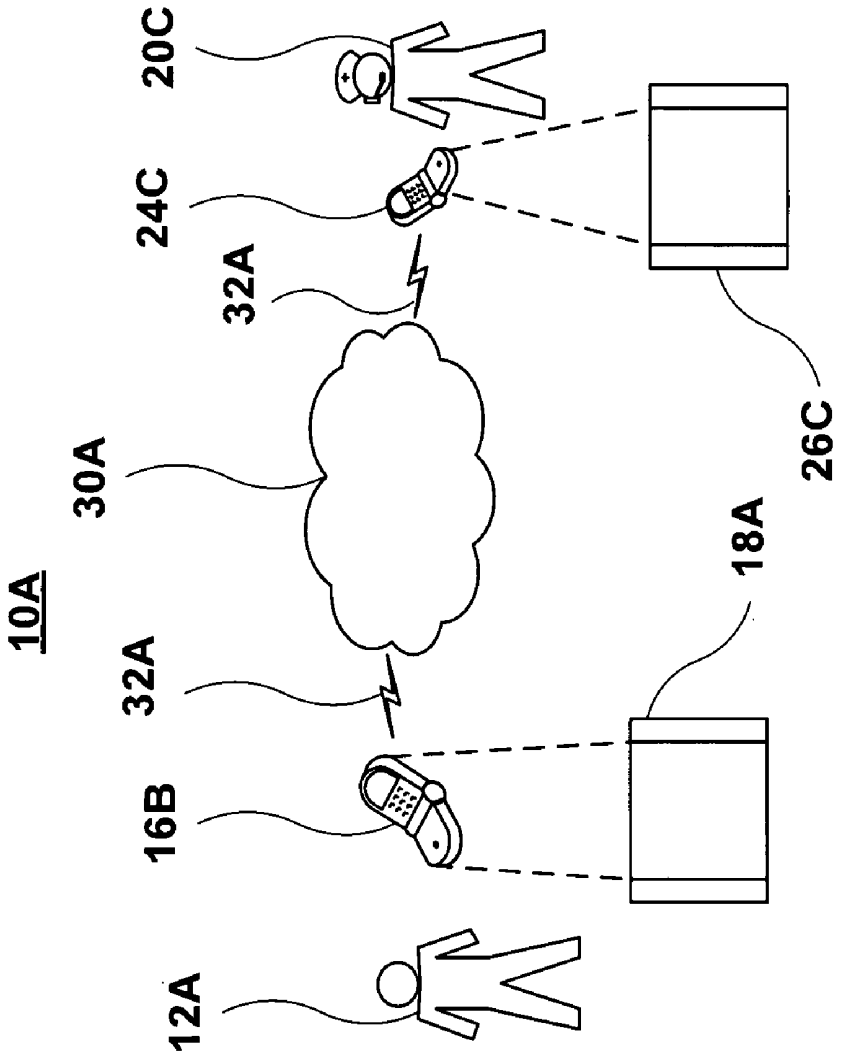


FIG. 72

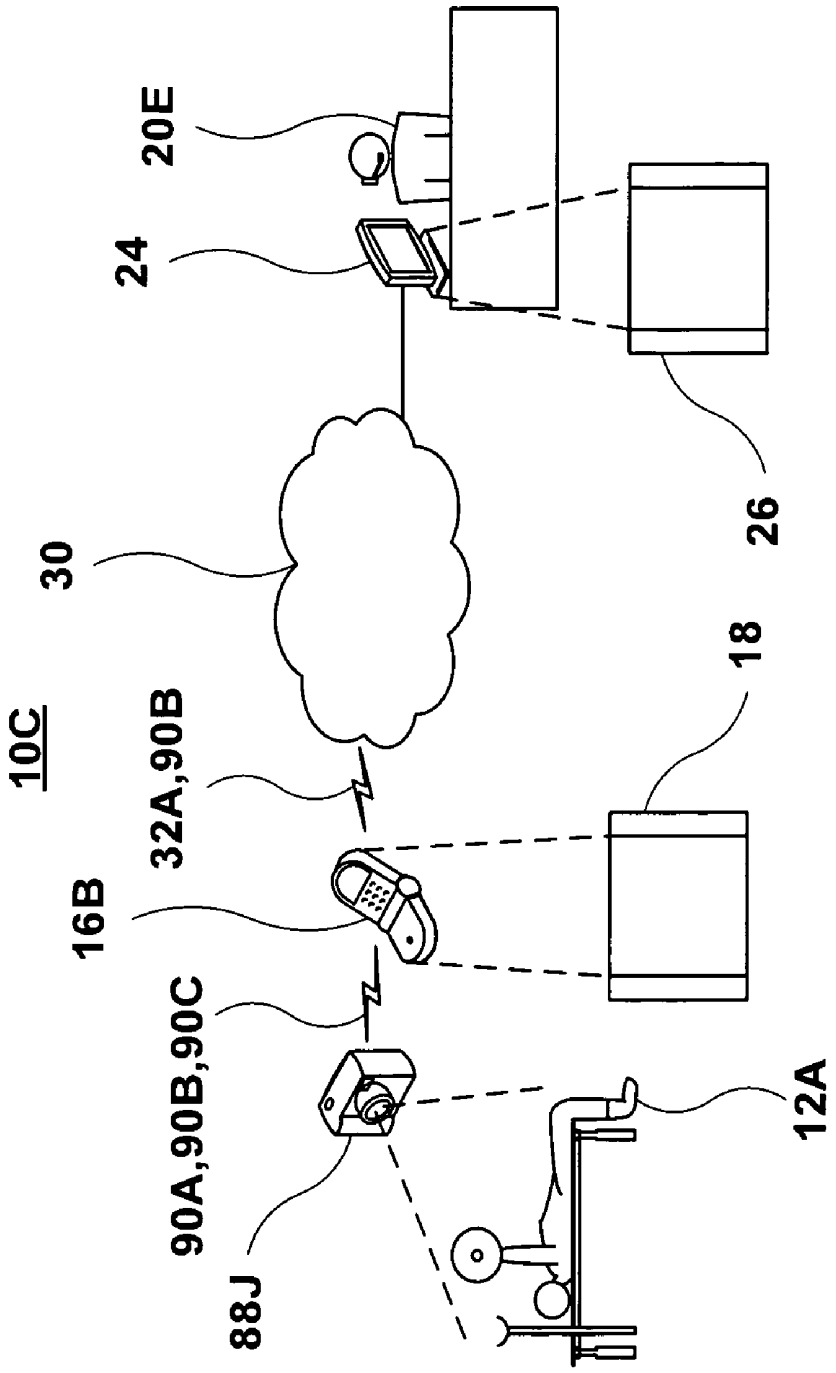


FIG. 73

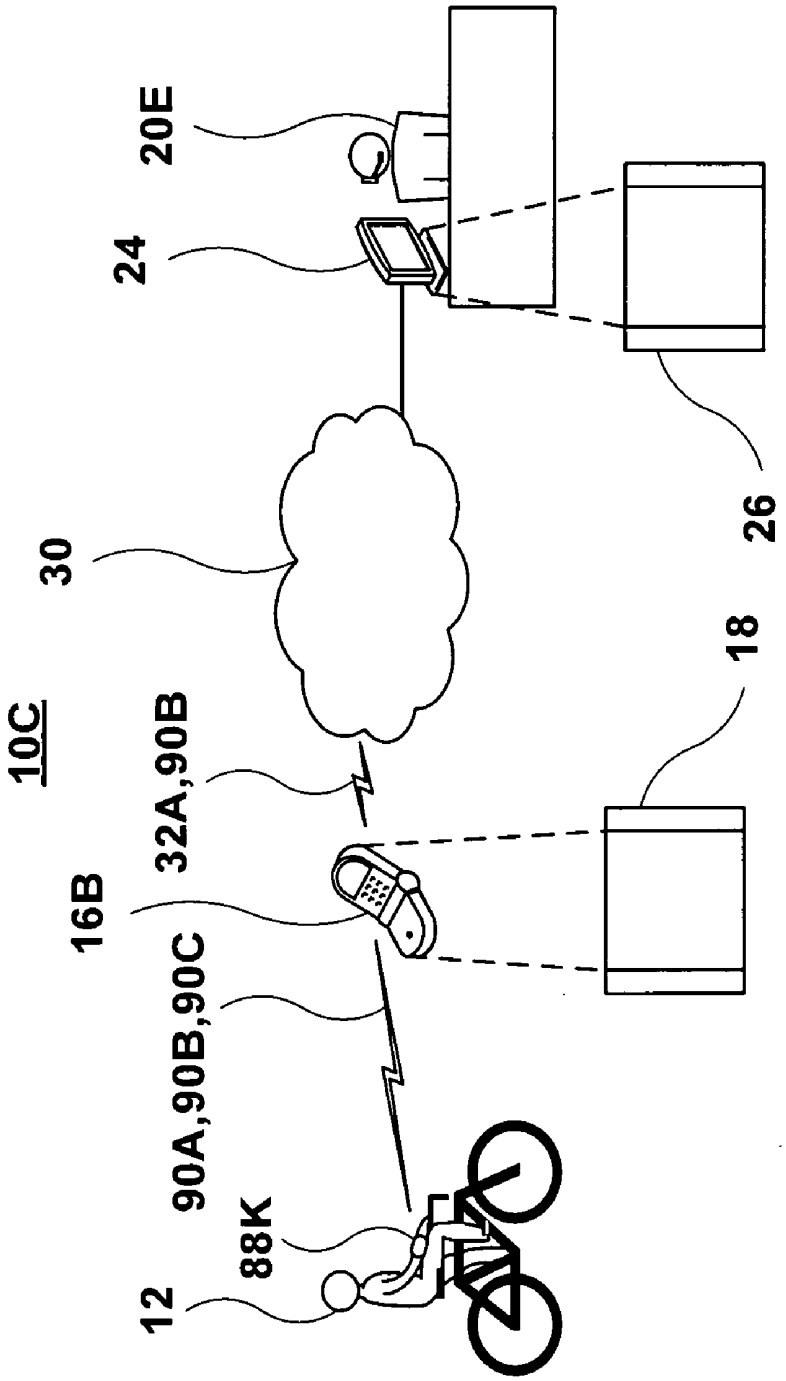


FIG. 74

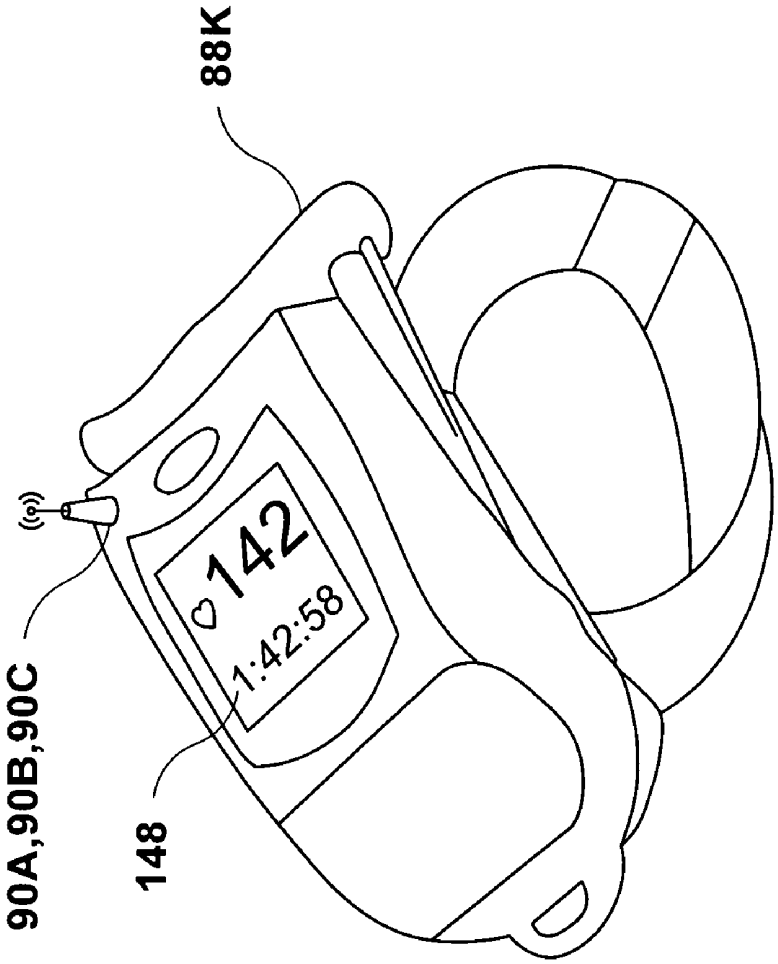


FIG. 75

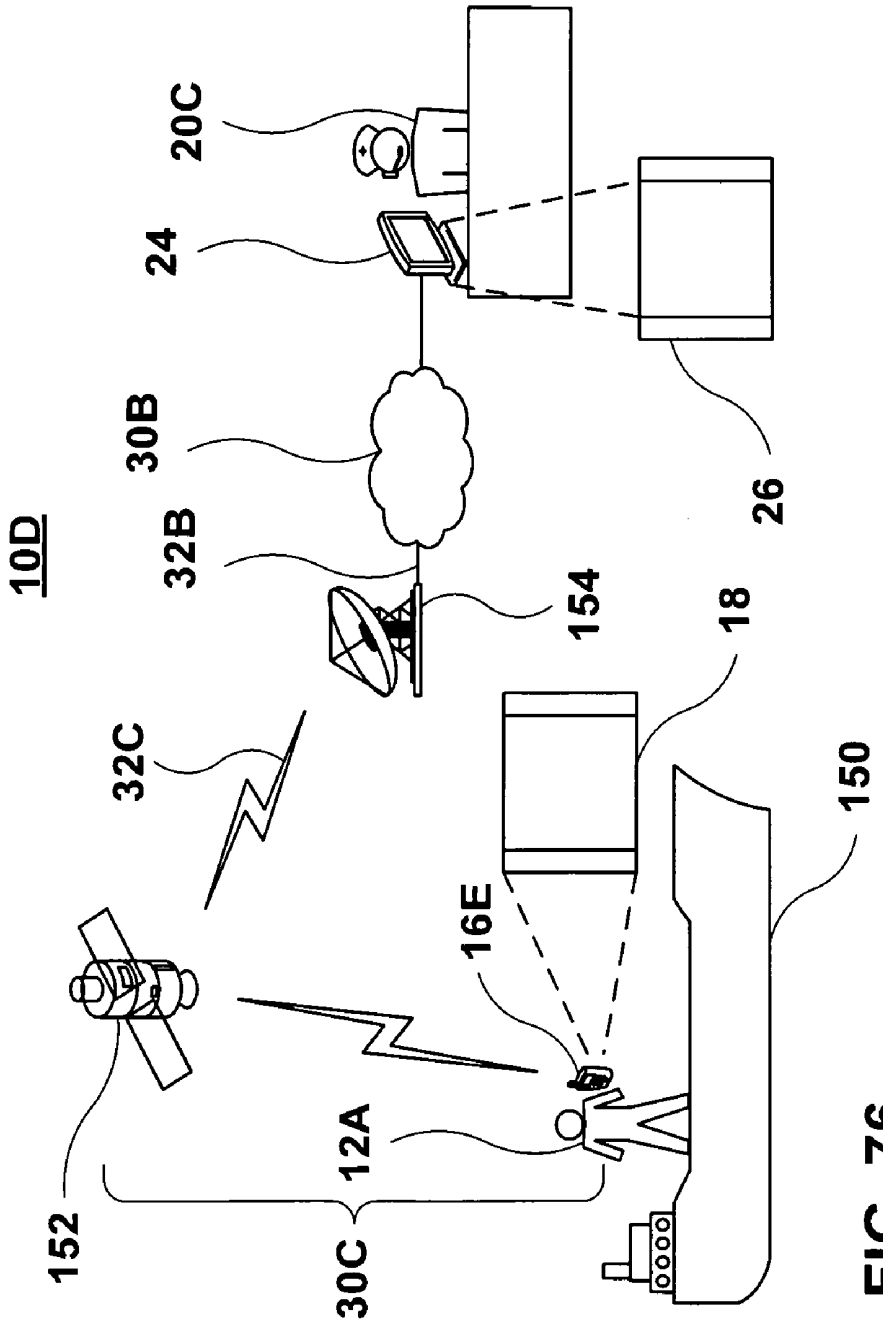


FIG. 76

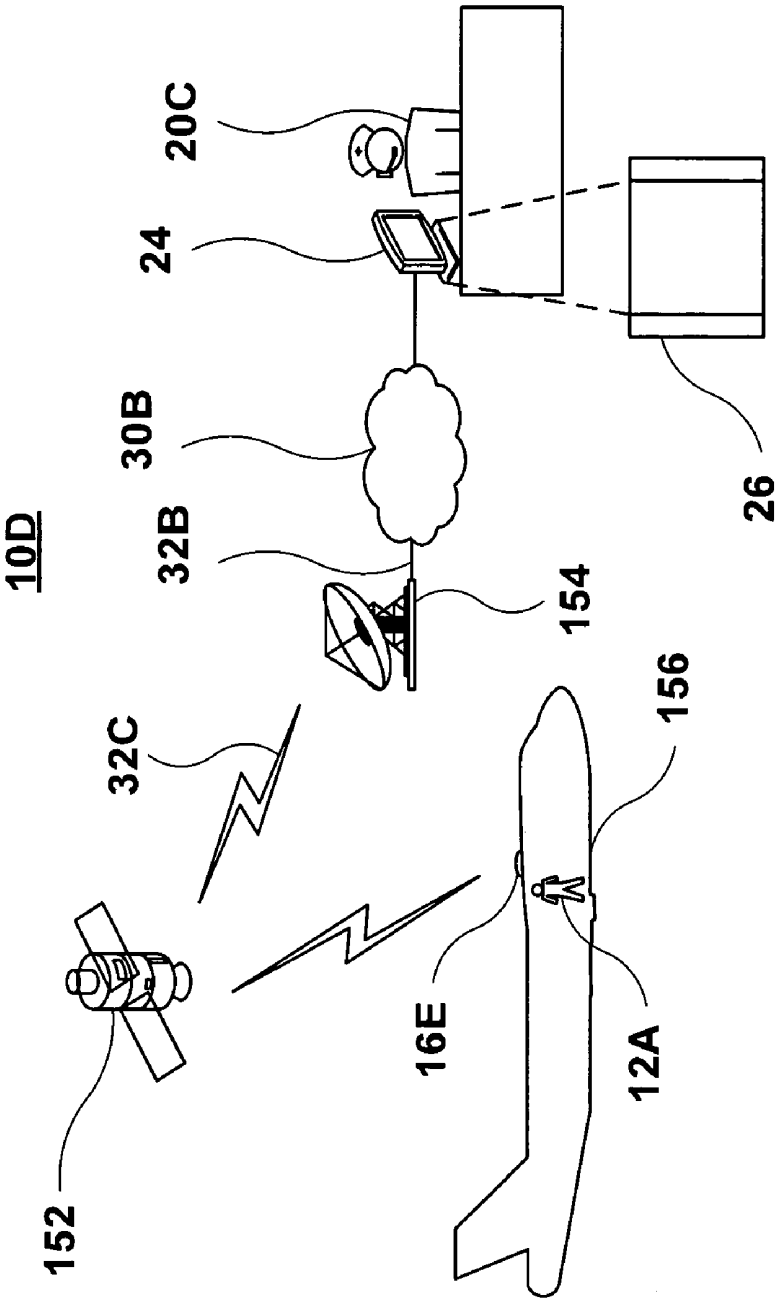


FIG. 77

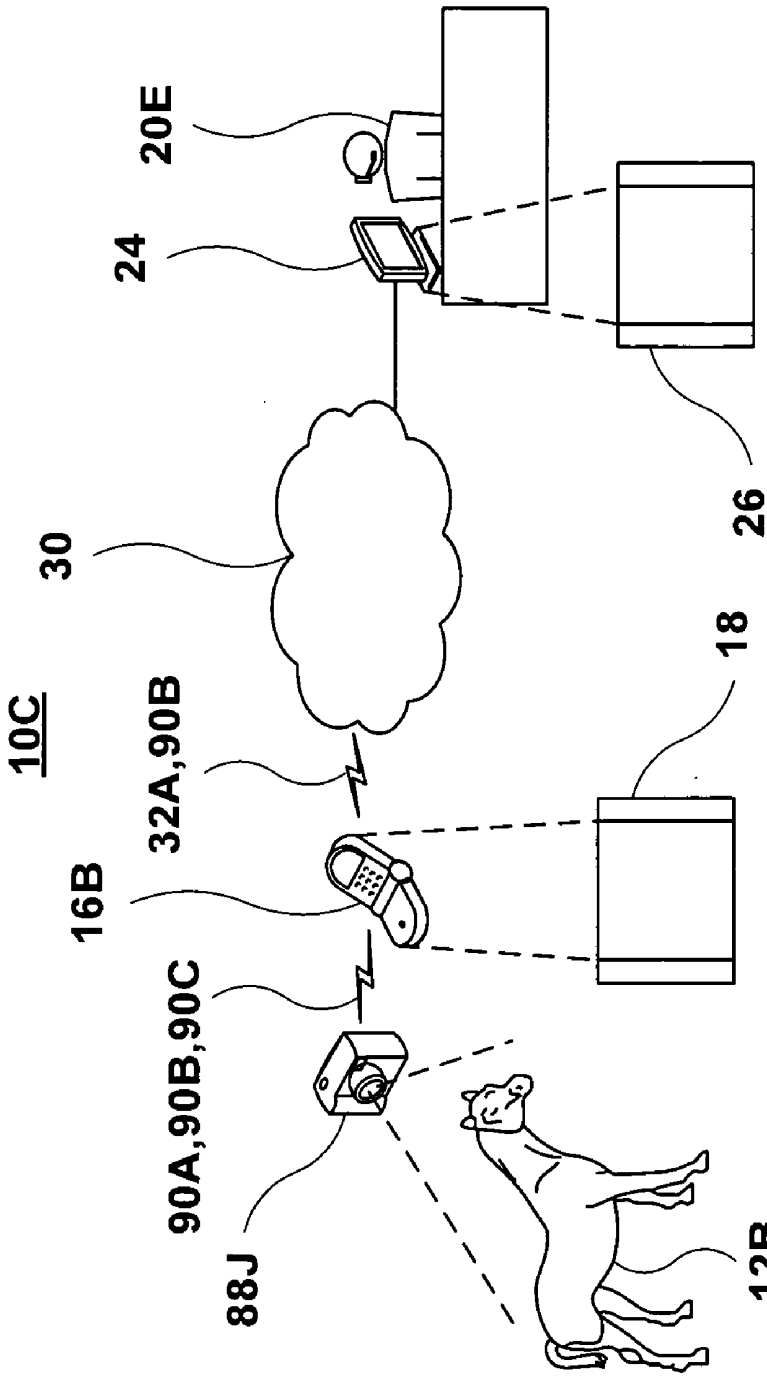


FIG. 78

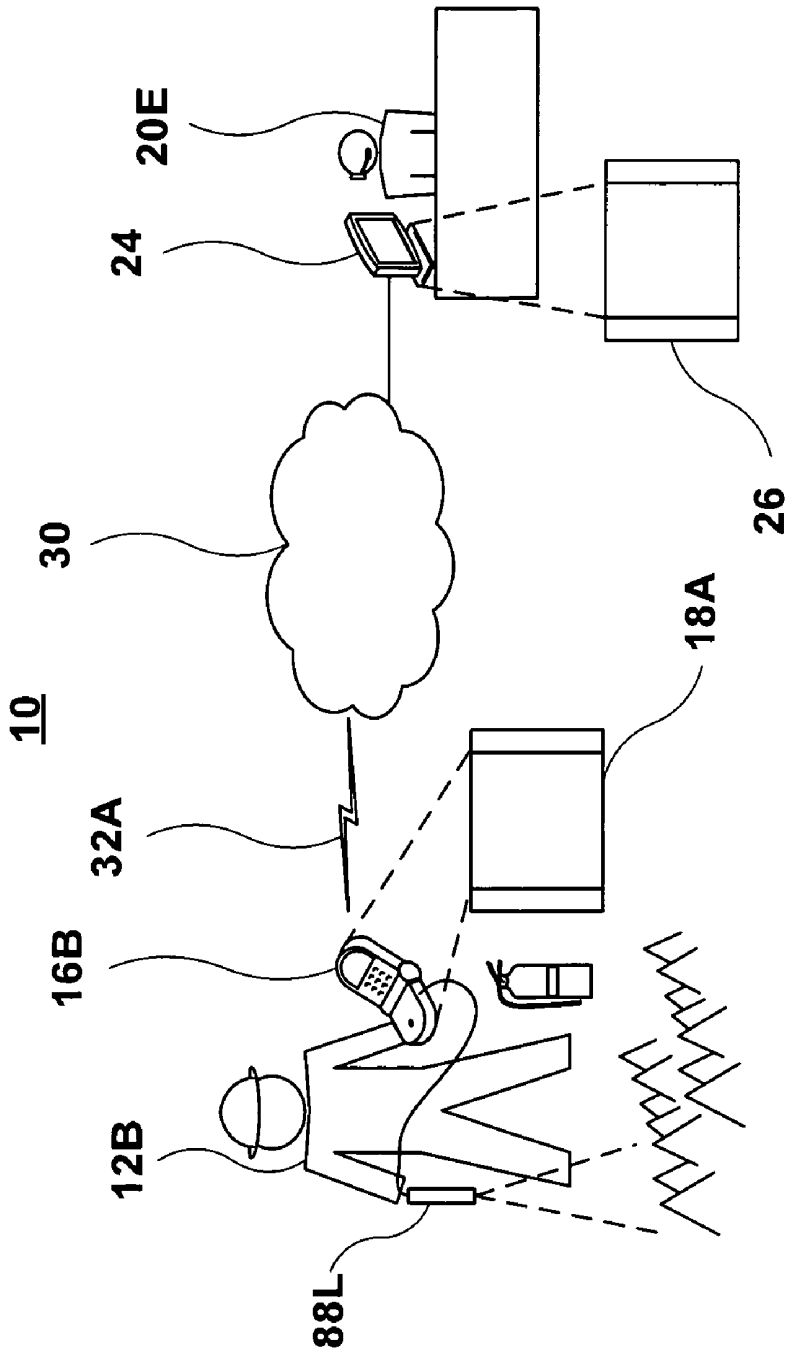


FIG. 79

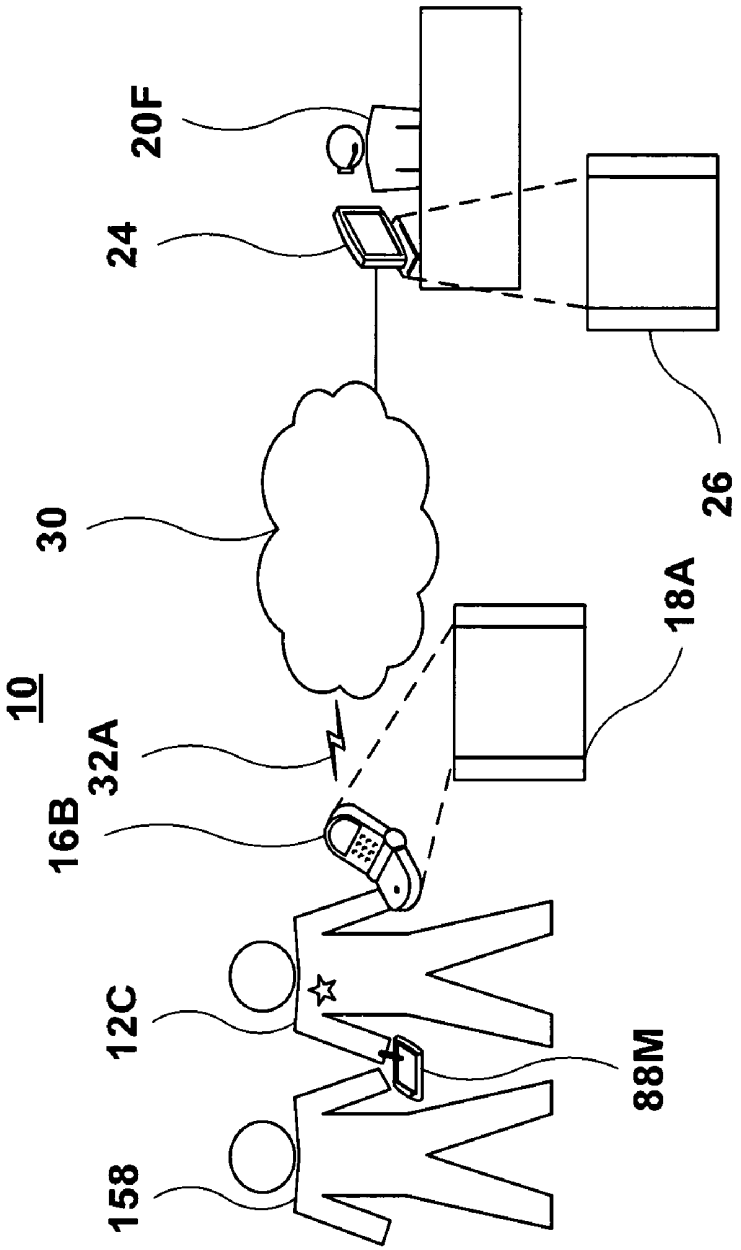


FIG. 80

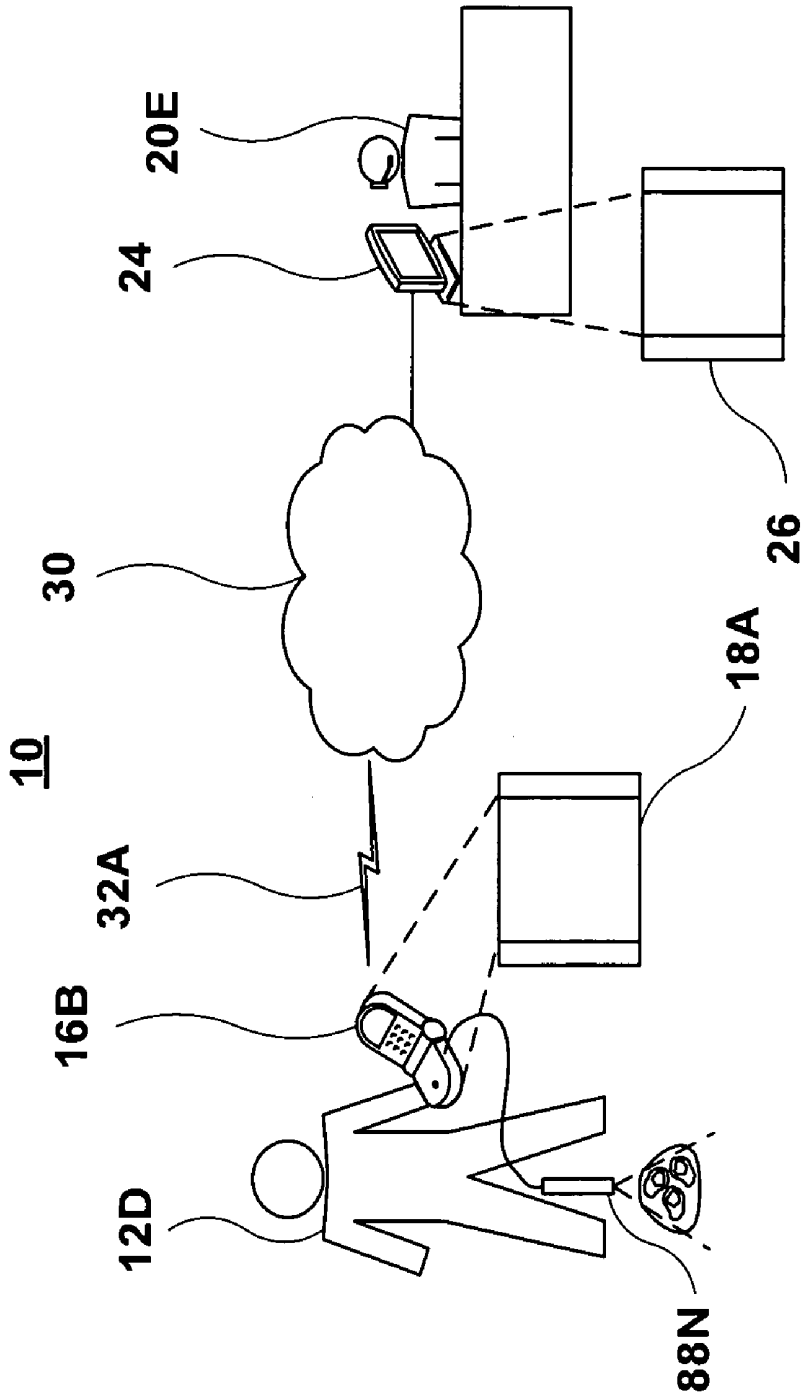


FIG. 81

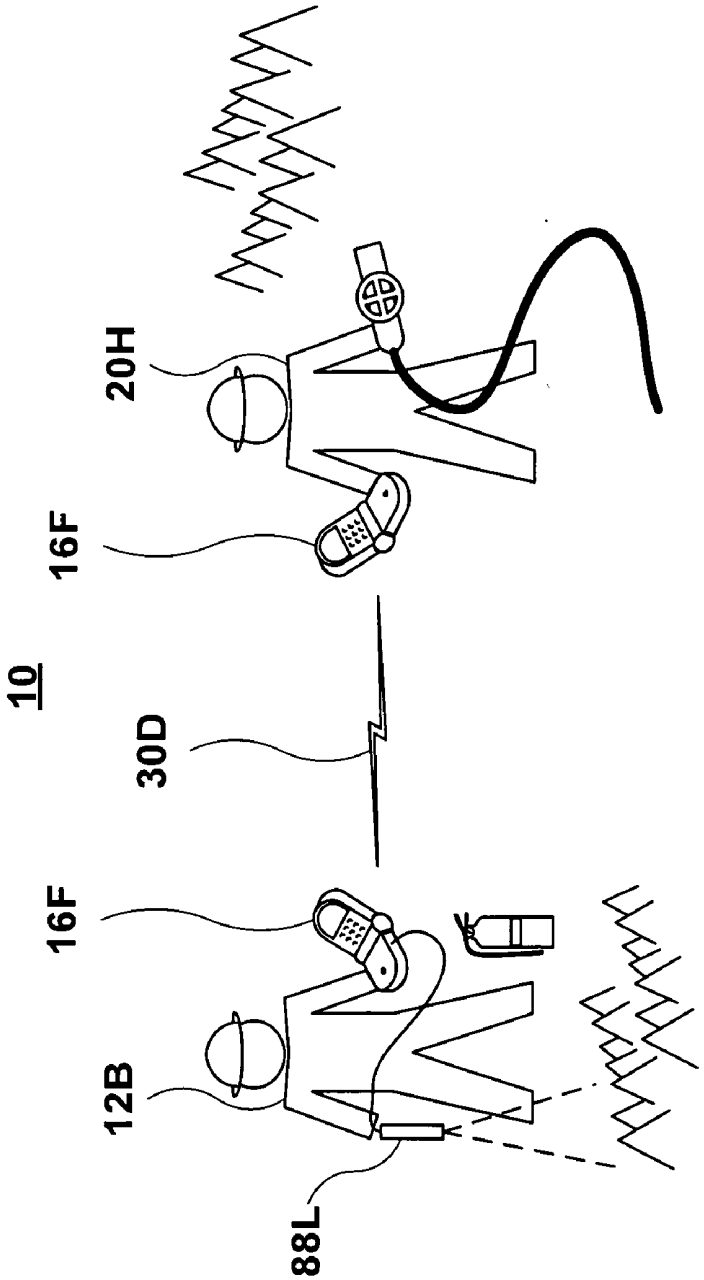


FIG. 82

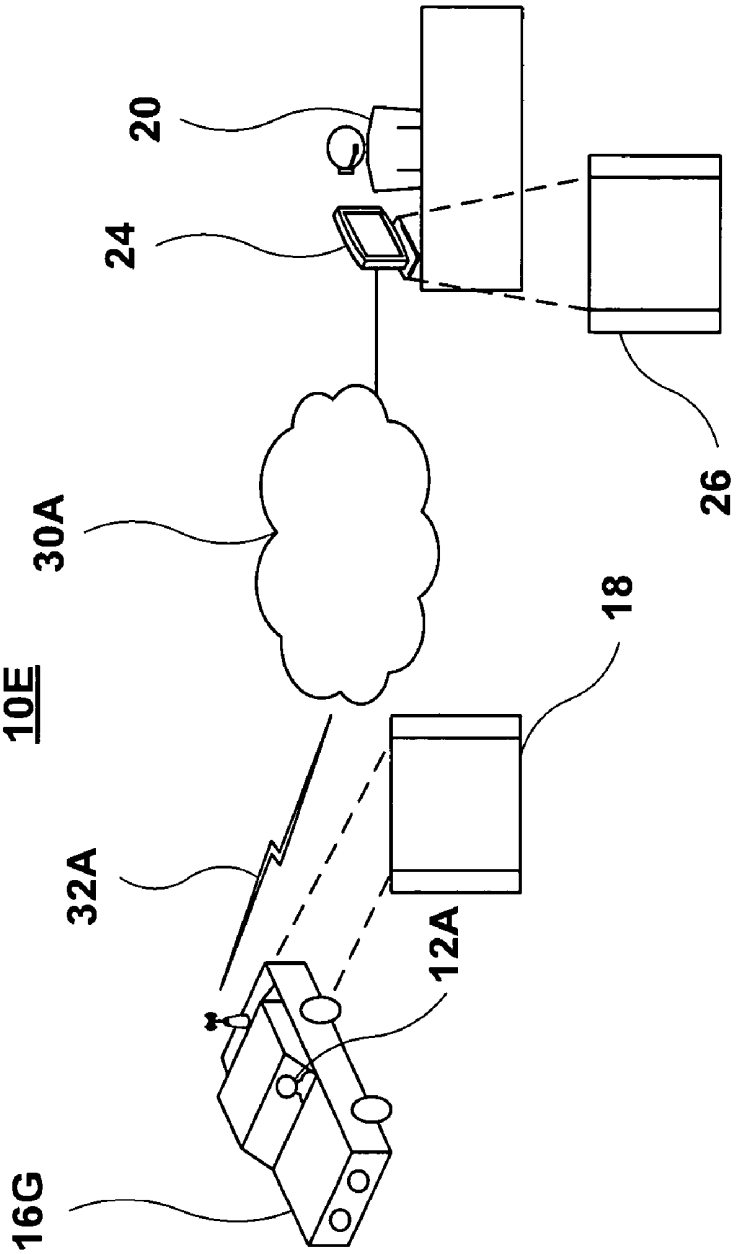


FIG. 83

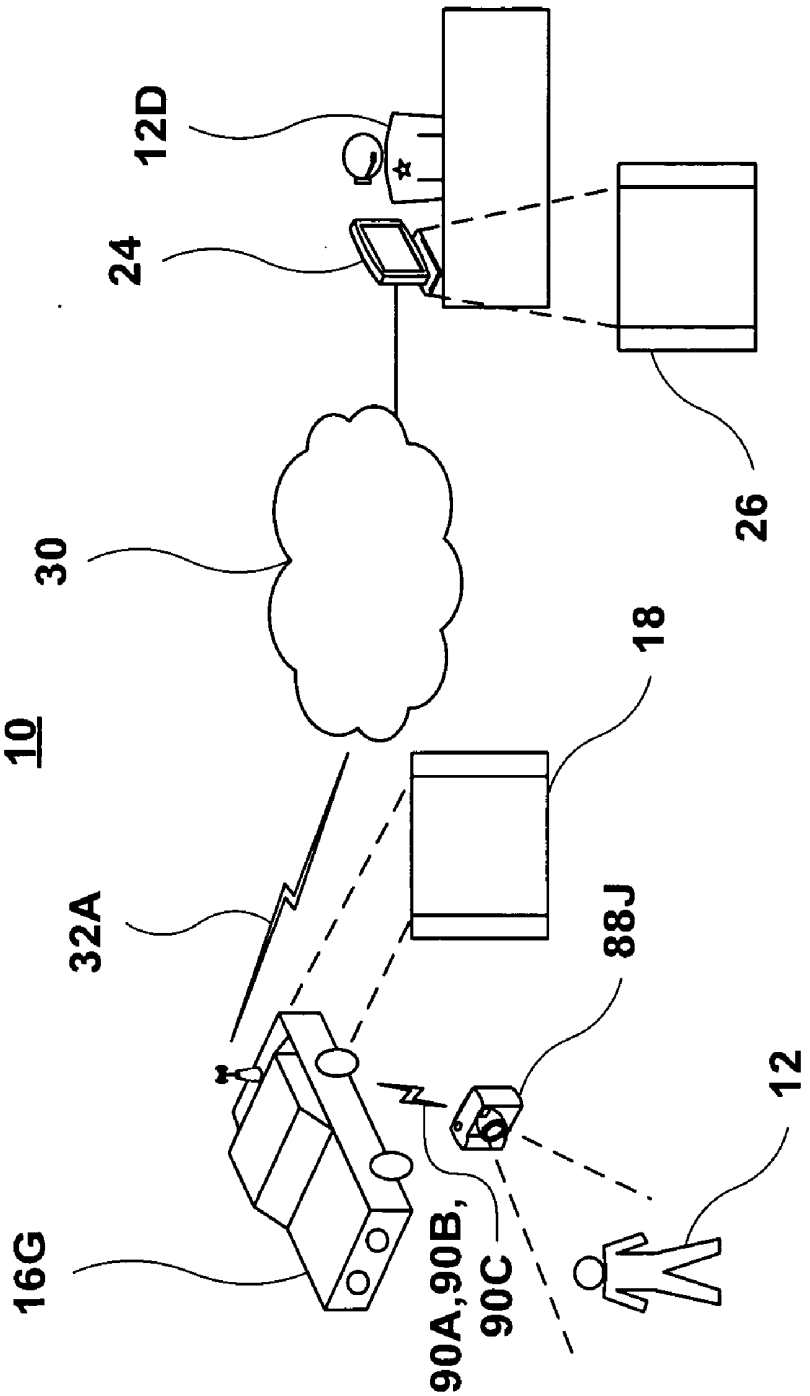


FIG. 84

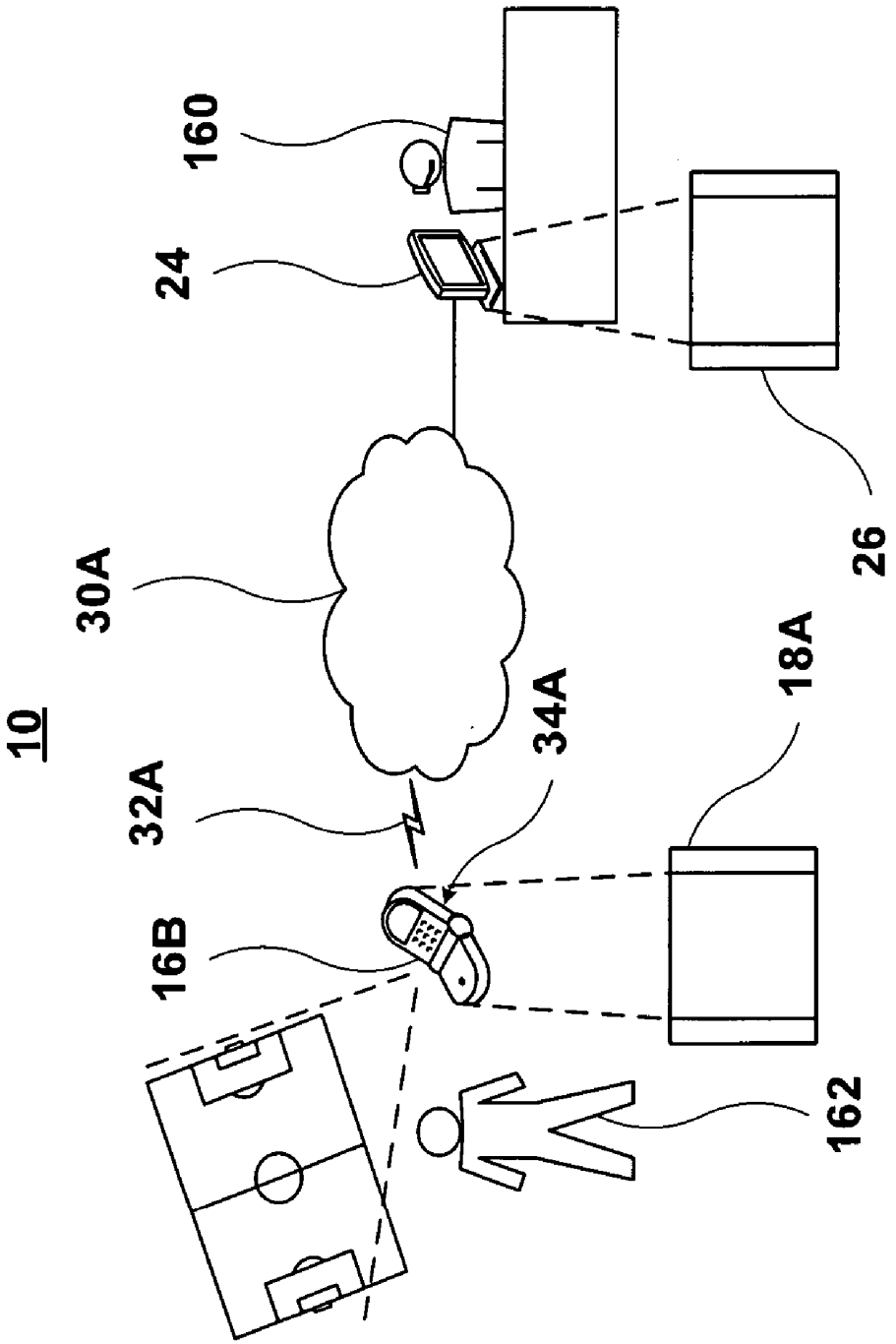


FIG. 85

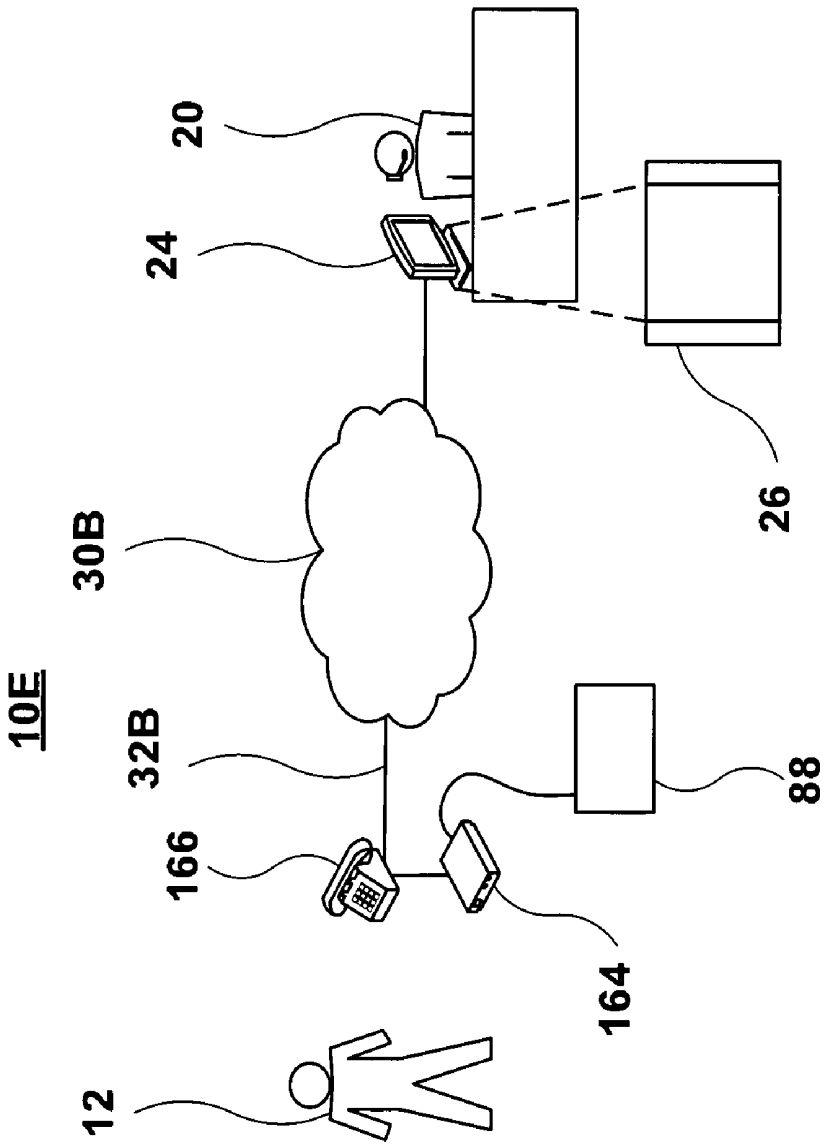


FIG. 86

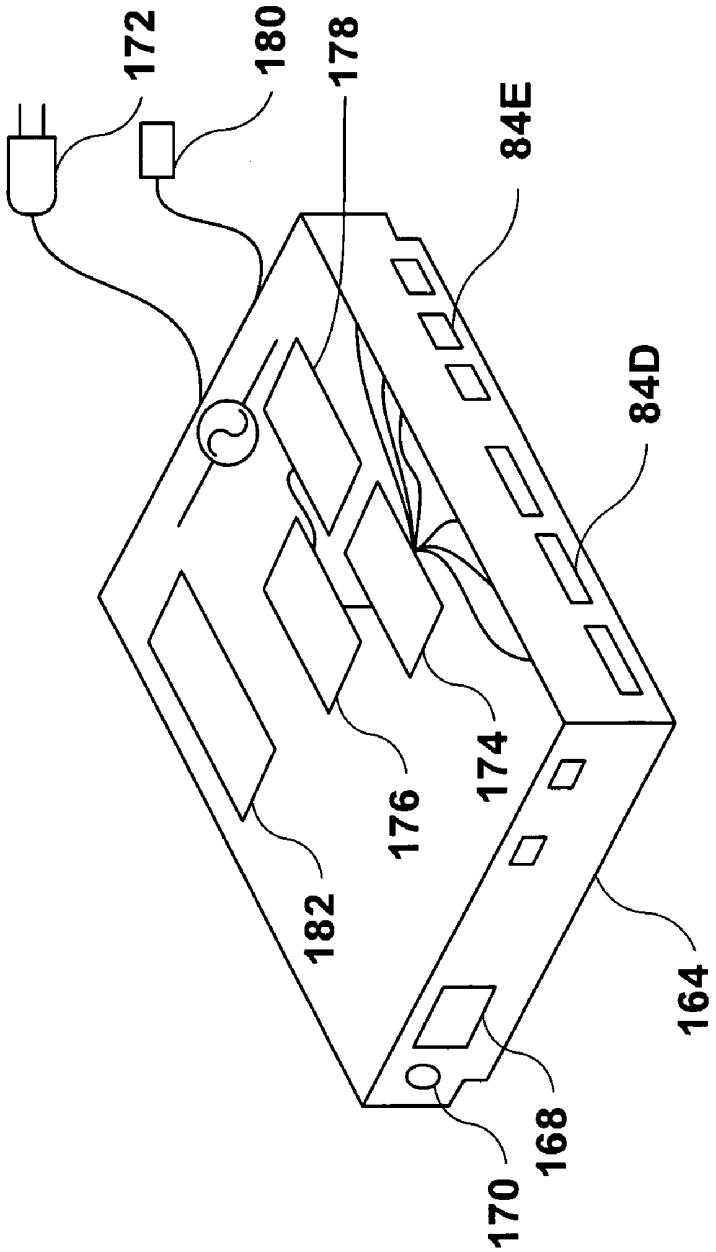


FIG. 87

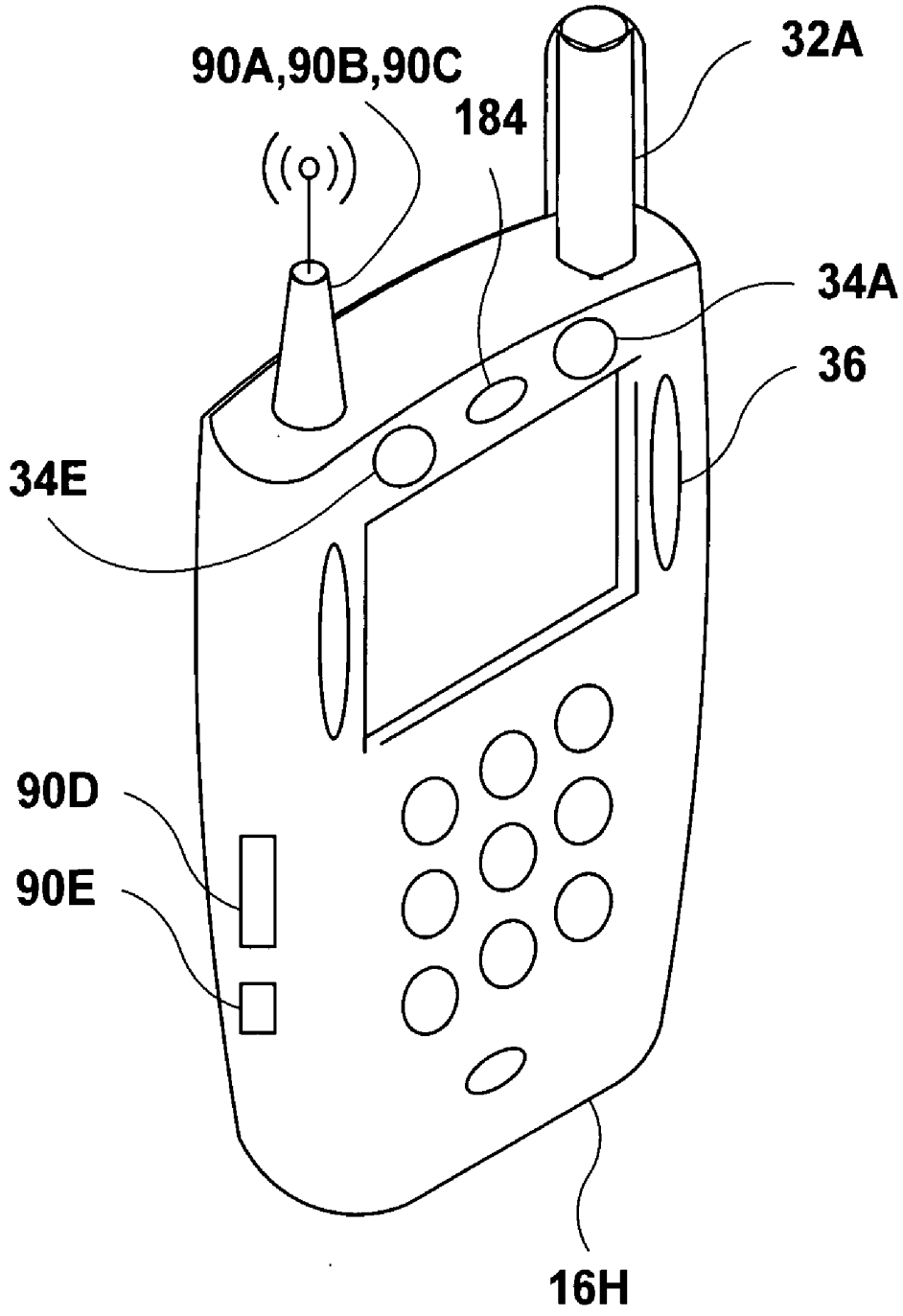


FIG. 88

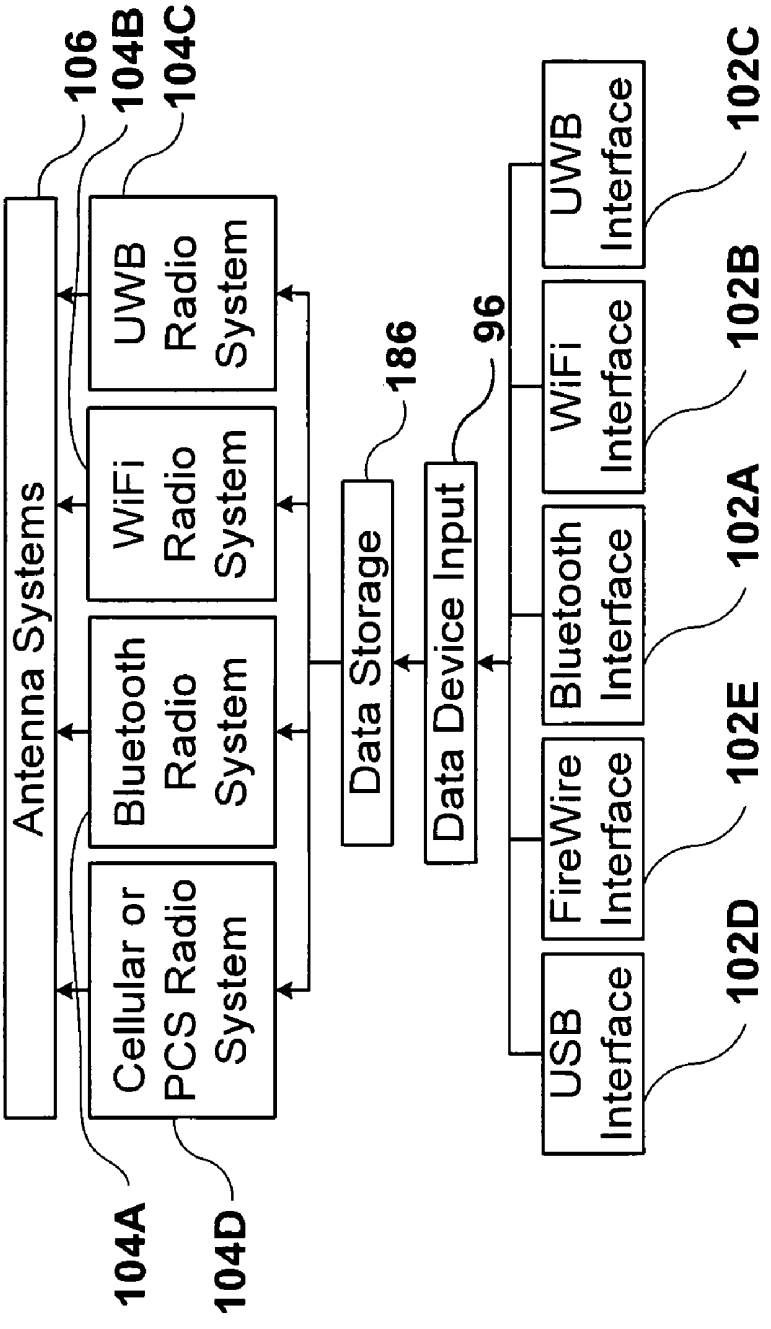

Antenna Systems
106
Cellular or PCS Radio System
Bluetooth Radio System
WiFi Radio System
UWB Radio System
104B
104C
104A
104D
Data Storage
186
Data Device Input
96
USB Interface
FireWire Interface
Bluetooth Interface
WiFi Interface
UWB Interface
102D
102E
102A
102B
102C

FIG. 89

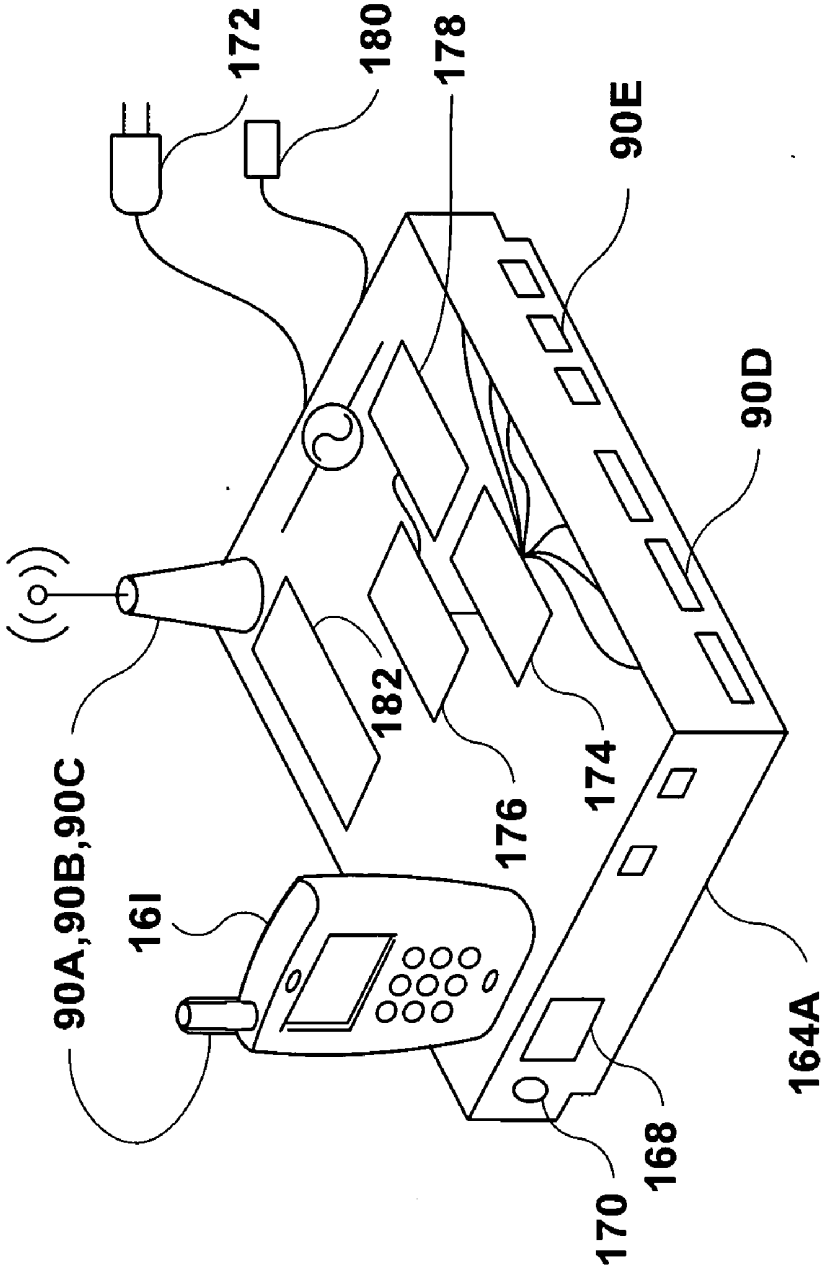


FIG. 90

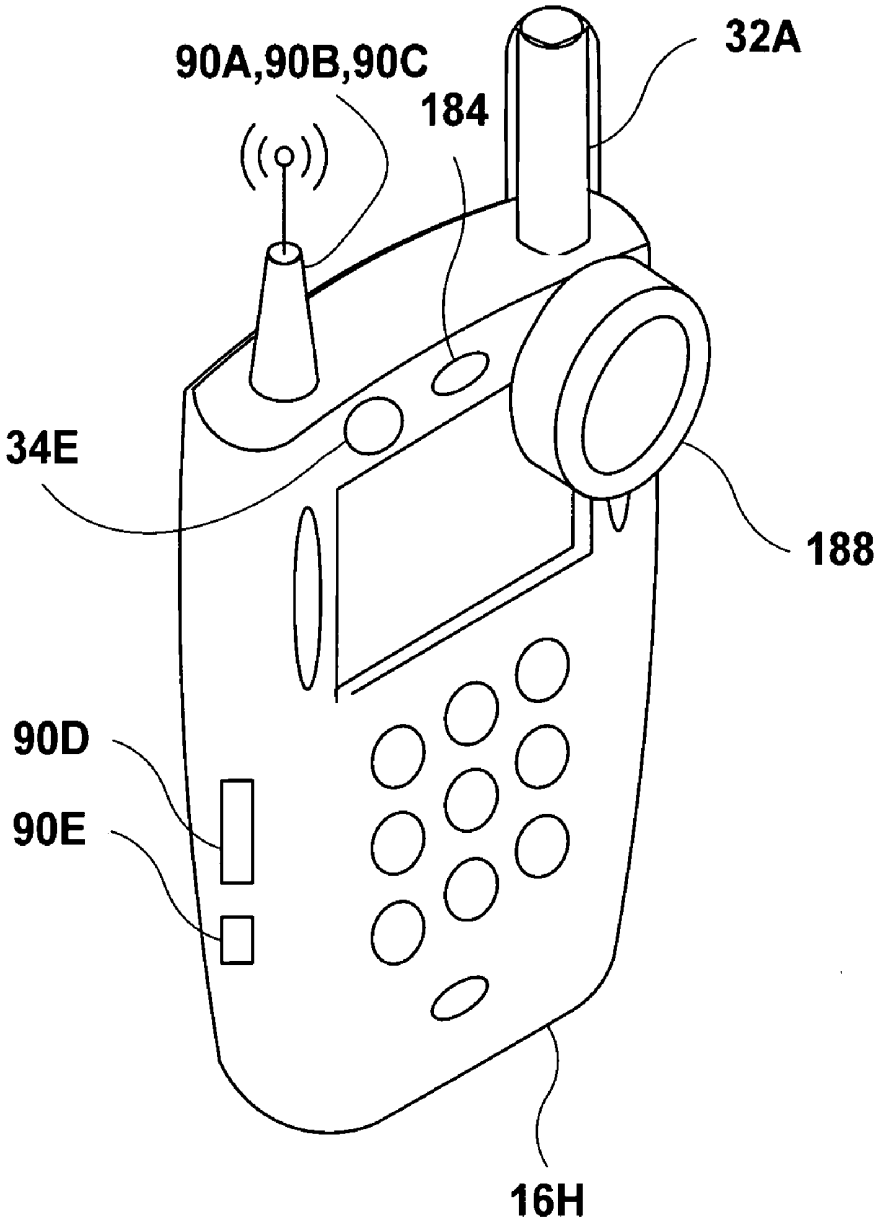


FIG. 91

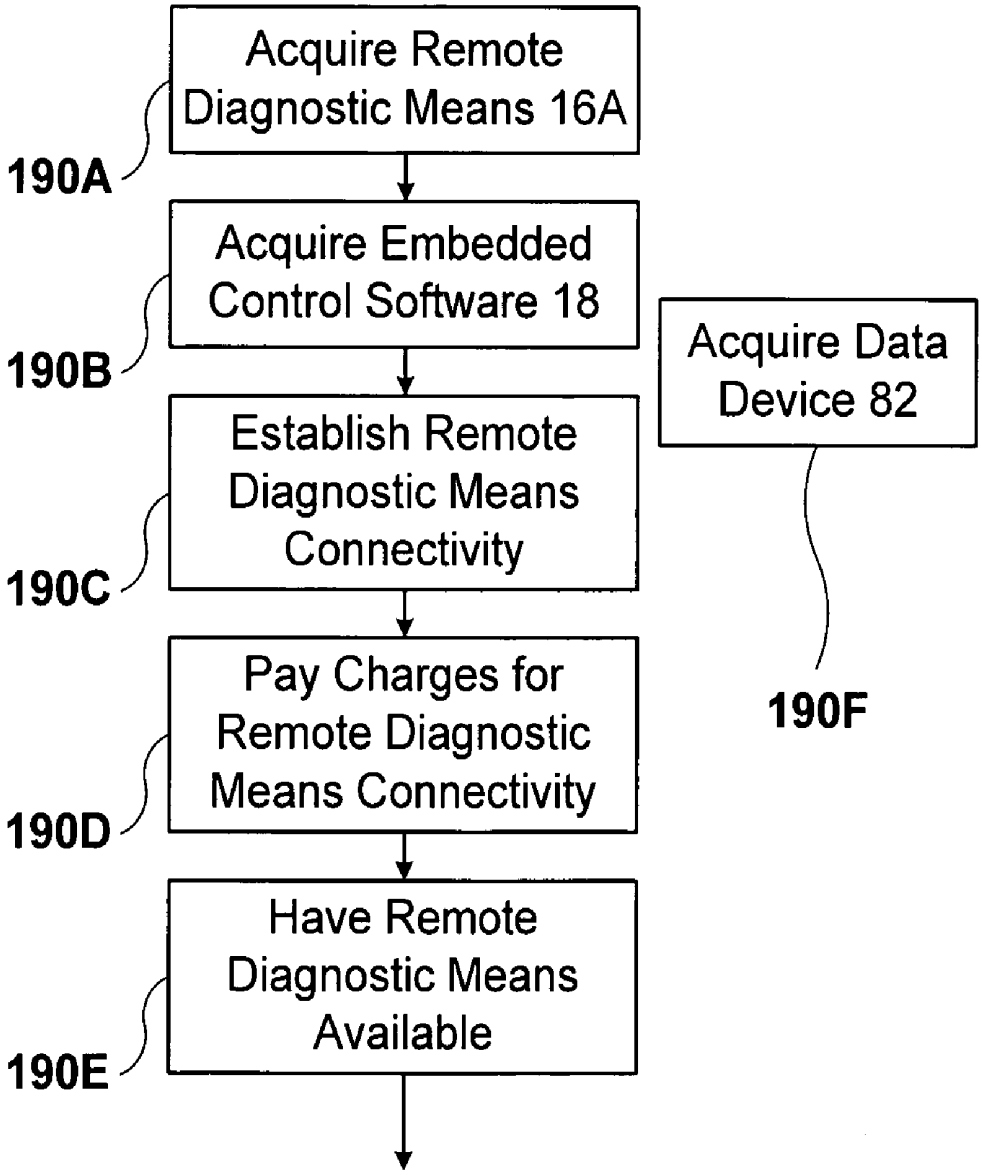

Acquire Remote Diagnostic Means 16A
190A
Acquire Embedded Control Software 18
190B
Establish Remote Diagnostic Means Connectivity
190C
Pay Charges for Remote Diagnostic Means Connectivity
190D
Have Remote Diagnostic Means Available
190E
Acquire Data Device 82
190F

FIG. 92

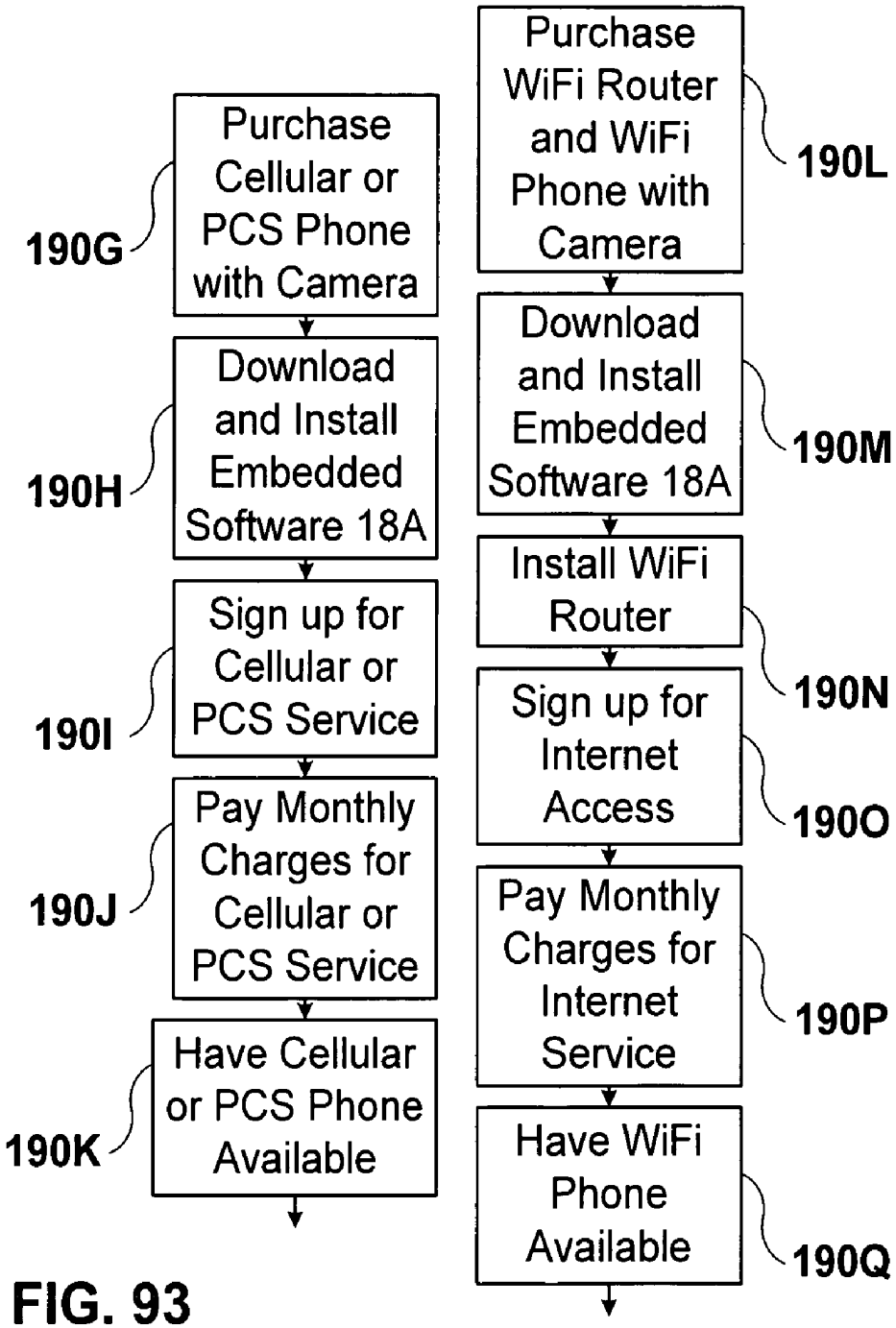

Purchase Cellular or PCS Phone with Camera
190G
Download and Install Embedded Software 18A
190H
Sign up for Cellular or PCS Service
190I
Pay Monthly Charges for Cellular or PCS Service
190J
Have Cellular or PCS Phone Available
190K
Purchase WiFi Router and WiFi Phone with Camera
190L
Download and Install Embedded Software 18A
190M
Install WiFi Router
190N
Sign up for Internet Access
190O
Pay Monthly Charges for Internet Service
190P
Have WiFi Phone Available
190Q

FIG. 93

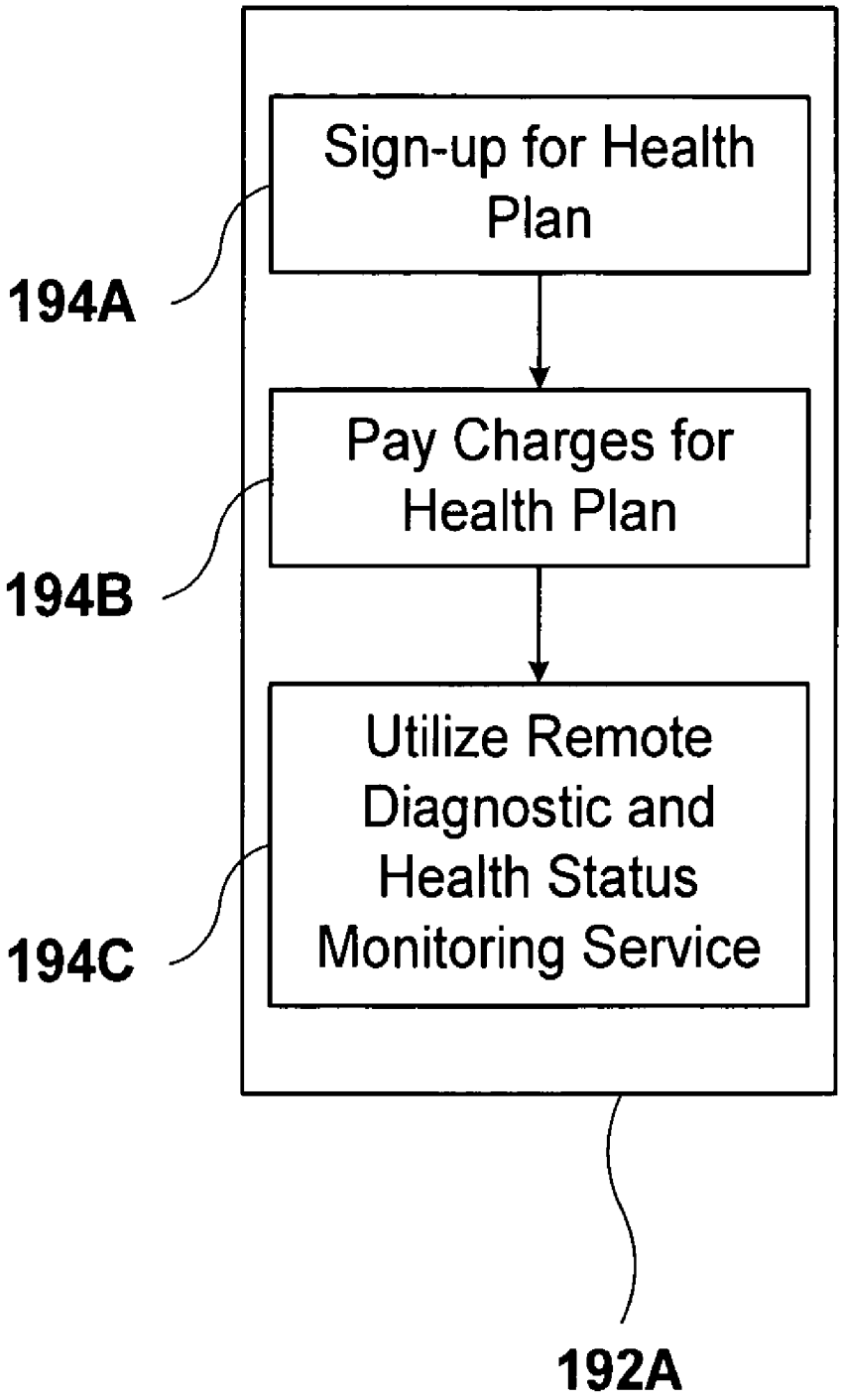

Sign-up for Health Plan
194A
Pay Charges for Health Plan
194B
Utilize Remote Diagnostic and Health Status Monitoring Service
194C
192A

FIG. 94

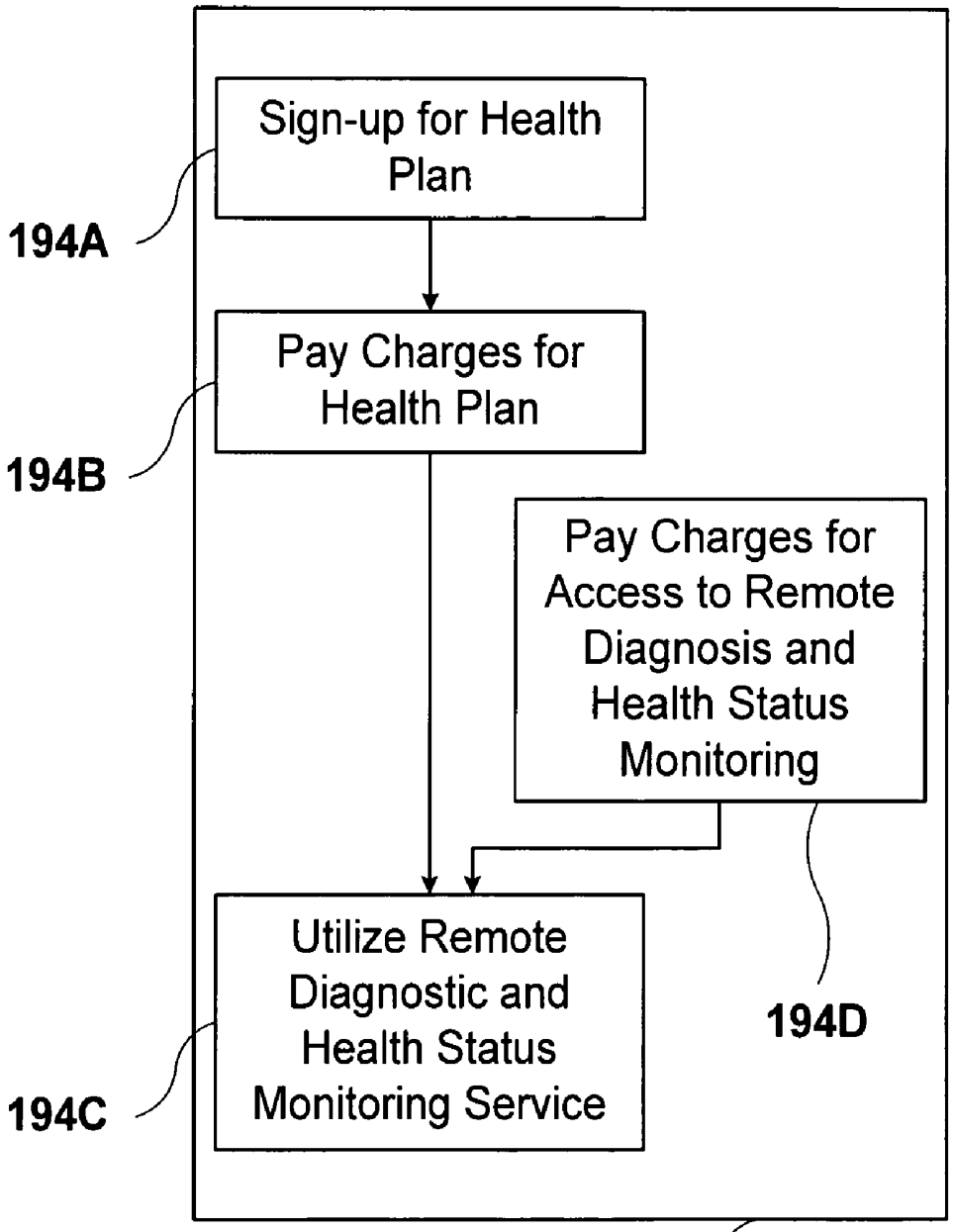

Sign-up for Health Plan
194A
Pay Charges for Health Plan
194B
Pay Charges for Access to Remote Diagnosis and Health Status Monitoring
194D
Utilize Remote Diagnostic and Health Status Monitoring Service
194C
192B

FIG. 95

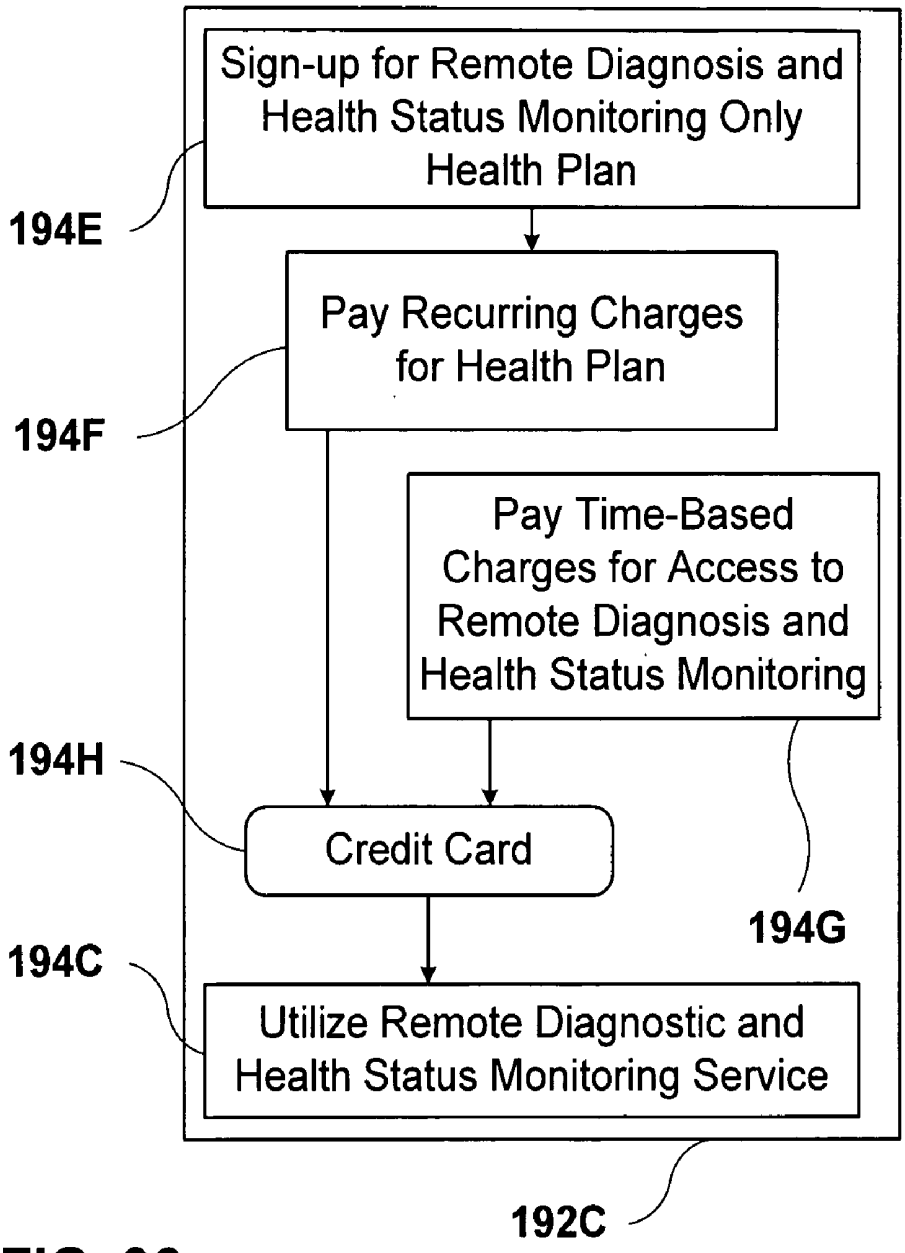

Sign-up for Remote Diagnosis and Health Status Monitoring Only Health Plan
194E
Pay Recurring Charges for Health Plan
194F
Pay Time-Based Charges for Access to Remote Diagnosis and Health Status Monitoring
194H
Credit Card
194G
194C
Utilize Remote Diagnostic and Health Status Monitoring Service
192C

FIG. 96

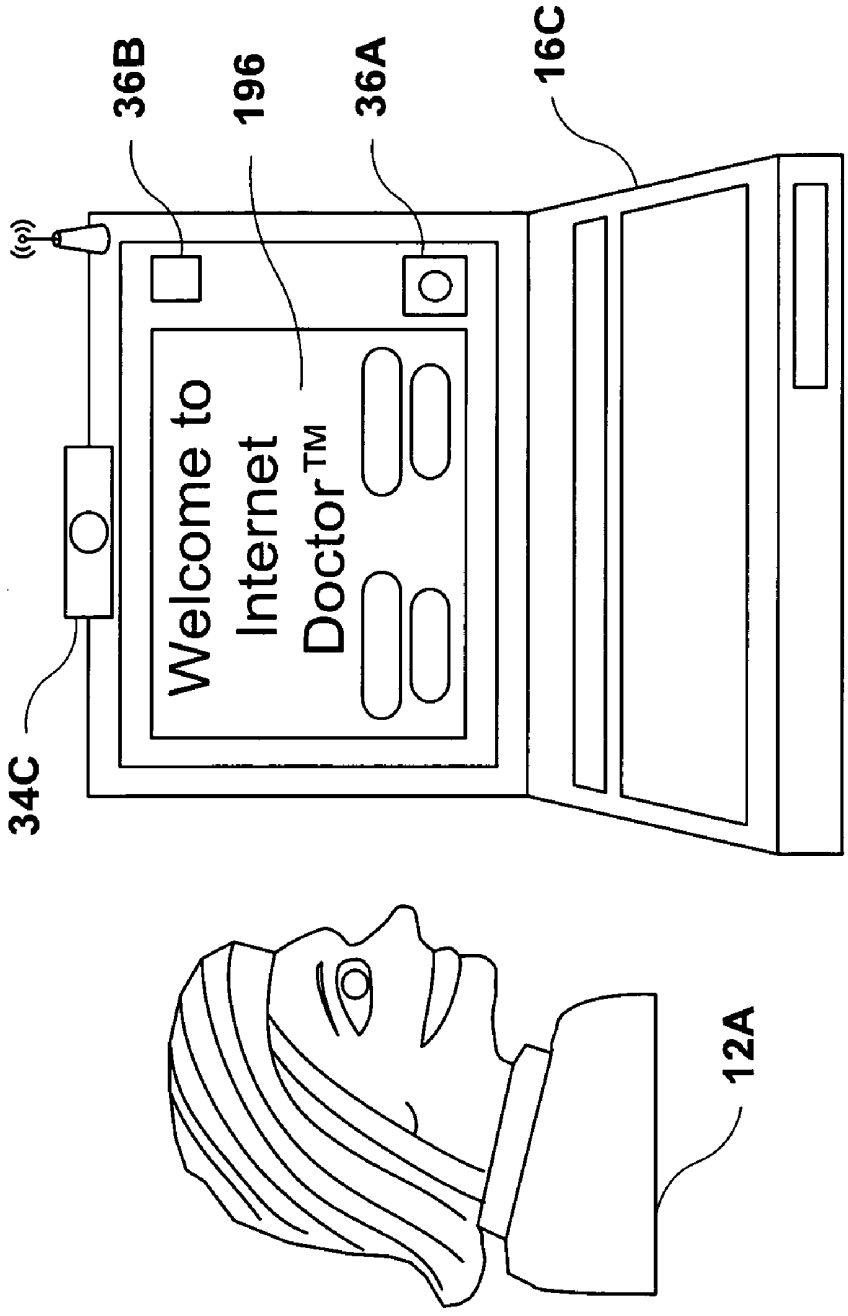


FIG. 97

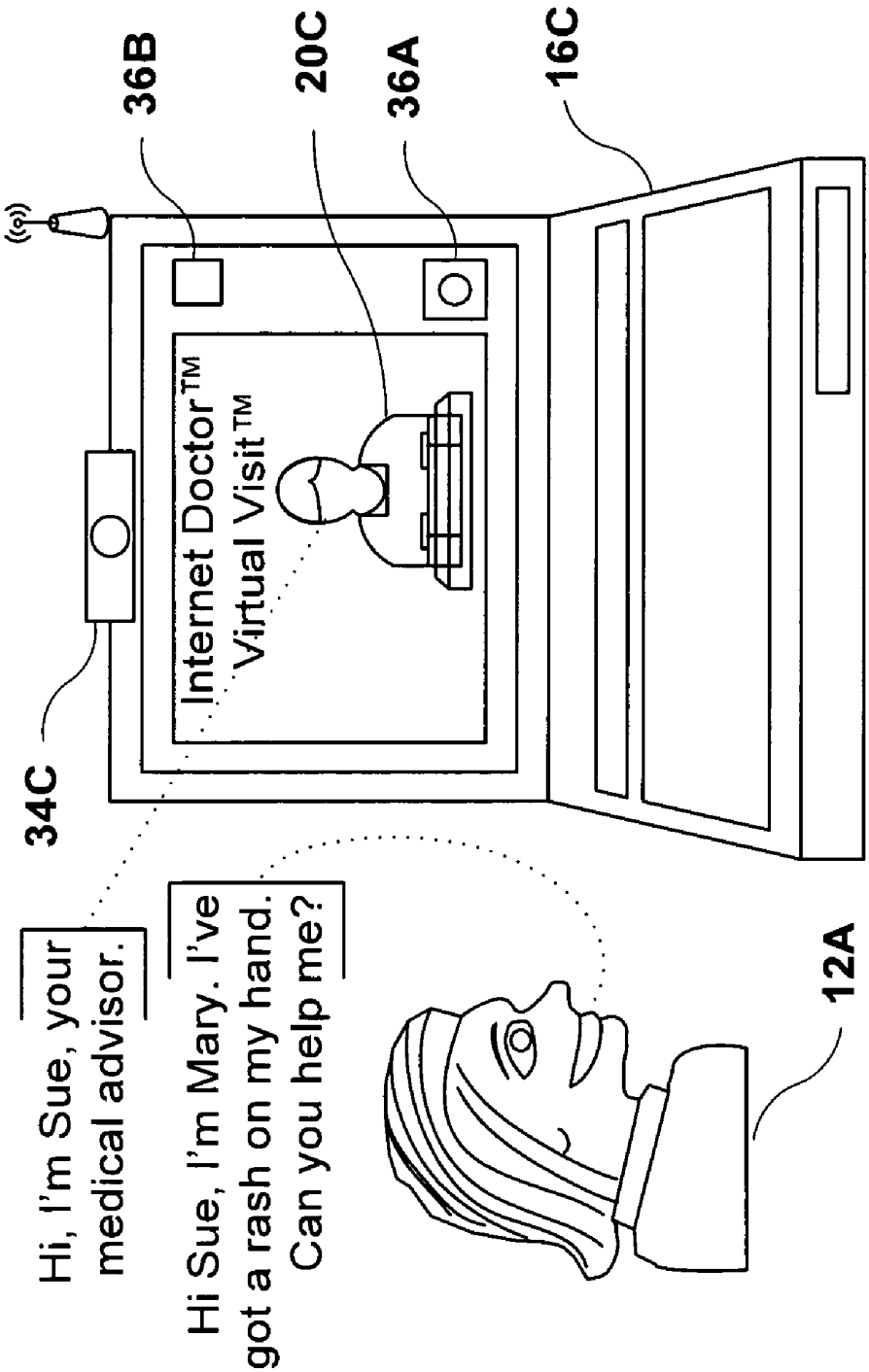

36B
20C
36A
16C
Internet Doctor™
Virtual Visit™
34C
Hi, I'm Sue, your medical advisor.
Hi Sue, I'm Mary. I've got a rash on my hand. Can you help me?
12A

FIG. 98

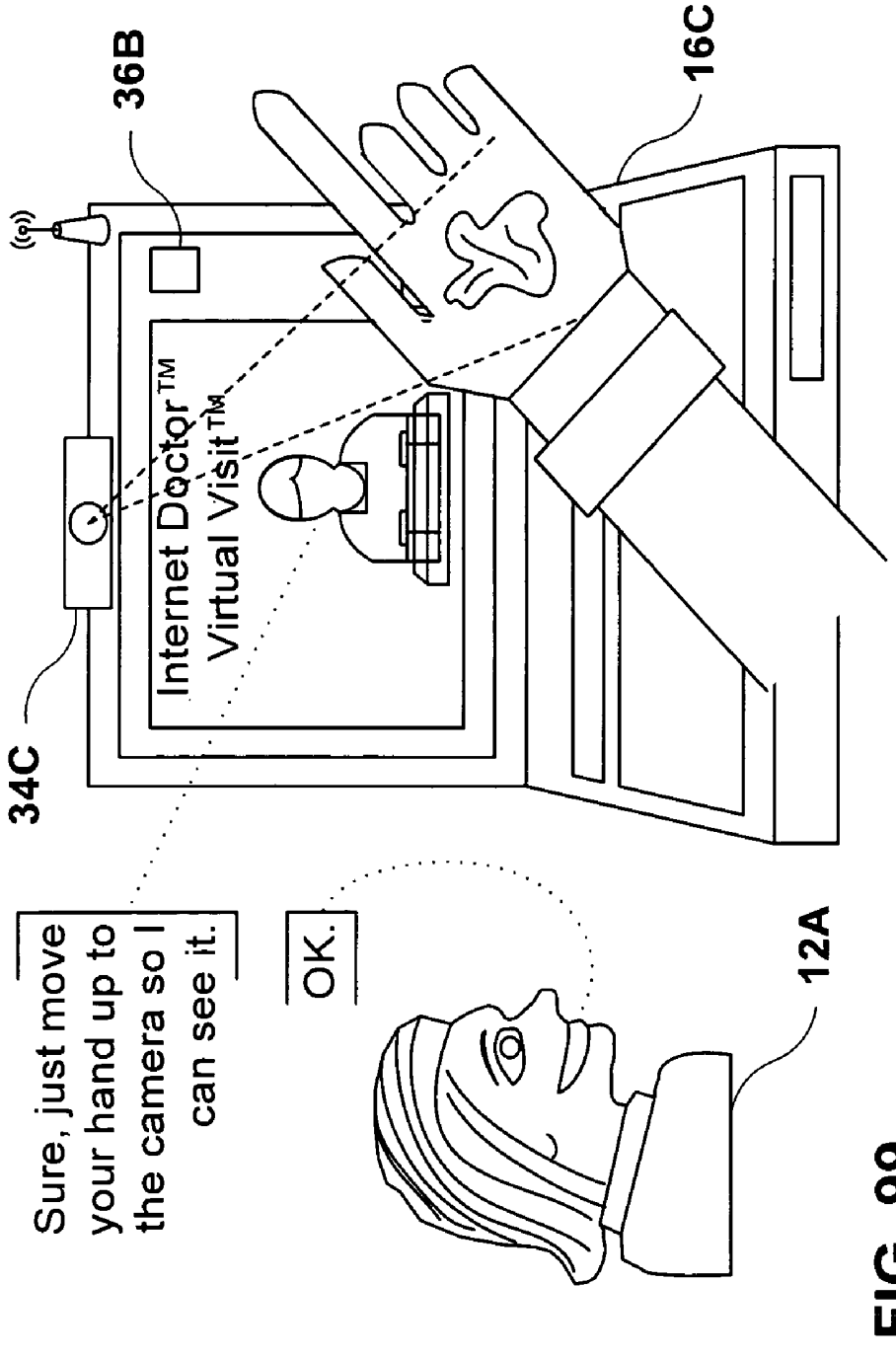

36B
16C
Internet Doctor™
Virtual Visit™
34C
Sure, just move your hand up to the camera so I can see it.
OK.
12A

FIG. 99

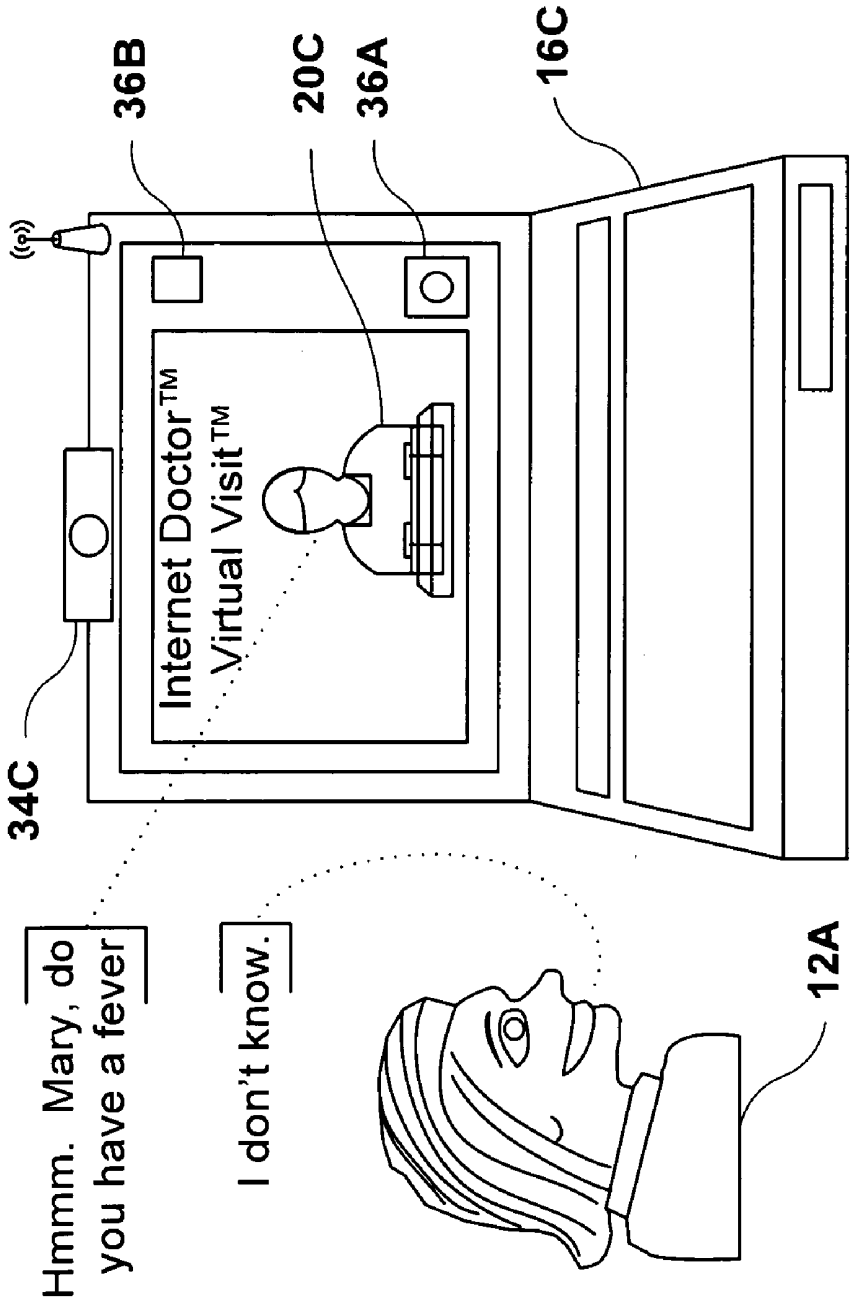

36B
20C
36A
16C
Internet Doctor™
Virtual Visit™
34C
Hmmm. Mary, do you have a fever
I don't know.
12A

FIG. 100

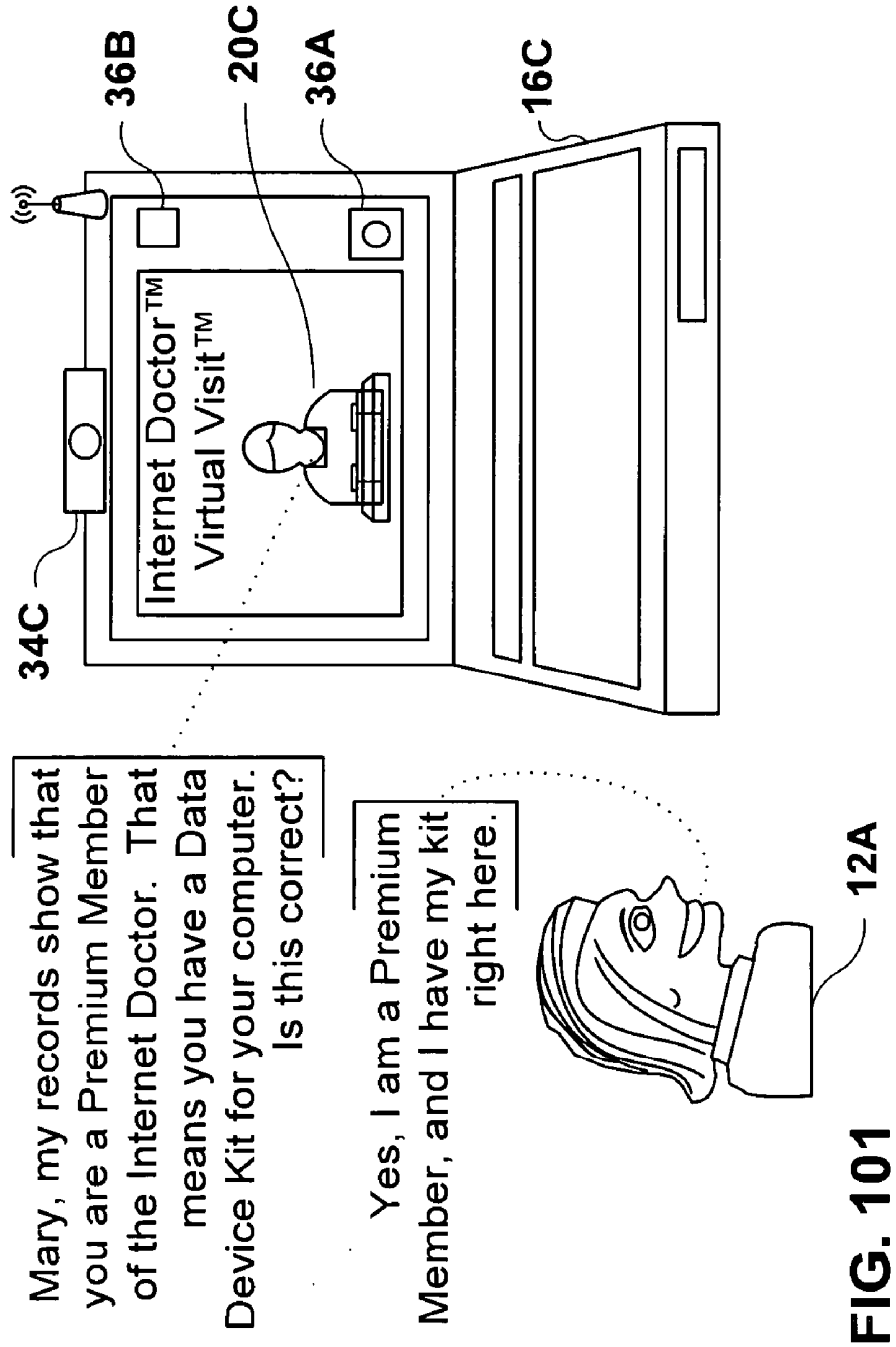

36B
20C
36A
16C
34C
Internet Doctor™
Virtual Visit™
Mary, my records show that you are a Premium Member of the Internet Doctor. That means you have a Data Device Kit for your computer. Is this correct?
Yes, I am a Premium Member, and I have my kit right here.
12A

FIG. 101

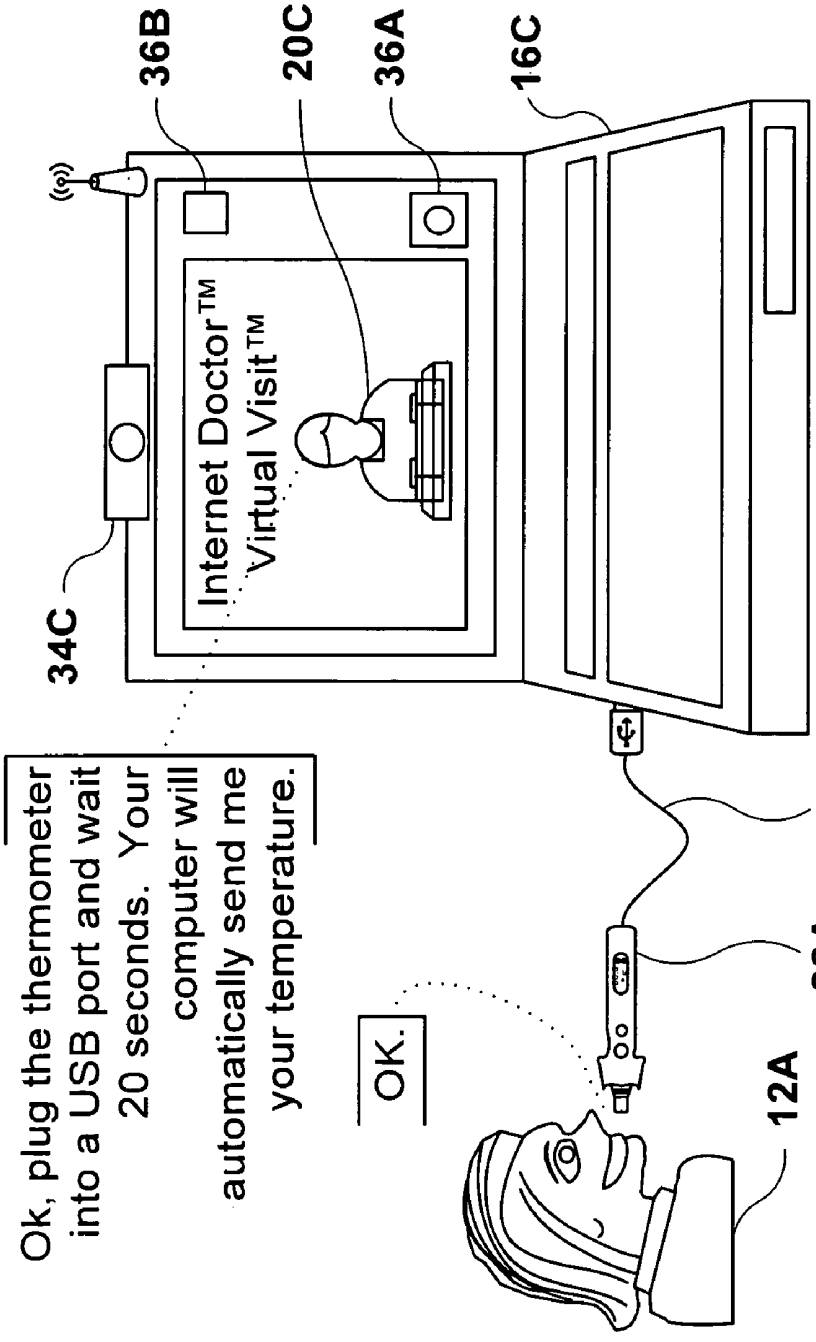

36B
20C
36A
16C
34C
Internet Doctor™
Virtual Visit™
Ok, plug the thermometer into a USB port and wait 20 seconds. Your computer will automatically send me your temperature.
OK.
90D
88A
12A

FIG. 102

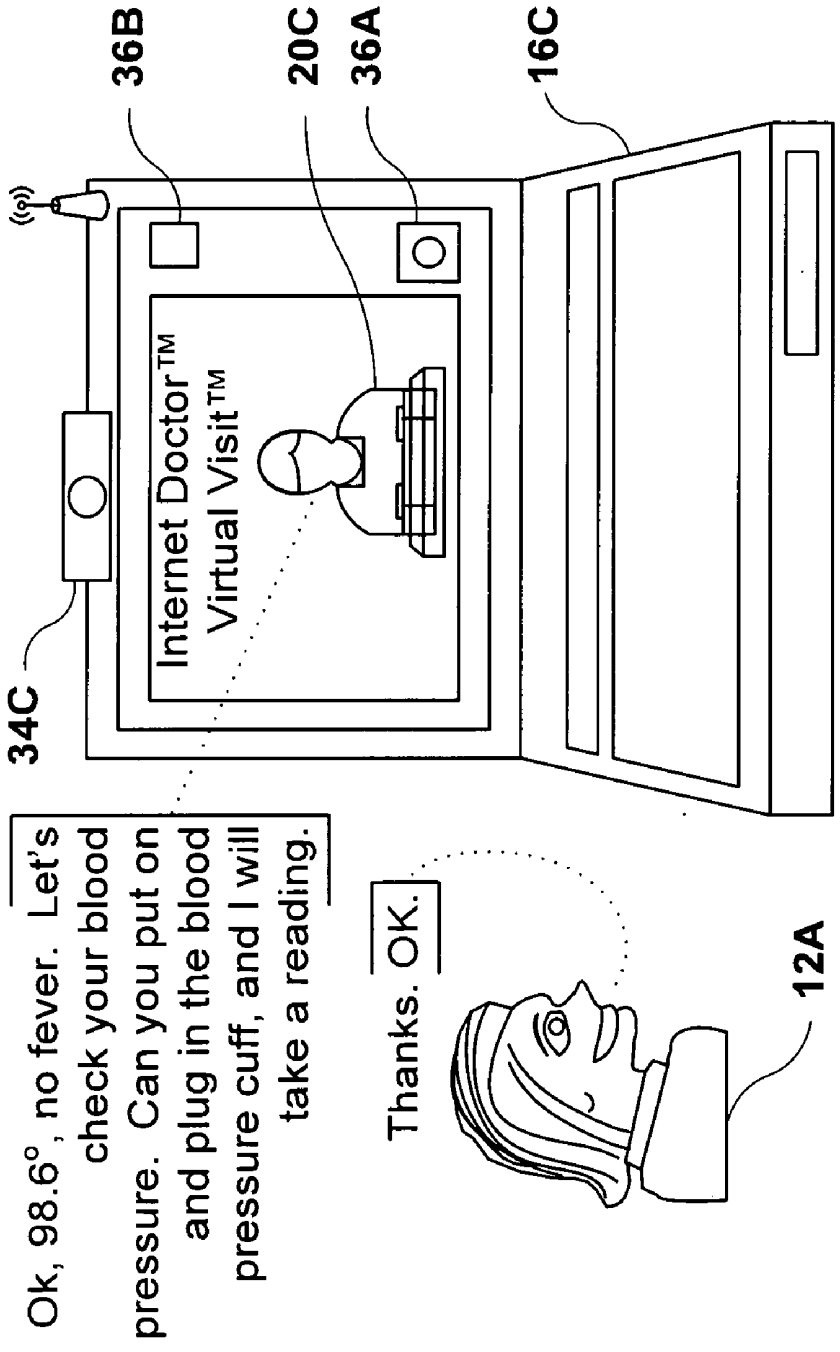

36B
20C
36A
16C
34C
Internet Doctor™
Virtual Visit™
Ok, 98.6°, no fever. Let's check your blood pressure. Can you put on and plug in the blood pressure cuff, and I will take a reading.
Thanks. OK.
12A

FIG. 103

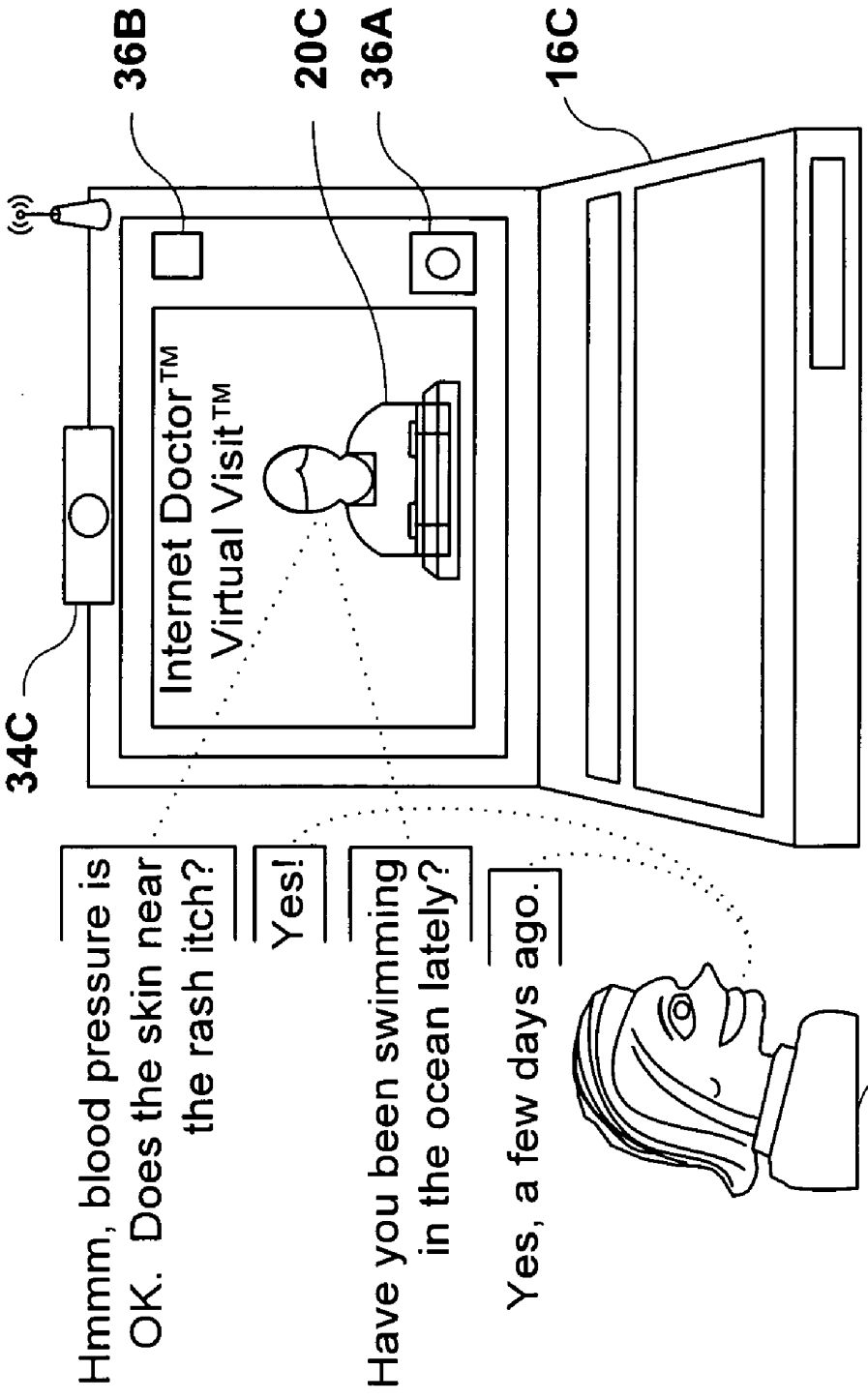

36B
20C
36A
16C
34C
Internet Doctor™
Virtual Visit™
Hmmm, blood pressure is OK. Does the skin near the rash itch?
Yes!
Have you been swimming in the ocean lately?
Yes, a few days ago.
12A

FIG. 104

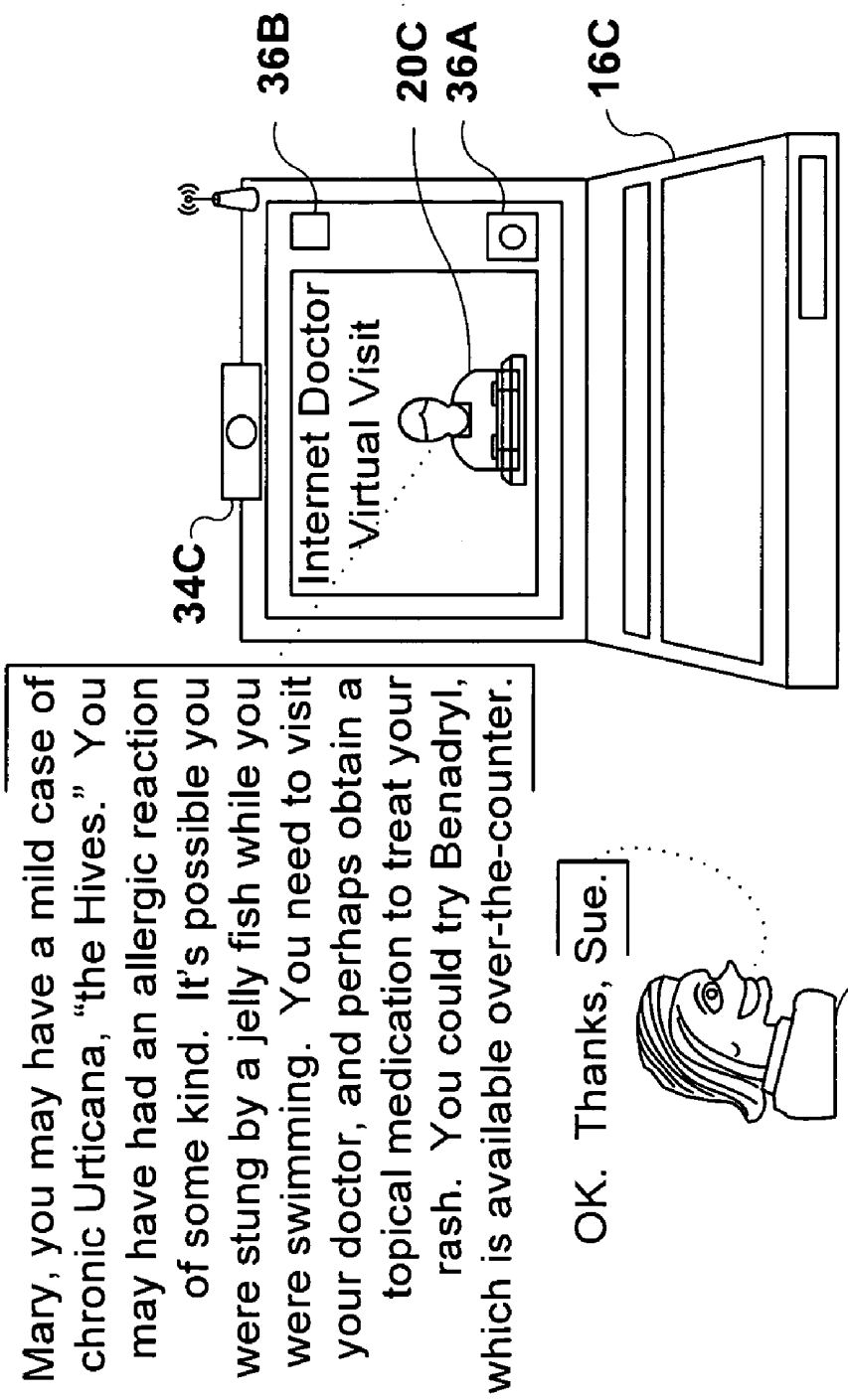

36B
20C
36A
16C
34C
Internet Doctor
Virtual Visit
Mary, you may have a mild case of chronic Urticana, "the Hives." You may have had an allergic reaction of some kind. It's possible you were stung by a jelly fish while you were swimming. You need to visit your doctor, and perhaps obtain a topical medication to treat your rash. You could try Benadryl, which is available over-the-counter.
OK. Thanks, Sue.
12A

FIG. 105

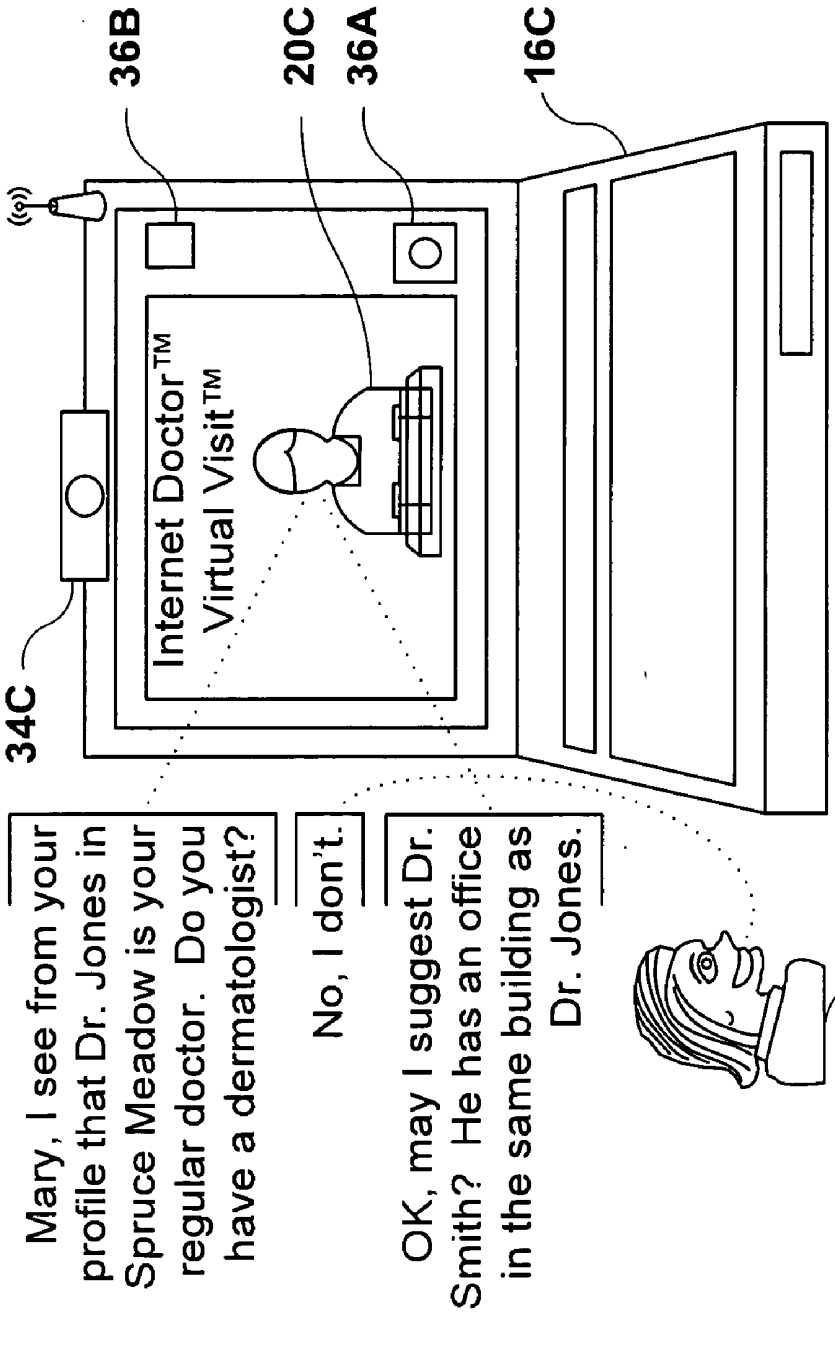

36B
20C
36A
16C
34C
Internet Doctor™
Virtual Visit™
Mary, I see from your profile that Dr. Jones in Spruce Meadow is your regular doctor. Do you have a dermatologist?
No, I don't.
OK, may I suggest Dr. Smith? He has an office in the same building as Dr. Jones.
12A

FIG. 106

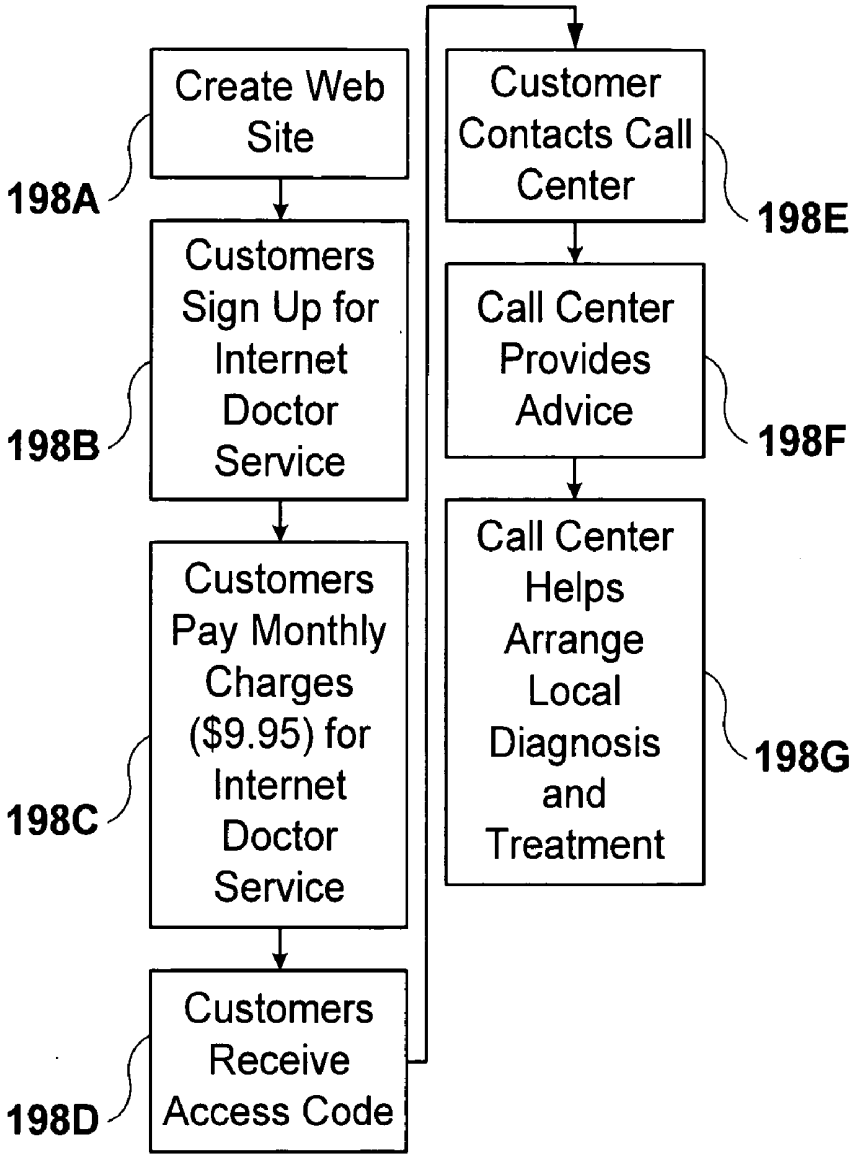

Create Web Site
198A
Customers Sign Up for Internet Doctor Service
198B
Customers Pay Monthly Charges ($9.95) for Internet Doctor Service
198C
Customers Receive Access Code
198D
Customer Contacts Call Center
198E
Call Center Provides Advice
198F
Call Center Helps Arrange Local Diagnosis and Treatment
198G

FIG. 107

REMOTE DIAGNOSTIC & TREATMENT SYSTEM

INTRODUCTION

[0001] The title of this Non-Provisional Patent Application is Remote Diagnostic & Treatment System. The Applicants are Richard L. Anglin, Jr., 2115 Heather Lane, Del Mar, Calif. 92014-2244 and Bradley T. Tipler, 4165 Pilon Point, San Diego, Calif. 92130-2205. Mr. Anglin is a Citizen of the United States of America; Mr. Tipler is a Citizen of Canada.

FIELD OF THE INVENTION

[0002] One embodiment of the present invention pertains to methods and apparatus for providing a remote diagnostic and treatment system. More particularly, one embodiment of the invention comprises a cellular telephone which includes a camera, a display, a speaker, a microphone and embedded remote control and diagnostic and treatment software. In an alternative embodiment, the invention may also include a variety of data devices which are connected to the cellular phone over a wired or wireless connection.

FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT

[0003] None.

BACKGROUND OF THE INVENTION

[0004] Some current health service providers operate call centers for telephonic triage and health status monitoring. A patient or potential patient phones the call center using a traditional wired or wireless telephone, and is connected to a health service practitioner nurse, paramedic, medical technician or doctor, who then provides advice.

[0005] No currently available product offers doctors, nurses, medical technicians or other health care providers a simple and versatile method and apparatus that will collect data and then provide diagnostic and treatment assistance at virtually any location over a wireless connection.

[0006] The development of a system that is able to provide audio, video and data information concerning a patient or potential patient from a remote location and is able to guide a user through a diagnostic and treatment procedure at the remote location would constitute a major technological advance, and would satisfy long felt needs and aspirations in the field of health care.

SUMMARY OF THE INVENTION

[0007] One embodiment of the present invention comprises a cellular telephone that includes a camera, a display, a speaker, a microphone and embedded remote control and diagnostic and treatment software. In an alternative embodiment, the invention may also include a variety of data devices which are connected to the cellular phone over a wired or wireless connection. In one embodiment, an operator at a call center may partially or jointly control the cellular telephone and/or a data device.

[0008] An appreciation of the other aims and objectives of the present invention and a more complete and comprehensive understanding of this invention may be obtained by studying the following description of a preferred embodiment, and by referring to the accompanying drawings.

A BRIEF DESCRIPTION OF THE DRAWINGS

[0009] FIG. **1** shows a system for collecting information in a first location and conveying that information to a second location for assessment and evaluation.

[0010] FIG. **2** shows an embodiment of a system for collecting information in a first location and conveying that information to a second location that is a call center.

[0011] FIG. **3** shows a system for collecting information in a first location and conveying that information to a second location via a network.

[0012] FIG. **4** shows a system for undertaking remote triage and health status monitoring, a "virtual visit" of a patient or potential patient by a health service practitioner.

[0013] FIG. **5** shows a first preferred embodiment of system for undertaking remote triage and health status monitoring, a "virtual visit" of a patient or potential patient by a health service practitioner in which the remote diagnostic means is a cellular or Personal Communications Service (PCS) wireless phone.

[0014] FIG. **6** shows a first preferred embodiment of the remote diagnostic means, which is a cellular or Personal Communications Service (PCS) wireless phone with a camera and embedded software that enables remote function control of the wireless phone, including the camera.

[0015] FIG. **7** shows a image on a cellular or Personal Communications Service (PCS) phone being converted into a picture.

[0016] FIG. **8** shows a first preferred embodiment of a functional block diagram of the embedded software that enables remote function control of a cellular or Personal Communications Service (PCS) wireless phone.

[0017] FIG. **9** shows a first embodiment of a screen of the diagnostic, display and control software application deployed on a diagnostic, display and control means.

[0018] FIG. **10** shows a first preferred embodiment of a functional block diagram of the diagnostic, display and control software application deployed on a diagnostic, display and control means.

[0019] FIG. **11** shows a screen displayed on a diagnostic, display and control means used by a health service practitioner showing a picture.

[0020] FIG. **12** shows the disclosed invention in which one or more data devices are connected to device or terminal.

[0021] FIG. **13** shows a preferred embodiment of the disclosed invention in which one or more data devices are connected to a device or terminal via a wireless connection.

[0022] FIG. **14** shows a preferred embodiment of the disclosed invention in which one or more data devices are connected to a device or terminal via a wired connection.

[0023] FIG. **15** shows the functional block diagram for a connection interface device.

[0024] FIG. **16** shows a data device, a digital thermometer.

[0025] FIG. **17** shows a first embodiment of a functional block diagram of embedded software that enables remote functional control of data devices for the remote diagnostic

means as well as a software application that enables remote functional control of the data devices for the remote diagnostic means.

[0026] FIG. **18** shows a pop-up window for the location of the temperature reading on the body.

[0027] FIG. **19** shows a screen displayed on a diagnostic, display and control means used by a health service practitioner showing the temperature.

[0028] FIG. **20** shows the temperature reading fed to the connection interface device for connection to the remote diagnostic means.

[0029] FIG. **21** shows a data device, a stethoscope or high fidelity microphone.

[0030] FIG. **22** shows a second embodiment of a functional block diagram of embedded software that enables remote functional control of data devices for the remote diagnostic means as well as a software application that enables remote functional control of the data devices for the remote diagnostic means.

[0031] FIG. **23** shows a screen displayed on a diagnostic, display and control means used by a health service practitioner showing the pulse.

[0032] FIG. **24** shows a transducer converting the stethoscope sound into electrical signals that are fed to the connection interface device for connection to the remote diagnostic means.

[0033] FIG. **25** shows a data device, a scale.

[0034] FIG. **26** shows a third embodiment of a functional block diagram of embedded software that enables remote functional control of data devices for the remote diagnostic means as well as a software application that enables remote functional control of the data devices for the remote diagnostic means.

[0035] FIG. **27** shows a screen displayed on a diagnostic, display and control means used by a health service practitioner showing the weight.

[0036] FIG. **28** shows the weight reading fed to the connection interface device for connection to the remote diagnostic means.

[0037] FIG. **29** shows a data device, a blood pressure cuff.

[0038] FIG. **30** shows a fourth embodiment of a functional block diagram of embedded software that enables remote functional control of data devices for the remote diagnostic means as well as a software application that enables remote functional control of the data devices for the remote diagnostic means.

[0039] FIG. **31** shows a screen displayed on a diagnostic, display and control means used by a health service practitioner showing the blood pressure and pulse readings.

[0040] FIG. **32** shows the pulse and blood pressure readings fed to the connection interface device for connection to the remote diagnostic means.

[0041] FIG. **33** shows a data device, an oximeter.

[0042] FIG. **34** shows a fifth embodiment of a functional block diagram of embedded software that enables remote functional control of data devices for the remote diagnostic means as well as a software application that enables remote functional control of the data devices for the remote diagnostic means.

[0043] FIG. **35** shows a screen displayed on a diagnostic, display and control means used by a health service practitioner showing the oximeter and pulse readings.

[0044] FIG. **36** shows the pulse and oximeter readings fed to the connection interface device for connection to the remote diagnostic means.

[0045] FIG. **37** shows a data device, an electrocardiogram (EKG or ECG).

[0046] FIG. **38** shows a sixth embodiment of a functional block diagram of embedded software that enables remote functional control of data devices for the remote diagnostic means as well as a software application that enables remote functional control of the data devices for the remote diagnostic means.

[0047] FIG. **39** shows a screen displayed on a diagnostic, display and control means used by a health service practitioner showing the electrocardiogram and pulse readings.

[0048] FIG. **40** shows the pulse and electrocardiogram readings fed to the connection interface device for connection to the remote diagnostic means.

[0049] FIG. **41** shows a data device, a glucose meter.

[0050] FIG. **42** shows a seventh embodiment of a functional block diagram of embedded software that enables remote functional control of data devices for the remote diagnostic means as well as a software application that enables remote functional control of the data devices for the remote diagnostic means.

[0051] FIG. **43** shows a screen displayed on a diagnostic, display and control means used by a health service practitioner showing the glucose reading.

[0052] FIG. **44** shows the glucose reading fed to the connection interface device for connection to the remote diagnostic means.

[0053] FIG. **45** shows a data device, an otoscope.

[0054] FIG. **46** shows an eighth embodiment of a functional block diagram of embedded software that enables remote functional control of data devices for the remote diagnostic means as well as a software application that enables remote functional control of the data devices for the remote diagnostic means.

[0055] FIG. **47** shows a screen displayed on a diagnostic, display and control means used by a health service practitioner showing the glucose reading.

[0056] FIG. **48** shows the otoscope picture fed to the connection interface device for connection to the remote diagnostic means.

[0057] FIG. **49** shows a data device, an ultrasound device.

[0058] FIG. **50** shows a ninth embodiment of a functional block diagram of embedded software that enables remote functional control of data devices for the remote diagnostic means as well as a software application that enables remote functional control of the data devices for the remote diagnostic means.

[0059] FIG. **51** shows a screen displayed on a diagnostic, display and control means used by a health service practitioner showing the glucose reading.

[0060] FIG. **52** shows the ultrasound readings fed to the connection interface device for connection to the remote diagnostic means.

[0061] FIG. **53** shows a data device, a digital camera.

[0062] FIG. **54** shows a data device, a digital video camera.

[0063] FIG. **55** shows a tenth embodiment of a functional block diagram of embedded software that enables remote functional control of data devices for the remote diagnostic means as well as a software application that enables remote functional control of the data devices for the remote diagnostic means.

[0064] FIG. **56** shows the picture or video from an external camera fed to the connection interface device for connection to the remote diagnostic means.

[0065] FIG. **57** shows an external camera observing a patient or potential patient utilizing a remote diagnostic means, including data devices.

[0066] FIG. **58** shows an alternative embodiment of the remote diagnostic means as a laptop Personal Computer (PC) equipped with a camera.

[0067] FIG. **59** shows an alternative embodiment of the remote diagnostic means as a Personal Computer (PC) equipped with a camera.

[0068] FIG. **60** shows an alternative embodiment of the disclosed invention in which the remote diagnostic means is a personal computer, specifically a laptop personal computer.

[0069] FIG. **61** shows data devices connected to a personal computer using a Bluetooth, wireless fidelity (WiFi) and/or Ultra Wide Band (UWB) connection.

[0070] FIG. **62** shows data devices connected to a personal computer via an Universal Serial Bus (USB) connection.

[0071] FIG. **63** shows data devices connected to a personal computer via an Institute of Electrical and Electronics Engineers (IEEE) 1394 FireWire connection.

[0072] FIG. **64** shows data devices connected to a cellular or Personal Communications Service (PCS) wireless phone using a Bluetooth, wireless fidelity (WiFi) and/or Ultra Wide Band (UWB) connection.

[0073] FIG. **65** shows data devices connected to a cellular or Personal Communications Service (PCS) wireless phone via an Universal Serial Bus (USB) connection.

[0074] FIG. **66** shows data devices connected to a cellular or Personal Communications Service (PCS) wireless phone via an Institute of Electrical and Electronics Engineers (IEEE) 1394 FireWire connection.

[0075] FIG. **67** shows an embodiment of the remote diagnostic means of the disclosed invention to be deployed in an assisted living environment for elderly persons.

[0076] FIG. **68** shows an embodiment of the remote diagnostic means of the disclosed invention that includes a Global Positioning System (GPS) receiver.

[0077] FIG. **69** shows a screen displayed on a diagnostic, display and control means used by a health service practitioner showing the Global Positioning System (GPS) location of the patient or potential patient.

[0078] FIG. **70** shows the disclosed invention used by a health service practitioner to consult with another health service practitioner.

[0079] FIG. **71** shows the disclosed invention in which the health service practitioner uses a personal computer at home as the diagnostic, display and control means.

[0080] FIG. **72** shows the disclosed invention in which the health service practitioner uses a cellular or Personal Communications Service (PCS) wireless phone as the diagnostic, display and control means.

[0081] FIG. **73** shows the disclosed invention used in a physical rehabilitation or athletic coaching application in a fixed setting.

[0082] FIG. **74** shows the disclosed invention used in a physical rehabilitation or athletic coaching application on the move.

[0083] FIG. **75** shows a Bluetooth, wireless fidelity (WiFI) and Ultra Wide Band (UWB)-enabled heart rate monitor.

[0084] FIG. **76** shows a patient or potential patient in a remote location, here a ship, using a satellite phone as a diagnostic means.

[0085] FIG. **77** shows a patient or potential patient in a remote location, here an airplane, using a satellite phone as a diagnostic means.

[0086] FIG. **78** shows an embodiment of the systems used by a veterinarian to undertake remote triage and health status monitoring of an animal.

[0087] FIG. **79** shows a fire investigator using a chemical sniffer attached to a cellular or Personal Communications Service (PCS) wireless phone to get data about the potential causes of a fire that are transmitted to a laboratory analyst for assessment.

[0088] FIG. **80** shows a policeman uses a remote fingerprint device attached to a cellular or Personal Communications Service (PCS) wireless phone to fingerprint a suspect, which fingerprint is transmitted to an analyst for review and matching to fingerprint databases.

[0089] FIG. **81** shows an engineer using a soil sampling device attached to a cellular or Personal Communications Service (PCS) wireless phone, characteristics of which are transmitted to an laboratory analyst for assessment.

[0090] FIG. **82** shows a fire investigator is using a chemical sniffer attached to a walkie-talkie phone who transmits that data in real time to a fire fighter actively fighting the fire nearby.

[0091] FIG. **83** shows using OnStar®, which is available in vehicles from General Motors Corporation (GM), as a remote diagnostic means.

[0092] FIG. **84** shows using OnStar®, which is available in vehicles from General Motors Corporation (GM), as a remote diagnostic means with a camera outside the car to observe people outside the car.

[0093] FIG. **85** shows a grandparent watching grandchildren playing soccer through a cellular or Personal Communications Service (PCS) wireless phone where the grandparent controls the wireless phone.

[0094] FIG. **86** shows data devices connected to a home diagnostic device connected to a standard telephone connected to the Public Switched Telephone Network (PSTN).

[0095] FIG. **87** shows a functional schematic of a home diagnostic device.

[0096] FIG. **88** shows an embodiment of a purpose-designed diagnostic means.

[0097] FIG. **89** shows an embodiment of a purpose-designed diagnostic means with included data storage.

[0098] FIG. **90** shows an alternative embodiment of a purpose-designed diagnostic means in which the diagnostic means sits in and is recharged by an embodiment of a home diagnostic device.

[0099] FIG. **91** shows an alternative embodiment of a designed diagnostic means with a accessory macro lens.

[0100] FIG. **92** shows the steps a patient or potential patient must take to receive remote diagnostic and health status monitoring services.

[0101] FIG. **93** shows the steps a patient or potential patient must take to receive remote diagnostic and health status monitoring services using a cellular, Personal Communications Service (PCS) or Wireless Fidelity (WiFi) wireless phone.

[0102] FIG. **94** shows a first embodiment of a functional block diagram of an institutional structure or business model under which remote diagnostic and health status monitoring services may be provided.

[0103] FIG. **95** shows a second embodiment of a functional block diagram of an institutional structure or business model under which remote diagnostic and health status monitoring services may be provided.

[0104] FIG. **96** shows a third embodiment of a functional block diagram of an institutional structure or business model under which remote diagnostic and health status monitoring services may be provided.

[0105] FIG. **97** shows a patient or potential patient using a personal computer to visit a website, such as www.InternetDoctor.com, to obtain medical information and/or advice from a health service practitioner.

[0106] FIG. **98** depicts a patient or potential patient requesting information about a rash on her hand.

[0107] FIG. **99** illustrates a patient or potential patient placing her hand near the camera of the personal computer, which allows the health service practitioner to see the rash.

[0108] FIGS. **100** and **101** reveal additional dialog between a patient or potential patient and the health service practitioner, which enables the health service practitioner to provide a remote diagnosis.

[0109] FIGS. **102** through **104** portray the use of a data devices, which are connected to the personal computer, to enable a patient or potential patient to send medical data to the health service practitioner through the personal computer and then over the Internet.

[0110] FIGS. **105** and **106** provide views of the health service practitioner offering a preliminary diagnosis.

[0111] FIG. **107** is a flow chart which exhibits one method of the present invention.

A DETAILED DESCRIPTION OF PREFERRED & ALTERNATIVE EMBODIMENTS

I. The Remote Diagnostic and Treatment System

[0112] FIG. **1** depicts a Remote Diagnostic & Treatment System **10**. In the embodiment shown in FIG. **1**, a first person **12** in location **14** has a device or terminal **16**, including embedded software **18**. The device **16** is used to collect information that is then conveyed to a second person **20** in a second location **22**. The second person **20** uses another device or terminal **24** that includes software **26**. The second person **20** may use his or her device **24** and software **26** to provide information and assistance to the first person **12**. Additionally, the software **26** in device or terminal **24** may be used to control some or all of the features of the device or terminal **16** via its embedded software **18**.

[0113] In one specific embodiment of the invention shown in FIG. **2**, the first person or user **12** employs his or her first device **16** to contact a call center **28**. When used in this Specification and in the Claims that follow, the term "call center"**28** encompasses any facility, establishment or provision for receiving a call, request, message or signal from the first user **12**. The call center **28** may comprise a building, facility, place or site staffed by a plurality of operators, technicians, advisors or other personnel. The call center **28** may include any number of live operators **20**A, including a single person **20**B working in an office, at home or in any other location. In an alternative embodiment, the call center **28** may function without any live human assistance, and may rely on software running on a server, voice recognition equipment, recordings, and/or other automated systems.

[0114] Similarly, the term "second person **20**" or any other specific individual denotes any combination of persons or automated systems at the other end of the call from the point of view of the first person **12**, and may essentially be functionally equivalent to the term "call center"**28**.

[0115] In general, the present invention encompasses any plurality of devices or terminals **16**, **24** that are used in combination using a wired or wireless connection over a network **30** as shown in FIG. **3**. The network **30** may comprise any combination of wired or wireless connections, including a direct device-to-device link. The first terminal or device **16** is employed to collect, measure, record or otherwise process, store or receive data or information which is then conveyed to another terminal or device **24**. The first device **16** has software **18** that enables a user **12** to collect data with the first device **16**. The second device **24** has software **26** which enables some form of analysis, examination or response from the user **20** of the second terminal or device **24** back to the user **12** of the first device **16**.

[0116] The present invention also encompasses any plurality of devices **16**, **24** that are used cooperatively to gather information in one place **14**, and then use, store, assay,

process the data or formulate a response to the data in another place **22**. The two locations **14** and **22** may generally be separated by any distance. In addition, the invention provides for the remote direction, monitoring or guidance of the first device **16** by the user **20** of the second device **24**. In an alternative embodiment, the user **20** of the second device **24** controls, partially or fully, the operation of the first device **16**. In another embodiment, an automated system may control the operation of the first device **16**.

[**0117**] In one particular embodiment of the Remote Diagnostic & Treatment System **10**A, which is shown in FIG. **4**, the Virtual Visit System™ includes a diagnostic means **16**A for collecting data which has diagnostic means software **18**A embedded in the diagnostic means **16**A that enables remote function control of the diagnostic means **16**A. The specific embodiment of the remote diagnostic means **16**A collects information about a patient or potential patient **12**A. The diagnostic means **16**A conveys data over a connection **32** to a network **30** to a diagnostic display and control means **24**A which runs one or more software application(s) **26**A. In this embodiment, the diagnostic display and control means **24**A and software **26**A is used by a health service practitioner **20**C. In this embodiment, the term "diagnostic" refers to the process of determining or identifying an illness, disease, injury or sickness or other physical or mental condition as a precursor to furnishing an opinion, advice or suggested course of treatment.

[**0118**] In a specific embodiment of the Remote Diagnostic & Treatment System **10**A shown in FIG. **5**, the diagnostic means **16**A is a cellular or Personal Communications Service (PCS) wireless phone **16**B with a wireless network connection **32**A to a cellular or PCS network **30**A. The cellular or PCS network **30**A connects **32**B to a health service practitioner's **20**C device or terminal **24** via the Public Switched Telephone Network (PSTN) **30**B. The diagnostic, display and control means **24**A is a computer with a Liquid Crystal Display (LCD) display with one or more software application(s) **26**A used by the health service practitioner **20**C to remotely control the diagnostic means **16**A.

[**0119**] An example of an embodiment of the Remote Diagnostic & Treatment System **10** provides methods and apparatus for undertaking triage, that is, remote diagnosis, and health service monitoring. In this embodiment, the first person is a patient or potential patient **12**A having a remote diagnostic device **16**A with embedded software **18** that conveys information about the patient or potential patient **12**A. In this embodiment, the second person is a health service practitioner **20**C.

[**0120**] A second example of an embodiment involves a fire. A fireman on the scene of a fire **14** may use the terminal **16** and its software **18** to collect information about a substance that may have been used to start a fire. Information collected by fireman's terminal **16** may be conveyed to another terminal **24** running different software **26** where the information is analyzed.

[**0121**] A third example involves a crime scene. A police officer at the scene of a crime **14** may collect data concerning evidence of a crime. The policeman may collect this data using his device or terminal **16** and its software **18**, and then convey that data to a police headquarters or crime lab **22**, where a technician **20** examines the data using his or her own device or terminal **24** which runs software **26**.

[**0122**] A fourth example pertains to a construction site. A soil engineer who has obtained a soil sample may use his terminal or device **16** running software **18** to collect data relating to the soil sample, and then conveys the soil sample data to a remote location **22** for analysis by a laboratory technician **20** using his or her own device or terminal **24** and software **26**.

[**0123**] In the first preferred embodiment of the diagnostic means **16**A the cellular or PCS wireless phone **16**B includes a camera **34**A and speaker phone **36**A and has embedded software **18**A that enables remote function control of the wireless phone **16**B, including the camera **34**A and speaker phone **36**. See FIG. **6**. The camera image **38** is displayed on the screen **40**A of the cellular or PCS wireless phone **16**B. The camera image **38** is a continuous or semi-continuous viewing of what the camera **34**A "sees" versus a picture **42** that is a "frozen" instant in time representative of what the camera **34**A "sees." See FIG. **7**.

[**0124**] Cellular or PCS wireless phones **16**B to which embedded software **18**A can be added are available from Audiovox®, Ericcson®, Hewlett Packard®, Kyocera®, LG®, Motorola®, Nokia®, Palm®, Phillips®, Samsung®, Sanyo®, Sony Ericsson®, UT Starcom® and others.

[**0125**] A first preferred embodiment of a functional block diagram **44**A of the embedded software **18**A that enables remote function control of the cellular or PCS wireless phone **16**B is shown in FIG. **8**. The functions **46** of a cellular or PCS wireless phone **16**B to be controlled include, but are not limited to:

[**0126**] Turn the camera **34**A on or off **46**A;

[**0127**] "Zoom" the camera image **38** size **46**B;

[**0128**] Adjust the camera **34**A focus **46**C;

[**0129**] Adjust the camera **34**A color **46**D;

[**0130**] Adjust the camera **34**A hue **46**E;

[**0131**] Adjust the camera **34**A contrast **46**F;

[**0132**] Take **46**G a picture **42**;

[**0133**] Turn **46**H the speaker phone **36** on or off;

[**0134**] Enter **46**I a telephone number **48** to which to send the picture **42**; and

[**0135**] Enter **46**J an electronic mail (e-mail) address **50** to which to send the picture **42**.

[**0136**] When a health service practitioner **20**C receives a call from a patient or potential patient **12**A the first element of the diagnostic, display and control software application **26**A deployed on a diagnostic, display and control means **26**A is the screen **52** shown in FIG. **9**. A preferred embodiment of the software application **26**A captures the incoming phone number **54** using caller identification (CID). If for some reason CID is not available, the health service practitioner **20**C asks the patient or potential patient **12**A for his or her telephone number **54** and enters the incoming phone number **54** into the screen **52** so that if there is an interruption in communications, the health service practitioner **20**C can call the patient or potential patient **12**A back. The second thing the health service practitioner **20**C ascertains is an alternate phone number **56** to reach the patient or potential

patient **12**A in the event communications cannot be reestablished via the incoming phone number **54**.

[**0137**] Once communications are assured, the health service practitioner **20**C gets the patient's or potential patient's **12**A name **58**, date of birth **60**, Social Security Number (SSN) **62**, and insurance carrier **64**. Insurance carriers **64** utilizing a particular Remote Diagnostic & Treatment System **10**A may be accessible to the health service practitioner **20**C via a pull down menu **66**.

[**0138**] In a preferred embodiment of a Remote Diagnostic & Treatment System **10**A, a patient's **12**A medical records are available on-line and are displayed **68** once the patient's name **58**, date of birth **60** and SSN **62** are entered.

[**0139**] The screen **52** also contains an area **70** for the health service practitioner **20**C to enter notes about his or her interaction with the patient or potential patient **12**A.

[**0140**] The software application **26**A automatically notes the date of the phone call **72**, the current time **74**, the start time and end time **76** of the phone call as well as the call duration **78**.

[**0141**] A first preferred embodiment of a block diagram **80**A for the diagnostic, display and control software application **26**A deployed on a diagnostic, display and control means **24**A used by a health service practitioner **20**C to control a cellular or PCS wireless phone **16**B is shown in FIG. **10**. The remote functional control means **82** for a cellular or PCS wireless phone **16**B include, but are not limited to:

[**0142**] An "off" button and an "on" button **82**A for controlling **46**A the camera **34**A;

[**0143**] A slider **82**B that "zooms" the camera image **38** size **46**B from zero percent (0%) to one hundred percent (100%);

[**0144**] A slider **82**C that adjusts the camera focus **46**C from minus (−) to plus (+);

[**0145**] A slider **82**D that adjusts the color **46**D from zero percent (0%) to one hundred percent (100%);

[**0146**] A slider **82**E that adjusts the hue **46**E from zero percent (0%) to one hundred percent (100%);

[**0147**] A slider **82**F that adjusts the contrast **46**F from minus (−) to plus (+);

[**0148**] A button **82**G for taking **46**G a picture **36**;

[**0149**] An "off" button and an "on" button **82**H for controlling **46**H the speaker phone **36**;

[**0150**] A button **82**I for dialing **461** the phone number **48** to which the picture **42** is to be sent; and

[**0151**] A button **82**J for sending **46**J the picture **42** to an e-mail address **50**.

[**0152**] The diagnostic, display and control software application **26**A deployed on a diagnostic, display and control means **24**A used by a health service practitioner **20**C has to have the ability to display the camera image **38** and the picture **42**.

[**0153**] Camera-equipped **34**A cellular and PCS phones **16**A have embedded software that allows a user to take a picture **42** and send it to a second user of a camera-equipped **34**A cellular or PCS phone **16**B. The software application **26**A must have the same capability so that the health service practitioner **20**C can view the picture **42**. Today's camera-equipped **34**A cellular or PCS phone **16**B are limited to sending pictures **42**; future phones are expected to allow short video clips to be sent.

[**0154**] If the picture **42** is to be e-mailed, then the software application **26**A must have access to the Internet and an e-mail application that allows the health service practitioner **20**C to view the picture **42**.

[**0155**] FIG. **11** shows a screen **84** displayed on a diagnostic, display and control means **24**A used by a health service practitioner **20**C. A transmitted picture **42** appears in the window **86**.

[**0156**] In this Specification and in the Claims that follow, the term "partially control" refers to a joint or cooperative sharing of the control of the features of the terminal or cellular phone **16**A by both the user and a another person, such as an operator **20**A at a call center **28**. The operator **20**A may control some or all of the features of the cellular phone **16**A.

II. Data Devices

[**0157**] Many different data devices **88** can enhance the effectiveness of the Remote Diagnostic & Treatment System **10**. These data devices **88** are connected **90** to the device or terminal **16** as shown in FIG. **12**. There are numbers of technologies that may be used for the connection **90** between the data devices **88** and the device or terminal **16**, both wired and wireless.

[**0158**] Numbers of cellular and PCS wireless phones **16**A include Bluetooth®**90**A, a low-power radio communications to wirelessly link phones, computers and other network devices over short distances. Wireless signals transmitted with Bluetooth cover short distances, typically up to thirty feet (30 ft) or ten meters (10 m).

[**0159**] "WiFi"**90**B is an abbreviation for "wireless fidelity," a wireless local area network (WLAN) that conforms to the Institute of Electrical and Electronics Engineers (IEEE) specification 802.11. Some cellular and PCS wireless phones **16**A also include WiFi capabilities.

[**0160**] Ultra Wide Band (UWB) **90**C is a wireless technology that uses less power and provides higher data speed than WiFi or Bluetooth and has the ability to carry signals through doors and other obstacles that tend to reflect signals at more limited bandwidths and a higher power. UWB chip sets and their concomitant support software are just now becoming available. Cellular and PCS wireless phones **16**A with UWB capabilities are just being commercially announced.

[**0161**] Wireless connections **90**A, **90**B, **90**C between the data devices **88** and the device or terminal **16** are shown in FIG. **13**.

[**0162**] A first embodiment of a wired connection between an data device **88** and a device or terminal **16** is Universal Serial Bus (USB) **90**D, an external bus standard that supports data transfer rates of 12 Mbps for up to one hundred twenty-seven peripheral devices.

[**0163**] A second embodiment of a wired connection between an data device **88** and a device or terminal **16** is

FireWire **84**E, IEEE 1394, High Performance Serial Bus. FireWire provides a single plug-and-socket connection on which up to sixty-three devices can be attached with data transfer speeds up to four hundred megabits per second.

[0164] Wired connections **90**D, **90**E between data devices **88** and the device or terminal **16** are shown in FIG. **14**.

[0165] For each of the data devices **88** to connect **90** to a remote device or terminal **16**, there must be a connection interface device **92** that accepts the data from the data device **88**, and configures it for the connection **90** to the device or terminal **16**.

[0166] FIG. **15** shows a functional block diagram **94** for the connection interface device **92**. Device data input **96** is fed to a preamplifier **98** and then an amplifier **100**. Thereafter the amplified data input **96** is fed into the appropriate interface **102** for the connection **90** to be used; the Bluetooth interface **102**A for Bluetooth **90**A, the WiFi interface **102**B for WiFi **90**B, the UWB interface **102**C for UWB **90**C, the USB interface **102**D for USB **90**D, and the FireWire interface **102**E for FireWire **90**E. The output of the USB interface **102**D is the USB connection **90**D; the output of the FireWire interface **102**E is the FireWire connection **90**E. The output of the Bluetooth interface **102**A is fed into the Bluetooth radio system **104**A and then to the antenna system **106**. Similarly, the output of the WiFi interface **102**B is fed to into the WiFi radio system **104**B and then to the antenna system **106**. The output of the UWB interface **102**C is fed into the UWB radio system **104**C and then to the antenna system **106**.

[0167] In one embodiment, the connection interface device **92** is built into the data devices **88**. In one embodiment, one or more connection **90** technologies is built into each data device **88**.

Thermometer

[0168] The first data device **88** is a thermometer **88**A. Many different contact-less digital thermometers **88**A are commercially available from Bebesounds®, Braun®, EJK®, Lumiscope®, Mabis Healthcare®, Samsumg® and others. A preferred embodiment of a thermometer **88**A to be deployed in the Remote Diagnostic & Treatment System **10**A is shown in FIG. **16**, and includes a connection **90** to a device or terminal **16**. The embodiment shown in FIG. **16** includes one or more wireless connections, Bluetooth **90**A, WiFi **90**B and UWB **90**C, and one or more wired connections, USB **90**D and FireWire **90**E.

[0169] For a cellular or PCS wireless phone **16**B to receive the temperature reading from the thermometer **88**A, it must have embedded software **18**A that recognizes that a digital temperature reading is being sent to the wireless phone **16**B. One embodiment of the embedded software **18**A allows the temperature to be displayed on the screen **40**A of a wireless phone **16**B. Having received the temperature reading from the thermometer **88**A, there must be additional software **18**A to forward the temperature reading to the diagnostic, display and control software application **26**A deployed on the diagnostic, display and control means **24**A used by a health service practitioner **20**C.

[0170] Similarly, the diagnostic, display and control software application **26**A deployed on a diagnostic, display and control means **24**A used by a health service practitioner **20**C has to have the ability to display the temperature reading received from the cellular or PCS wireless phone **16**B. The health service practitioner **20**C must have the ability to take or retake the temperature reading, as well as to determine whether to display the temperature reading on the cellular or PCS wireless phone **16**B.

[0171] FIG. **17** shows a first embodiment of a functional block diagram **108** of embedded software **18**A that enables remote functional control of the data devices **88** for the diagnostic means **16**A as well as a software application **26**A that enables remote functional control of the data devices **88** connected to the diagnostic means **16**A. The functions shown in **108**A are deployed as a component of **18**A, the software embedded in a cellular and PCS wireless phone **16**B; those in **108**B as a component of the diagnostic, display and control software application **26**A.

[0172] The functions **46** embedded in a cellular or PCS wireless phone **16**B for controlling the data device **88** the thermometer **88**A include, but are not limited to:

[0173] Turn the thermometer **88**A on or off **46**K;

[0174] Capture and send the temperature reading **46**L; and

[0175] Turn the temperature reading display **46**M of the cellular and PCS wireless phone **16**B on or off.

[0176] The functional control means **82** in the diagnostic, display and control software application **26**A for remotely controlling the thermometer **88**A via a cellular or PCS wireless phone **16**B include, but are not limited to:

[0177] An "off" button and an "on" button **82**K for controlling **46**K the thermometer **88**A;

[0178] A button **82**L for capturing or recapturing the temperature reading **46**L;

[0179] A button **82**M for sending the temperature reading **46**L to a health service practitioner **14**; and

[0180] An "off" button and an "on" button **82**N for controlling the display **46**M of the temperature reading **46**L on a cellular and PCS wireless phone **16**B.

[0181] An additional functional control means **82**O allows the health service practitioner **20**C to save the temperature reading **46**L to the patient's or potential patient's **12**A electronic medical file. The diagnostic, display and control software application **26**A automatically tags the temperature reading **46**L with the date **72** and current time **74**.

[0182] When button **82**O is pushed, pop-up window **110** appears on the diagnostic, display and control means **24**A allowing the health service practitioner **20**C to note where on the patient's or potential patient's **12**A body the temperature reading **46**L was taken **112**, as shown in FIG. **18**. If the location **112** is not listed in pop-up window **110**, the health service practitioner **20**C enters the location in the "other" box **112**D. Selecting one of **112**A through **112**C automatically closes pop-up window **110**. If information is entered into **112**D, the health service practitioner **20**C clicks the "done" button **114** to close the pop-up window **110**.

[0183] The temperature reading **46**L appears in window **116** on the health service practitioner's **20**C diagnostic, display and control means **24**A as shown in FIG. **19**.

[0184] FIG. **20** shows the temperature reading **46**L fed to the connection interface device **92** for connection **90** to the device or terminal **16**.

Stethoscope or High Fidelity Microphone

[0185] A second data device **88** is an acoustic sensor, such as a stethoscope or high fidelity microphone **88**B. A stethoscope or high fidelity microphone **88**B is used to listen to the heart and lungs of a patient or potential patient **12**A as well as to capture pulse rate. Numbers of stethoscopes **88**B are commercially available from AllHeart®, American Diagnostic Corporation (ADC)®, Doctors Research Group (DRG)®, Heine®, Prestige Medical®, 3M Littmann®, UltraScopes®, W. A. Baum®, WelchAllyn® and others. High fidelity microphones are commercially available from AKG®, Audio-Technica®, Beyerdynamics®, Sennheiser®, Shure®, Sony® and others. A preferred embodiment of a stethoscope or high fidelity microphone **88**B to be deployed in the Remote Diagnostic & Treatment System **10**A is shown in FIG. **21**, and includes a connection **90** to a device or terminal **16**. The embodiment shown in FIG. **21** includes one or more wireless connections, Bluetooth **90**A, WiFi **90**B and UWB **90**C, and one or more wired connections, USB **90**D and FireWire **90**E.

[0186] FIG. **22** shows a second embodiment of a functional block diagram **108** of embedded software **18**A that enables remote functional control of the data devices **88** for the diagnostic means **16**A as well as a software application **26**A that enables remote functional control of the data devices **88** connected to the diagnostic means **16**A. The functions shown in **108**A are deployed as a component of **18**A, the software embedded in a cellular and PCS wireless phone **16**B; those in **108**B as a component of the diagnostic, display and control software application **26**A.

[0187] The pulse rate is automatically captured by either the embedded software that enables remote function control **18**A or the diagnostic, display and control software application **26**A, basically by listening to the heart beats and measuring them against the time **74**.

[0188] The functions **46** embedded in a cellular or PCS wireless phone **16**B for controlling the data device **88** the stethoscope or high fidelity microphone **88**B include, but are not limited to:

[0189] Turn the stethoscope or high fidelity microphone **88**B on or off **46**N;

[0190] Adjust the volume **46**O of the stethoscope or high fidelity microphone **88**B;

[0191] Adjust the tone **46**P of the stethoscope or high fidelity microphone **88**B using an equalizer; and

[0192] Capture and send the pulse **46**Q.

[0193] The functional control means **82** in the diagnostic, display and control software application **26**A for remotely controlling the stethoscope or high fidelity microphone **88**B via a cellular or PCS wireless phone **16**B include, but are not limited to:

[0194] An "off" button and an "on" button **82**P for controlling **46**N the stethoscope or high fidelity microphone **88**B;

[0195] A slider **82**Q that adjusts the volume **46**O of the stethoscope or high fidelity microphone **88**B from minus (−) to plus (+);

[0196] Multiple sliders **82**R that adjust the tone **46**P of the stethoscope or high fidelity microphone **88**B from minus (−) to plus (+);

[0197] A button **82**S for capturing or recapturing the pulse reading **46**Q; and

[0198] A button **82**T for sending the pulse reading **46**Q to a health service practitioner **14**.

[0199] An additional functional control means **82**U allows the health service practitioner **20**C to save the pulse reading **46**Q to the patient's or potential patient's **12**A electronic medical file. The software application **26**A automatically tags the pulse reading **46**Q with the date **72** and current time **74**.

[0200] The pulse reading **46**Q appears in window **118** on the health service practitioner's **20**C diagnostic, display and control means **24**A as shown in FIG. **23**.

[0201] A stethoscope is basically a cavity resonator that amplifies sound; there are no electronic components. Microphone components, a transducer **120**, must be added to a stethoscope to convert sound waves to electrical signals. The stethoscope or high fidelity microphone **88**B must have an interface that captures the sound signals and makes those signals available to the connection **90** to the device or terminal **16**. This is accomplished via the connection interface device **92** shown in FIG. **24**.

Weight Scale

[0202] The third data device **88** is a weight measurement device, such as a scale **88**C. Numbers of weight scales **88**C are commercially available from Braun®, Health-O-Meter®, Homedics®, LifeSource®, MedWeigh®, Rowenta®, Soehnle®, Tanita® and others. A preferred embodiment of a weight scale **88**C to be deployed in the Remote Diagnostic & Treatment System **10**A is shown in FIG. **25**, and includes a connection **90** to a device or terminal **16**. The embodiment shown in FIG. **25** includes one or more wireless connections, Bluetooth **90**A, WiFi **90**B and UWB **90**C, and one or more wired connections, USB **90**D and FireWire **90**E.

[0203] For a cellular or PCS wireless phone **16**B to receive the weight reading from the scale **88**C, it must have embedded software **18**A that recognizes that a digital weight reading is being sent to the wireless phone **16**B. One embodiment of the embedded software **18**A allows the weight to be displayed on the screen **40**A of the wireless phone **16**B. Having received the weight reading from the scale **88**C, there must be additional software **18**A to forward the weight reading to the diagnostic, display and control means **24**A used by a health service practitioner **20**C.

[0204] Similarly, the diagnostic, display and control software application **26**A deployed on a diagnostic, display and control means **24**A used by a health service practitioner **20**C has to have the ability to display the weight reading received from the cellular or PCS wireless phone **16**B. The health service practitioner **20**C must have the ability to take or retake the weight reading, as well as to determine whether to display the weight reading on the cellular or PCS wireless phone **16**B.

[0205] FIG. **26** shows a third embodiment of a functional block diagram **108** of embedded software **18**A that enables remote functional control of the data devices **88** for the diagnostic means **16**A as well as a software application **26**A that enables remote functional control of the data devices **88** connected to the diagnostic means **16**AA. The functions shown in **108**A are deployed as a component of **18**A, the software embedded in a cellular and PCS wireless phone **16**B; those in **108**B as a component of the diagnostic, display and control software application **26**A.

[0206] The functions **46** embedded in a cellular or PCS wireless phone **16**B for controlling the data device **88** the weight scale **88**C include, but are not limited to:

[0207] Turn the scale **88**C on or off **46**R;

[0208] Capture and send the weight reading **46**S; and

[0209] Turn the weight reading display **46**T on or off.

[0210] The functional control means **82** in the diagnostic, display and control software application **26**A for remotely controlling the scale **88**C via a cellular or PCS wireless phone **16**B include, but are not limited to:

[0211] An "off" button and an "on" button **82**V for controlling **46**R the scale **88**C;

[0212] A button **82**W for capturing or recapturing the weight reading **46**S;

[0213] A button **82**X for sending the weight reading **46**S to a health service practitioner **14**; and

[0214] An "off" button and an "on" button **82**Y for controlling the display **46**T of the weight reading **46**S.

[0215] An additional functional control means **82**Z allows the health service practitioner **20**C to save the weight reading **46**S to the patient's or potential patient's **12**A electronic medical file. The software application **26**A automatically tags the weight reading **46**S with the date **72** and current time **74**.

[0216] The weight reading **46**S appears in window **122** on the health service practitioner's **20**C diagnostic, display and control means **24**A as shown in FIG. **27**.

[0217] FIG. **28** shows the weight reading **46**S fed to the connection interface device **92** for connection **90** to the device or terminal **16**.

Blood Pressure Cuff

[0218] The fourth data device **88** is a blood pressure measurement device, such as a cuff **88**D. Numbers of blood pressure cuffs **88**D are commercially available from Health-O-Meter®, Hitachi®, Lumiscope®, Mabis®, Microlife®, Omron®, Oregon Scientific®, Panasonic®, Samsung® and others. A preferred embodiment of a blood pressure cuff **88**D to be deployed in the Remote Diagnostic & Treatment System **10**A is shown in FIG. **29**, and includes a connection **90** to a device or terminal **16**. The embodiment shown in FIG. **29** includes one or more wireless connections, Bluetooth **90**A, WiFi **90**B and UWB **90**C, and one or more wired connections, USB **90**D and FireWire **90**E.

[0219] For a cellular or PCS wireless phone **16**B to receive the blood pressure and pulse readings from the blood pressure cuff **88**D, it must have embedded software **18**A that recognizes that digital blood pressure and pulse readings are being sent to the wireless phone **16**B. One embodiment of the embedded software **18**A allows the blood pressure and pulse readings to be displayed on the screen **40**A of the wireless phone **16**B. Having received the blood pressure and pulse readings from the blood pressure cuff **88**D, there must be additional software **18**A to forward the blood pressure and pulse readings to the diagnostic, display and control means **24**A used by a health service practitioner **20**C.

[0220] Similarly, the diagnostic, display and control software application **26**A deployed on a diagnostic, display and control means **24**A used by a health service practitioner **20**C has to have the ability to display the blood pressure and pulse readings received from the cellular or PCS wireless phone **16**B. The health service practitioner **20**C must have the ability to take or retake the blood pressure and pulse readings, as well as to determine whether to display the weight reading on the cellular or PCS wireless phone **16**B.

[0221] FIG. **30** shows a fourth embodiment of a functional block diagram **108** of embedded software **18**A that enables remote functional control of the data devices **88** for the diagnostic means **16**A as well as a software application **26**A that enables remote functional control of the data devices **88** connected to the diagnostic means **16**A. The functions shown in **108**A are deployed as a component of **18**A, the software embedded in a cellular and PCS wireless phone **16**B; those in **108**B as a component of the diagnostic, display and control software application **26**A.

[0222] The functions **46** embedded in a cellular or PCS wireless phone **16**B for controlling the data device **88** the blood pressure cuff **88**D include, but are not limited to:

[0223] Inflate or deflate **46**U the blood pressure cuff **88**D;

[0224] Capture and send the blood pressure reading **46**V;

[0225] Capture and send the pulse reading **46**Q; and

[0226] Turn the blood pressure and pulse readings display **46**W on or off.

[0227] The functional control means **82** in the diagnostic, display and control software application **26**A for remotely controlling the blood pressure cuff **88**D via a cellular or PCS wireless phone **16**B include, but are not limited to:

[0228] A button **82**AA for inflating and deflating **46**U the blood pressure cuff **88**D;

[0229] A button **82**AB for capturing or recapturing the blood pressure reading **46**V;

[0230] A button **82**AC for sending the blood pressure reading **46**V to a health service practitioner **14**;

[0231] A button **82**S for capturing or recapturing the pulse reading **46**Q; and

[0232] A button **82**T for sending the pulse reading **46**Q to a health service practitioner **14**.

[0233] An "off" button and an "on" button **82**AD for controlling the display **46**W of the blood pressure and pulse readings **46**W.

[0234] An additional functional control means **82**AE allows the health service practitioner **20**C to save the blood pressure reading **46**V to the patient's or potential patient's

12A electronic medical file. The software application 26A automatically tags the blood pressure reading 46V with the date 72 and current time 74.

[0235] An additional functional control means 82U allows the health service practitioner 20C to save the pulse reading 46Q to the patient's or potential patient's 12A electronic medical file. The software application 26A automatically tags the pulse reading 46Q with the date 72 and current time 74.

[0236] The pulse reading 46Q appears in window 118 on the health service practitioner's 20C diagnostic, display and control means 24A as shown in FIG. 31.

[0237] The blood pressure reading 46V appears in window 124 on the health service practitioner's 20C diagnostic, display and control means 24A as shown in FIG. 31.

[0238] FIG. 32 shows the pulse 46Q and the blood pressure reading 46V fed to the connection interface device 92 for connection 90 to the device or terminal 16.

Oximeter

[0239] The fifth data device 88 is a device which measures levels of oxygen in the blood, such as an oximeter 88E. Numbers of oximeters 88E are commercially available from BCI®, Criticare®, INVOS®, Nonin Medical®, Smiths Medical PM Inc.®, SPO®, Turner Medical® and others. The Nonin Medical Inc. Avant™ 4600 Digital Pulse Oximetry System sends pulse rate data from a wrist-worn sensor to a monitor via Bluetooth. A preferred embodiment of an oximeter 88E to be deployed in the Remote Diagnostic & Treatment System 10A is shown in FIG. 33, and includes a connection 90 to a device or terminal 16. The embodiment shown in FIG. 33 includes one or more wireless connections, Bluetooth 90A, WiFi 90B and UWB 90C, and one or more wired connections, USB 90D and FireWire 90E.

[0240] For a cellular or PCS wireless phone 16B to receive the reading of the percent of hemoglobin that is saturated with oxygen and pulse reading from the oximeter 88E, it must have embedded software 18A that recognizes that the reading of the percent of hemoglobin that is saturated with oxygen and pulse reading are being sent to the wireless phone 16B. One embodiment of the embedded software 18A allows the reading of the percent of hemoglobin that is saturated with oxygen and pulse reading to be displayed on the screen 40A of the wireless phone 16B. Having received the reading of the percent of hemoglobin that is saturated with oxygen and pulse reading from the oximeter 88E, there must be additional software 18A to forward the reading of the percent of hemoglobin that is saturated with oxygen and pulse reading to the diagnostic, display and control means 24A used by a health service practitioner 20C.

[0241] Similarly, the diagnostic, display and control software application 26A deployed on a diagnostic, display and control means 24A used by a health service practitioner 20C has to have the ability to display the reading of the percent of hemoglobin that is saturated with oxygen and pulse reading received from the cellular or PCS wireless phone 16B. The health service practitioner 20C must have the ability to take or retake the reading of the percent of hemoglobin that is saturated with oxygen and pulse reading, as well as to determine whether to display the readings on the cellular or PCS wireless phone 16B.

[0242] FIG. 34 shows a fifth embodiment of a functional block diagram 108 of embedded software 18A that enables remote functional control of the data devices 88 for the diagnostic means 16A as well as a software application 26A that enables remote functional control of the data devices 88 connected to the diagnostic means 16A. The functions shown in 108A are deployed as a component of 18A, the software embedded in a cellular and PCS wireless phone 16B; those in 108B as a component of the diagnostic, display and control software application 26A.

[0243] The functions 46 embedded in a cellular or PCS wireless phone 16B for controlling the data device 88 the oximeter 88E include, but are not limited to:

[0244] Turn the oximeter 88E on or off 46X;

[0245] Capture and send the reading of the percent of hemoglobin that is saturated with oxygen 46Y;

[0246] Capture and send the pulse reading 46Q; and

[0247] Turn the reading of the percent of hemoglobin that is saturated with oxygen and pulse reading display 46Z on or off.

[0248] The functional control means 82 in the diagnostic, display and control software application 26A for remotely controlling the oximeter 88E via a cellular or PCS wireless phone 16B include, but are not limited to:

[0249] An "off" button and an "on" button 82AF for controlling 46X the oximeter 88E;

[0250] A button 82AG for capturing or recapturing the reading of the percent of hemoglobin that is saturated with oxygen 46Y;

[0251] A button 82AH for sending the reading of the percent of hemoglobin that is saturated with oxygen 46Y to a health service practitioner 14;

[0252] A button 82S for capturing or recapturing the pulse reading 46Q; and

[0253] A button 82T for sending the pulse reading 46Q to a health service practitioner 14;

[0254] An "off" button and an "on" button 82AI for controlling the display 46Z of the reading of the percent of hemoglobin that is saturated with oxygen and pulse reading.

[0255] An additional functional control means 82AJ allows the health service practitioner 20C to save the reading of the percent of hemoglobin that is saturated with oxygen 46Y to the patient's or potential patient's 12A electronic medical file. The software application 26A automatically tags the blood pressure reading 46V with the date 72 and current time 74.

[0256] An additional functional control means 82U allows the health service practitioner 20C to save the pulse reading 46Q to the patient's or potential patient's 12A electronic medical file. The software application 26A automatically tags the pulse reading 46Q with the date 72 and current time 74.

[0257] The pulse reading 46Q appears in window 118 on the health service practitioner's 20C diagnostic, display and control means 24A as shown in FIG. 35.

[0258] The reading of the percent of hemoglobin that is saturated with oxygen **46**Y appears in window **126** on the health service practitioner's **20**C diagnostic, display and control means **24**A as shown in FIG. **35**.

[0259] FIG. **36** shows the pulse **46**Q and the percent of hemoglobin that is saturated with oxygen **46**Y fed to the connection interface device **92** for connection **90** to the device or terminal **16**.

Electrocardiogram

[0260] The sixth data device **88** is a device for obtaining an electrocardiograph, such as an electrocardiogram unit **88**F. Numbers of electrocardiogram units **88**F are commercially available from Biolog®, Bionet®, Burdich®, Brentwood®, Cardioline®, GE Marquette®, Midmark®, Nihon Kohden®, Phillips®, QRS®, Schiller America®, WelchAllyn® and others. A preferred embodiment of an electrocardiogram unit **88**F to be deployed in the Remote Diagnostic & Treatment System **10**A is shown in FIG. **37**, and includes a connection **90** to a device or terminal **16**. The embodiment shown in FIG. **37** includes one or more wireless connections, Bluetooth **90**A, WiFi **90**B and UWB **90**C, and one or more wired connections, USB **90**D and FireWire **90**E.

[0261] For a cellular or PCS wireless phone **16**B to receive the electrocardiogram and pulse reading from the electrocardiogram unit **88**F, it must have embedded software **18**A that recognizes that the electrocardiogram and pulse reading are being sent to the wireless phone **16**B. Having received the electrocardiogram and pulse reading from the electrocardiogram unit **88**F, there must be additional software **18**A to forward the electrocardiogram and pulse reading to the diagnostic, display and control means **24**A used by a health service practitioner **20**C.

[0262] Similarly, the diagnostic, display and control software application **26**A deployed on a diagnostic, display and control means **24**A used by a health service practitioner **20**C has to have the ability to display the electrocardiogram and pulse reading received from the cellular or PCS wireless phone **16**B. The health service practitioner **20**C must have the ability to take or retake the electrocardiogram and pulse reading.

[0263] FIG. **38** shows a sixth embodiment of a functional block diagram **108** of embedded software **18**A that enables remote functional control of the data devices **88** for the diagnostic means **16**A as well as a software application **26**A that enables remote functional control of the data devices **88** connected to the diagnostic means **16**A. The functions shown in **108**A are deployed as a component of **18**A, the software embedded in a cellular and PCS wireless phone **16**B; those in **108**B as a component of the diagnostic, display and control software application **26**A.

[0264] The functions **46** embedded in a cellular or PCS wireless phone **16**B for controlling the data device **88** the electrocardiogram **88**F include, but are not limited to:

[0265] Turn the electrocardiogram unit **88**F on or off **46**AA;

[0266] Capture and send the electrocardiogram reading **46**AB;

[0267] Capture and send the pulse reading **36**Q; and

[0268] Turn the electrocardiogram reading display **46**AC on or off.

[0269] The functional control means **82** in the diagnostic, display and control software application **26**A for remotely controlling the electrocardiogram unit **88**F via a cellular or PCS wireless phone **16**B include, but are not limited to:

[0270] An "off" button and an "on" button **82**AK for controlling **46**AA the electrocardiogram unit **88**F;

[0271] A button **82**AL for capturing or recapturing the electrocardiogram reading **46**AB;

[0272] A button **82**AM for sending the electrocardiogram reading **46**AA to a health service practitioner **14**;

[0273] A button **82**S for capturing or recapturing the pulse reading **46**Q;

[0274] A button **82**T for sending the pulse reading **46**Q to a health service practitioner **14**; and

[0275] An "off" button and an "on" button **82**AN for controlling the display **46**AC of the electrocardiogram reading.

[0276] An additional functional control means **82**AO allows the health service practitioner **20**C to save the electrocardiogram reading **46**AA to the patient's or potential patient's **12**A electronic medical file. The software application **26**A automatically tags the electrocardiogram **46**AA with the date **72** and current time **74**.

[0277] An additional functional control means **82**U allows the health service practitioner **20**C to save the pulse reading **46**Q to the patient's or potential patient's **12**A electronic medical file. The software application **26**A automatically tags the pulse reading **46**Q with the date **72** and current time **74**.

[0278] The pulse reading **46**Q appears in window **118** on the health service practitioner's **20**C diagnostic, display and control means **24**A as shown in FIG. **39**.

[0279] The electrocardiogram **46**AA appears in window **128** on the health service practitioner's **20**C diagnostic, display and control means **24**A as shown in FIG. **39**.

[0280] FIG. **40** shows the pulse **46**Q and the electrocardiogram **46**AB fed to the connection interface device **92** for connection **90** to the device or terminal **16**.

Glucose Meter

[0281] The seventh data device **88** is a device for measuring the glucose level in the blood, such as a glucose meter **88**G. Numbers of glucose meters **80**G are commercially available from Ascensia®, BD Logic®, Home Diagnostics, Inc.®, Hypoguard®, LifeScan®, MediSense®, Roche Diagnostics®, SpectRx, Inc.® and others. A preferred embodiment of a glucose meter **80**G to be deployed in the Remote Diagnostic & Treatment System **10**A is shown in FIG. **41**, and includes a connection **90** to a device or terminal **16**. The embodiment shown in FIG. **41** includes one or more wireless connections, Bluetooth **90**A, WiFi **90**B and UWB **90**C, and one or more wired connections, USB **90**D and FireWire **90**E.

[0282] For a cellular or PCS wireless phone **16**B to receive the glucose reading from the meter **88**G, it must have embedded software **18**A that recognizes that a digital weight reading is being sent to the wireless phone **16**B. One

embodiment of the embedded software **18**A allows the glucose reading to be displayed on the screen **34**A of the wireless phone **16**B. Having received the glucose reading from the meter **88**G, there must be additional software **18**A to forward the glucose reading to the diagnostic, display and control means **24**A used by a health service practitioner **20**C.

[**0283**] Similarly, the diagnostic, display and control software application **26**A deployed on a diagnostic, display and control means **24**A used by a health service practitioner **20**C has to have the ability to display the glucose reading received from the cellular or PCS wireless phone **16**B. The health service practitioner **20**C must have the ability to take or retake the glucose reading, as well as to determine whether to display the glucose reading on the cellular or PCS wireless phone **16**B.

[**0284**] FIG. **42** shows a seventh embodiment of a functional block diagram **108** of embedded software **18**A that enables remote functional control of the data devices **88** for the diagnostic means **16**A as well as a software application **26**A that enables remote functional control of the data devices **88** connected to the diagnostic means **16**A. The functions shown in **108**A are deployed as a component of **18**A, the software embedded in a cellular and PCS wireless phone **16**B; those in **108**B as a component of the diagnostic, display and control software application **26**A.

[**0285**] The functions **46** embedded in a cellular or PCS wireless phone **16**B for controlling the data device **88** the glucose meter **88**F include, but are not limited to:

[**0286**] Turn the glucose meter **88**G on or off **46**AD;

[**0287**] Capture and send the glucose reading **46**AE; and

[**0288**] Turn the glucose reading display **46**AF on or off.

[**0289**] The functional control means **82** in the diagnostic, display and control software application **26**A for remotely controlling the glucose meter **88**G via a cellular or PCS wireless phone **16**B include, but are not limited to:

[**0290**] An "off" button and an "on" button **82**AP for controlling **46**AD the glucose meter **80**G;

[**0291**] A button **82**AQ for capturing or recapturing the glucose reading **46**AE;

[**0292**] A button **82**AR for sending the glucose reading **46**AD to a health service practitioner **20**C; and

[**0293**] An "off" button and an "on" button **82**AS for controlling the display **46**AF of the glucose reading **46**AE.

[**0294**] An additional functional control means **82**AT allows the health service practitioner **20**C to save the glucose reading **46**AE to the patient's or potential patient's **12**A electronic medical file. The software application **26**A automatically tags the glucose reading **46**AE with the date **72** and current time **74**.

[**0295**] The glucose reading **46**AE appears in window **130** on the health service practitioner's **20**C diagnostic, display and control means **24**A as shown in FIG. **43**.

[**0296**] FIG. **44** shows the glucose reading **46**AE fed to the connection interface device **92** for connection **90** to the device or terminal **16**.

Otoscope

[**0297**] An eighth data device **88** is an otoscope **88**H. An otoscope **88**H is used to examine the ears, nose, and mouth. It contains a light and a magnifying lens. Numbers of otoscopes **88**H are commercially available from American Diagnostic Corporation (ADC)®, Dr. Mom®, Heine®, Riester®, WelchAllyn® and others. A preferred embodiment of an otoscope **88**H to be deployed in the Remote Diagnostic & Treatment System **10**A is shown in FIG. **45**, and includes a connection **90** to a device or terminal **16**. The embodiment shown in FIG. **45** includes one or more wireless connections, Bluetooth **90**A, WiFi **90**B and UWB **90**C, and one or more wired connections, USB **90**D and FireWire **90**E.

[**0298**] An otoscope is basically a visual aid to a health service practitioner **20**C who has physical access to a patient or potential patient **12**A. A camera **34**B must be added to the otoscope **88**H for it to be deployed in the Remote Diagnostic & Treatment System **10**. The otoscope **88**H must also have an interface that captures the images **38** and makes those images available to the connection **90** to the device or terminal **16**.

[**0299**] FIG. **46** shows a eighth embodiment of a functional block diagram **108** of embedded software **18**A that enables remote functional control of the data devices **88** for the diagnostic means **16**A as well as a software application **26**A that enables remote functional control of the data devices **88** connected to the diagnostic means **16**A. The functions shown in **108**A are deployed as a component of **18**A, the software embedded in a cellular and PCS wireless phone **16**B; those in **108**B as a component of the diagnostic, display and control software application **26**A.

[**0300**] The functions **46** embedded in a cellular or PCS wireless phone **16**B for controlling the data device **88** the otoscope **88**H include, but are not limited to:

[**0301**] Turn the camera **88**H on or off **46**AG;

[**0302**] Zoom **46**AH the camera **88**H;

[**0303**] Focus **46**AI the camera **88**H;

[**0304**] Adjust the camera **88**H color **46**AJ;

[**0305**] Adjust the camera **88**H hue **46**AK;

[**0306**] Adjust the camera **88**H contrast **46**AL;

[**0307**] Take **46**AM a picture **36**; and

[**0308**] Turn the camera **88**H display **46**AN on or off.

[**0309**] The functional control means **82** in the diagnostic, display and control software application **26**A for remotely controlling the stethoscope or high fidelity microphone **88**B via a cellular or PCS wireless phone **16**B include, but are not limited to:

[**0310**] An "off" button and an "on" button **82**AU for controlling **46**AG the camera **88**H;

[**0311**] A slider **82**AV that adjusts the zoom **46**AH from zero percent (0%) to one hundred percent (100%);

[**0312**] A slider **82**AW that adjusts the camera focus **46**AI from minus (−) to plus (+);

[**0313**] A slider **82**AX that adjusts the color **46**AJ from zero percent (0%) to one hundred percent (100%);

[0314] A slider **82**AY that adjusts the hue **46**AK from zero percent (0%) to one hundred percent (100%);

[0315] A slider **82**AZ that adjusts the contrast **46**AL from minus (−) to plus (+);

[0316] A button **82**BA for taking **46**AM a picture **36**;

[0317] A button **82**BB for sending **46**AM the picture **36**; and

[0318] An "off" button and an "on" button **82**BC for controlling the display **46**AN of the camera **88**H.

[0319] An additional functional control means **82**BD allows the health service practitioner **20**C to save the picture **42** to the patient's or potential patient's **12**A electronic medical file. The software application **26**A automatically tags the picture **42** with the date **72** and current time **74**.

[0320] The picture **42** appears in window **132** on the health service practitioner's **20**C diagnostic, display and control means **24**A as shown in FIG. **47**.

[0321] FIG. **48** shows the picture **42** fed to the connection interface device **92** for connection **90** to the device or terminal **16**.

Ultrasound

[0322] The ninth data device **88** is an ultrasound unit **88**I. Numbers of ultrasound units **88**I are commercially available from Amrex®, Intelect®, GE Logiq®, Koality®, Mettler®, Siemens Acuson® and others. A preferred embodiment of an ultrasound unit **88**I to be deployed in the Remote Diagnostic & Treatment System **10**A is shown in FIG. **49**, and includes a connection **90** to a device or terminal **16**. The embodiment shown in FIG. **49** includes one or more wireless connections, Bluetooth **90**A, WiFi **90**B and UWB **90**C, and one or more wired connections, USB **90**D and FireWire **90**E.

[0323] For a cellular or PCS wireless phone **16**B to receive the ultrasound readings from the ultrasound unit **88**I, it must have embedded software **18**A that recognizes that the ultrasound readings are being sent to the wireless phone **16**B. Having received the ultrasound readings from the ultrasound unit **88**I, there must be additional software **18**A to forward the ultrasound readings to the diagnostic, display and control means **24** used by a health service practitioner **20**C.

[0324] Similarly, the diagnostic, display and control software application **26**A deployed on a diagnostic, display and control means **24**A used by a health service practitioner **20**C has to have the ability to display the ultrasound readings received from the cellular or PCS wireless phone **16**B. The health service practitioner **20**C must have the ability to take or retake the ultrasound readings.

[0325] FIG. **50** shows a ninth embodiment of a functional block diagram **108** of embedded software **18**A that enables remote functional control of the data devices **88** for the diagnostic means **16**A as well as a software application **26**A that enables remote functional control of the data devices **88** connected to the diagnostic means **16**A. The functions shown in **108**A are deployed as a component of **18**A, the software embedded in a cellular and PCS wireless phone **16**B; those in **108**B as a component of the diagnostic, display and control software application **26**A.

[0326] The functions **46** embedded in a cellular or PCS wireless phone **16**B for controlling the data device **88** the ultrasound unit **88**I include, but are not limited to:

[0327] Turn the ultrasound unit **88**I on or off **46**AO;

[0328] Capture and send the ultrasound reading **46**AP; and

[0329] Turn the ultrasound display **46**AQ on or off.

[0330] The functional control means **82** in the diagnostic, display and control software application **26**A for remotely controlling the ultrasound unit **88**I via a cellular or PCS wireless phone **16**B include, but are not limited to:

[0331] An "off" button and an "on" button **82**BE for controlling **46**AO the ultrasound unit **88**I;

[0332] A button **82**BF for capturing or recapturing the ultrasound readings **46**AP;

[0333] A button **82**BG for sending the ultrasound readings **46**AP to a health service practitioner **20**C; and

[0334] An "off" button and an "on" button **82**BH for controlling the display **46**AQ of the ultrasound **88**I.

[0335] An additional functional control means **82**BI allows the health service practitioner **20**C to save the ultrasound readings **46**AN to the patient's or potential patient's **12**A electronic medical file. The software application **26**A automatically tags the ultrasound readings **46**AA with the date **72** and current time **74**.

[0336] The ultrasound readings **46**AP appears in window **134** on the health service practitioner's **20**C diagnostic, display and control means **24**A as shown in FIG. **51**.

[0337] FIG. **52** shows the ultrasound readings **46**AP fed to the connection interface device **92** for connection **90** to a device or terminal **16**.

External Camera

[0338] The tenth data device **88** is a camera **88**J that is not part of a diagnostic means **16**A. A preferred embodiment of an external camera **88**J to be deployed in the Remote Diagnostic & Treatment System **10** is shown in FIG. **53**, and includes a connection **90** to a device or terminal **16**. The embodiment shown in FIG. **53** includes one or more wireless connections, Bluetooth **90**A, WiFi **90**B and UWB **90**C, and one or more wired connections, USB **90**D and FireWire **90**E.

[0339] The specific embodiment of the external camera **88**J shown in FIG. **53** is a digital camera. Modern digital cameras take pictures **42** as well as short videos **136**. An alternative embodiment of the external camera **88**J is a digital video recorder as shown in FIG. **54**. Modern digital video cameras take videos **136** as well as pictures **42**. The embodiment shown in FIG. **53** includes one or more wireless connections, Bluetooth **90**A, WiFi **90**B and UWB **90**C, and one or more wired connections, USB **90**D and FireWire **90**E.

[0340] At present there are only few manufacturers of Bluetooth-enabled cameras, Concord Camera®, Panasonic®, Sony®, Sony Ericcson®; other manufacturers are expected to enter this market in the near future. Some manufacturers have WiFi-enabled cameras, 4xem®, Axis Communications®, BenQ®, Creative Labs®, D-Link®, Kodak®, Linksys®, Nikon®, Sony® and others. Additional manufacturers are expected to enter this market in the near future. It is expected that manufacturers will add UWB to cameras in the near future.

[0341] For a cellular or PCS wireless phone **16**B to receive the image from the external camera **88**J, it must have embedded software **18**A that recognizes that a camera image is being sent to the wireless phone **16**B. One embodiment of the embedded software **18**A allows the camera image to be displayed on the screen **40**A of the wireless phone **16**B. Having received the image from the external camera **88**J, there must be additional software **18**A to forward the external camera image to the diagnostic, display and control means **24**A used by a health service practitioner **20**C.

[0342] Similarly, the diagnostic, display and control software application **26**A deployed on a diagnostic, display and control means **24**A used by a health service practitioner **20**C has to have the ability to display the external camera image received from the cellular or PCS wireless phone **16**B. The health service practitioner **20**C must have the ability to take or retake the camera images, as well as to determine whether to display the external camera image on the cellular or PCS wireless phone **16**B.

[0343] FIG. **55** shows a tenth embodiment of a functional block diagram **108** of embedded software **18**A that enables remote functional control of the data devices **88** for the diagnostic means **16**A as well as a software application **26**A that enables remote functional control of the data devices **88** connected to the diagnostic means **16**A. The functions shown in **108**A are deployed as a component of **18**A, the software embedded in a cellular and PCS wireless phone **16**B; those in **108**B as a component of the diagnostic, display and control software application **26**A.

[0344] The functions **46** embedded in a cellular or PCS wireless phone **16**B for controlling the data device **88** the external camera **88**J include, but are not limited to:

[0345] Turn the camera **88**J on or off **46**AR;

[0346] Zoom **46**AS the camera **88**J;

[0347] Focus **46**AT the camera **88**J;

[0348] Pan **46**AU camera **88**J;

[0349] Tilt **46**AV camera **88**J;

[0350] Adjust the camera **88**J color **46**AW;

[0351] Adjust the camera **88**J hue **46**AX;

[0352] Adjust the camera **88**J contrast **46**AY;

[0353] Take **46**AZ a picture **36**;

[0354] Take **46**BA video **112**; and

[0355] Turn the camera **88**J display **46**BB on or off.

[0356] The functional control means **82** in the diagnostic, display and control software application **26**A for remotely controlling the external camera **88**J via a cellular or PCS wireless phone **16**B include, but are not limited to:

[0357] An "off" button and an "on" button **82**BJ for controlling **46**AR the camera **88**J;

[0358] A slider **82**BK that adjusts the zoom **46**AS from zero percent (0%) to one hundred percent (100%);

[0359] A slider **82**BL that adjusts the camera focus **46**AT from minus (−) to plus (+);

[0360] A slider **82**BM that adjusts the camera pan **46**AU from minus (−) to plus (+);

[0361] A slider **82**BN that adjusts the camera tilt **46**AV from minus (−) to plus (+);

[0362] A slider **82**BO that adjusts the color **46**AW from zero percent (0%) to one hundred percent (100%);

[0363] A slider **82**BP that adjusts the hue **46**AX from zero percent (0%) to one hundred percent (100%);

[0364] A slider **82**BQ that adjusts the contrast **46**AY from minus (−) to plus (+);

[0365] A button **82**BR for taking **46**AZ a picture **38**;

[0366] A button **82**BS for sending **46**BA the picture **38**;

[0367] A button **82**BT for capturing **46**BB video **130**;

[0368] A button **82**BU for sending **46**BC video **130**; and

[0369] An "off" button and an "on" button **82**BV for controlling the display **46**BB of the camera **88**J.

[0370] An additional functional control means **82**BW allows the health service practitioner **20**C to save the picture **42** to the patient's or potential patient's **12**A electronic medical file. The software application **26**A automatically tags the picture **42** with the date **72** and current time **74**.

[0371] An additional functional control means **82**BX allows the health service practitioner **20**C to save the video **136** to the patient's or potential patient's **12**A electronic medical file. The software application **26**A automatically tags the video **136** with the date **72** and current time **74**.

[0372] The external camera **88**J picture **42** appears in window **132** on the health service practitioner's **20**C diagnostic, display and control means **24**A as shown in FIG. **51**.

[0373] The external camera **88**J video **136** appears in window **134** on the health service practitioner's **20**C diagnostic, display and control means **24**A as shown in FIG. **51**.

[0374] FIG. **56** shows the picture **42** or the video **136** fed to the connection interface device **92** for connection **90** to a device or terminal **16**.

[0375] The external camera **88**J is particularly useful to the health service practitioner **20**C for observing the patient or potential patient **12**A as he or she utilizes the diagnostic means **16**A, including data devices **88**, as shown in FIG. **57**. In this embodiment the external camera **88**J is set away from the patient or potential patient **12**A so that the health service practitioner **20**C can see what the patient or potential patient **12**A is doing, especially in placing data devices **88** on his or her body.

III. Alternative Embodiments of the Invention.

[0376] An embodiment of the device or terminal **16** has thus far been described as a cellular or PCS wireless phone **16**B. A first alternative embodiment of the device or terminal **16** is a Personal Computer (PC) equipped with a camera **28**, as shown in FIG. **58**. The preferred embodiment shown in FIG. **56** shows a laptop PC **16**C with a built in camera **28**C. Data devices **88** may be connected **90** to the laptop PC **16**C using wires or wirelessly. Modern day laptops **16**C have Bluetooth **90**A and WiFi **90**B capabilities built in. It is expected that in the near future they may also have UWB **90**C built in. Today, all laptop PCs **16**C have at least one USB port **90**D and at least one FireWire port **90**E.

[0377] FIG. **59** shows a second alternative embodiment of a PC, a desktop computer **16**D with an attached camera **28**D. The desktop computer **16**D shown in FIG. **59** is enabled with Bluetooth **90**A and WiFi **90**B capabilities. It is expected that in the near future they may also have UWB **90**C built in. Today, all desktop PCs **16**D have at least one USB port **90**D and at least one FireWire port **90**E.

[0378] FIG. **60** shows an alternative embodiment of the Remote Diagnostic & Treatment System **10** in which the device or terminal is a laptop PC **16**C. In this embodiment of the Remote Diagnostic & Treatment System **10**B the laptop PC **16**C is connected **90** to the network **30**, specifically the Internet **30**I, using a wired USB **90**D or a wireless connection, specifically a WiFi connection **90**B. Additionally, in this embodiment the embedded software that enables remote function control **18**B and the diagnostic, display and control means **24**B and software application(s) **26**B are Internet-enabled.

[0379] All of the data devices **88** may be connected to a laptop PC **16**C or a desktop PC **16**D via a wireless connection **90** as shown in FIG. **61**, Bluetooth **90**A, WiFi **90**B or UWB **90**C, or via a wired connection **90** as shown in FIG. **62** for USB **90**D and in FIG. **63** for FireWire **90**E.

[0380] Many cellular and PCS wireless phones **16**B are today enabled with Bluetooth **90**A. Cellular and PCS wireless phones **16**B enabled with WiFi **90**B are just becoming available from Avaya®, E-TEN®, Hewlett-Packard (HP)®, Microsoft®, Motorola®, NEC®, Proxim® and others. Data devices **88** may be connected to these new WiFi-enabled cellular and PCS wireless phones **16**B as shown in FIG. **64**. In the future manufacturers may add UWB **90**C chip sets to cellular and PCS wireless phones **16**B.

[0381] Most cellular and PCS wireless phones **16**B have a data port. Today, these data ports are proprietary. In the future there is no reason for cellular and PCS wireless phones **16**B not having USB **90**D and/or FireWire **90**E ports. FIG. **65** shows connection **90** of data devices **88** to a cellular or PCS wireless phone **16**B via USB **90**D; FIG. **66** shows connection **90** of data devices **88** to a cellular or PCS wireless phone **16**B via FireWire **90**E.

[0382] There are other developing and emerging wireless waveforms and network topologies that may be used in the Remote Diagnostic & Treatment System **10**.

[0383] Some medical conditions require continuous or semi-continuous monitoring. In one embodiment a cellular or PCS wireless phone **16**B can be left on and connected to a health service practitioner **20**C and the images **42** or data from data devices **88** continuously transmitted to the health service practitioner **20**C. Alternatively and more practically, the patient or potential patient **12**A can save images **42** or data from data devices **88** in the cellular or PCS wireless phone **16**B, laptop PC **16**C or desktop PC **16**D for transmission to a health service practitioner **20**C on a scheduled or an ad hoc basis.

IV. Alternative Applications of the Remote Diagnostic & Treatment System

[0384] The Remote Diagnostic & Treatment System **10** has numbers of applications beyond remote triage and health service monitoring. A first alternative embodiment addresses remote triage and monitoring of elderly patients or potential patients **12**A, particularly those in assisted living environments. Elderly patients or potential patients **12**A in assisted living environments are often provided a lanyard-based or clothing clipped button device that the patient or potential patient **12**A can push to alert the staff in the event of an emergency. Pushing the button usually turns on a light in a monitoring station and causes an attendant to go to the patient's or potential patient's **12**A unit to assess the situation. More advanced versions of the "button" include a microphone that enables the patient or potential patient **12**A to talk to the monitoring attendant.

[0385] An embodiment of the Remote Diagnostic & Treatment System **10**A to be deployed in an assisted living environment is shown in FIG. **67**. In this embodiment an elderly patient or potential patient **12**A that requires health monitoring wears a device **138** on his or her wrist that includes an embedded cellular or PCS wireless phone **16**B with speaker phone **36** and one or more monitoring data devices **88**. In the embodiment shown in FIG. **67** the data device is a blood pressure and pulse rate monitor **88**D. The device **138** also functions as a watch **140**. The device **138** also includes a button **142** that the elderly patient or potential patient **12**A can push in the case of an emergency that has an emergency phone number programmed into the button's activation. The preprogrammed number might be "911" or some other emergency service number that connects to a health service practitioner **20**C. When the emergency button **142** is pushed and the connection to the emergency phone number completed, the speaker phone **36** is turned on and the data from the data device **88** transmitted to the health service practitioner **20**C. The health service practitioner **20**C can talk to the patient or potential patient **12**A as well as hear them and the conditions surrounding them. These capabilities can assist the health service practitioner **20**C to respond to the emergency or incident.

[0386] The same or similar device **138** can be worn by a soldier to monitor his or her health status as well as to provide remote triage if the soldier is injured. In this embodiment it is beneficial to also embed a Global Positioning System (GPS) receiver **144** into the device **138** as shown in FIG. **68** so that the health service practitioner **20**C can know the location of the soldier. The diagnostic, display and control software application **26**A deployed on the diagnostic, display and control means **24**A has to receive and display the GPS **144** data as shown in FIG. **68**. The GPS **144** location appears in window **146** on the health service practitioner's **20**C diagnostic, display and control means **24**A as shown in FIG. **69**. In a preferred embodiment the display of the GPS **144** data is in the form of a map.

[0387] A device **138** with embedded GPS **144** is also useful for keeping track of patients or potential patients **12**A with Alzheimer's or other dementia disablements.

[0388] The Remote Diagnostic & Treatment System **10**A may also be used to support other health service practitioners **20**B. For example, devices or terminals **16** and data devices **88** may be deployed in ambulances and other emergency vehicles as shown in FIG. **70**. In the embodiment shown in FIG. **70** a paramedic **20**D consults with a remote health service practitioner **20**C about the patient's or potential patient's **12**A condition.

[0389] All of the embodiments described thus far have the health service practitioner **20**C in a fixed location. The

technologies of the Remote Diagnostic & Treatment System **10** enable the health service practitioner **20**C to work from home or on the move. In the embodiment shown in FIG. **71** the health service practitioner **20**C is at home with a laptop PC **16**C as the diagnostic, display and control means **24**B, and connected **32**I to the Internet **30**I. The diagnostic, display and control software application **26**B is Internet-enabled.

[**0390**] In the embodiment shown in FIG. **72** the health service practitioner **20**C can be on the move. In this embodiment the diagnostic, display and control means **24**C is a cellular or PCS wireless phone with the diagnostic, display and control software application **26**C embedded into it.

[**0391**] The Remote Diagnostic & Treatment System **10** may also be used for physical rehabilitation and athletic performance coaching. In this embodiment of the Remote Diagnostic & Treatment System **10**C the health service practitioner **20**C is replaced by a physical therapist or athletic coach **20**E. A preferred embodiment of this application is shown in FIG. **73**. An external camera **88**J is deployed so the physical therapist or athletic coach **20**E can observe the patient or potential patient **12**A lifting weights. By turning on the speaker phone **36** the physical therapist or athletic coach **20**E can correct the patient's or potential patient's **12**A body position by speaking to him or her. The image from the external camera **88**J can be transmitted to the cellular or PCS wireless phone **16**B via Bluetooth **90**A, WiFi **90**B or UWB **90**C. Similarly, the cellular or PCS wireless phone **16**B may communicate with the network **32** using cellular or PCS frequencies **32**A or WiFi **90**B, if enabled. Although FIG. **73** shows the coaching in a fixed setting, there is no reason why the coaching cannot take place while moving, for example, on bicycle. In this embodiment, shown in FIG. **74**, the patient or potential patient **12**A wears a heart rate monitor **88**K that communicates with to the cellular or PCS wireless phone **16**B via Bluetooth **90**A, WiFi **90**B or UWB **90**C as shown in FIG. **75**. Heart rate monitors are commercially available from Acumen®, Cardiosport®, Mio®, Polar®, Reebok® and others, and often include watches **140** or stop watches **148**.

[**0392**] An additional embodiment of the Remote Diagnostic & Treatment System **10**D is shown in FIG. **76**. In this embodiment a patient or potential patient **12**A in a remote location, in this embodiment aboard a ship **150**, uses a satellite phone **16**E as a diagnostic means **16**A. The satellite phone **16**E connects **32**C to a satellite **152** and then to an earth station **154** connected **32**B to the PSTN **30**B. Satellite network **30**C capacity is available from Iridium®, Globalstar®, Inmarsat®, New Skies®, Intelsat® and others.

[**0393**] An additional embodiment of the Remote Diagnostic & Treatment System **10**D is shown in FIG. **77**. In this embodiment a patient or potential patient **12**A aboard an airplane **156**, uses an aircraft satellite phone **16**F to connect **32**C to a satellite **152** and then to an earth station **154** connected **20**B to the PSTN **30**B. Aircraft satellite phone services are available from Inmarsat®, New Skies®, Intelsat® and Connection®.

[**0394**] Although described thus far in human terms, the Remote Diagnostic & Treatment System **10** may also be used to treat animals. In the embodiment shown in FIG. **78** the "patient" is an animal **12**B, here a horse, and the health service practitioner is a veterinarian **20**E.

[**0395**] Although described thus far in health care terms, embodiments of the Remote Diagnostic & Treatment System **10** may be used for consultations between field personnel and others. For example, in the embodiment shown in FIG. **79** a fire investigator **12**C is using a chemical sniffer **88**L attached to a cellular or PCS wireless phone **16**B to get data about the potential causes of a fire. The data is transmitted to a laboratory technician **20**F for assessment.

[**0396**] A further embodiment of the Remote Diagnostic & Treatment System **10** is shown in FIG. **80** in which a policeman **12**D uses a remote fingerprint device **88**M attached to a cellular or PCS wireless phone **16**B to fingerprint a suspect **158**. The fingerprint is transmitted to an analyst **20**G for review and matching to fingerprint databases.

[**0397**] A further embodiment of the Remote Diagnostic & Treatment System **10** is shown in FIG. **81** in which an engineer **12**E uses a soil sampling device **88**N attached to a cellular or PCS wireless phone **16**B. Characteristics of soil sample are transmitted to an laboratory technician **20**F for assessment.

[**0398**] It is highly desirable in certain situations for remotely deployed personnel to share data in real time. FIG. **82** shows an embodiment of the Remote Diagnostic & Treatment System **10** in which a fire investigator **12**C is using a chemical sniffer **88**L attached to a walkie-talkie phone **16**F and directly transmits **32**D that data in real time to a fire fighter **20**H actively fighting the fire nearby.

[**0399**] Many automobiles today include remote diagnostic and monitoring systems predominantly based upon cellular and PCS systems. Perhaps the best known such system is OnStar®, which is available in vehicles from General Motors Corporation (GM). An alternative embodiment of the Remote Diagnostic & Treatment System **10**E utilizes OnStar® or similar systems **16**G as a remote diagnostic means as shown in FIG. **83**.

[**0400**] A further embodiment of the Remote Diagnostic & Treatment System **10**E utilizing OnStar® or similar systems **16**G is shown in FIG. **84**. In this embodiment a camera **88**J outside the car or mounted in the car is used to observe persons **12** outside the car. In the case of potential theft or an accident, images **42** and data may be transmitted to police **12**D.

[**0401**] The Remote Diagnostic & Treatment System **10** may allow Grandpa **160** to watch the grandchildren playing soccer through Mom's **162** cellular or PCS wireless phone **16**B camera **34**A. While Mom **162** may hold the camera **34**A, Grandpa **160** can control the view of the camera **34**A to see what he wants to see, as shown in FIG. **85**.

[**0402**] An alternative embodiment of the Remote Diagnostic & Treatment System **10** is shown in FIG. **86**. In this embodiment data devices **88** are connected to a home diagnostic device **164** that is connected to a standard telephone **166** that is connected **32**B to the PSTN **30**B.

[**0403**] FIG. **87** shows a functional schematic of the home diagnostic device **164**. The home diagnostic device **164** includes an "on" and "off" switch **168** and a Light Emitting Diode (LED) **170** that illuminates if the home diagnostic device **164** is receiving power from being plugged **172** into a household plug. Data devices **88** connect to the home

diagnostic device **164** via USB **90**D or FireWire **90**E connections. Data from the connections are mixed in a data mixer **174**, amplified by an amplifier **176** and fed to a modem **178**. The modem **178** connects to the telephone **164** via an RJ11 connector **180**. The home diagnostic device **164** includes battery backup **182** in case of power interruptions.

V. Purpose-Built Alternative Embodiment of a Diagnostic Means

[**0404**] The embodiments described thus far have been based upon modification and integration of predominantly existing technologies, products and devices. There are additional capabilities to those described above to be considered if starting with a blank sheet of paper to design a diagnostic means **16**H.

[**0405**] In addition to a visible light camera **34**A it may be desirable to have an infrared camera **34**E that images the same injury or health condition; the infrared camera **34**E basically "sees" heat that may be indicative of an elevated temperature. It is highly desirable to have a light **184** that can be remotely adjusted **46**BC to provide the best possible illumination.

[**0406**] It is desirable that the designed diagnostic means **16**H be able to communicate with data devices **88** via Bluetooth **90**A, WiFi **90**B, UWB **90**C as well as other waveforms that might appear in the future. The designed diagnostic means **16**H should be able to communicate with networks **30** using cellular or PCS **32**A, WiFi **90**B as well as other waveforms that might appear in the future. The designed diagnostic means **16**H should have one or more USB **90**D and one or more FireWire **90**E ports built in as well as a speaker phone **36**. An embodiment of a designed diagnostic means **16**H is shown in FIG. **88**.

[**0407**] Today's cellular and PCS wireless **16**B or WiFi **90**B wireless phones have no or limited data storage capability for inputs from data devices **96**. It is desirable to include data storage **186** in a designed diagnostic means **16**H as shown in FIG. **89**.

[**0408**] FIG. **90** shows an alternative embodiment of a designed diagnostic means **16**I. In this embodiment the designed diagnostic means **16**I sits in and is recharged by an embodiment of a home diagnostic device **164**A. The designed diagnostic means **16**I communicates with the home diagnostic device **164**A via Bluetooth **90**A, WiFi **90**B, UWB **90**C or other waveforms.

[**0409**] FIG. **91** shows an alternative embodiment of a designed diagnostic means **16**H with a accessory macro lens **188** enabling a health service practitioner **20**C to see or examine more detail of an injury or health condition.

VI. Remote Diagnostic and Health Status Monitoring Service

[**0410**] FIGS. **1** through **5**, **57** through **68**, **70** through **72**, and **75** through **77** show embodiments of remote diagnostic means. FIGS. **67**, **68** and **75** show embodiments of devices **138** that may be deployed on people in fixed locations or in a mobile environment. To provide remote diagnostic and health status monitoring services the remote diagnostic means **16**A and the devices **138** need to connect to a health service practitioner **20**C as shown in FIGS. **4** and **5**, **12** through **14**, **70** through **74**, **76** and **77**. The health service practitioner **20**C must have a diagnostic display and control means **24**A which runs one or more software application(s) **26**A. There are a variety of institutional structures and business models under which such services may be provided.

[**0411**] A patient or potential patient **12**A must take certain steps **190** to receive remote diagnostic and health status monitoring services as shown in FIG. **92**:

[**0412**] Acquire **190**A remote diagnostic means **16**A;

[**0413**] Acquire **190**B embedded control software **18**;

[**0414**] Establish **190**C remote diagnostic means connectivity **30**;

[**0415**] Pay charges for **190**D for remote diagnostic means connectivity;

[**0416**] Have remote diagnostic means **16**A available **190**E.

The patient or potential patient **12**A may also elect to acquire **190**F one or more data devices **88**.

[**0417**] As shown in FIG. **93**, if the patient or potential patient **12**A plans to use a cellular or PCS wireless phone **16**B as the remote diagnostic means **16**A, he or she must:

[**0418**] Purchase a cellular or PCS wireless phone **16**B that has a camera **34**A in it **190**G;

[**0419**] Download and install **190**H diagnostic means software **18**A to the cellular or PCS wireless phone **16**B;

[**0420**] Sign up for cellular or PCS wireless service **190**I;

[**0421**] Pay the monthly charges for the cellular or PCS wireless service **190**J; and

[**0422**] Have the camera **34**A equipped cellular or PCS wireless phone **16**B available **190**K in case of an emergency or for routine health status monitoring.

If the patient or potential patient **12**A plans to use a WiFi wireless phone **16**J as the remote diagnostic means **16**A, he or she must:

[**0423**] Purchase a WiFi wireless phone **16**J that has a camera **34**F in it and a WiFi router **190**L;

[**0424**] Download and install **190**M diagnostic means software **18**D to the WiFi wireless phone **16**J;

[**0425**] Install **190**N the WiFi router **192**;

[**0426**] Sign up for Internet access **190**O;

[**0427**] Pay the monthly charges for Internet access **190**P; and

[**0428**] Have the camera **34**F equipped WiFi wireless phone **16**J available **190**Q in case of an emergency or for routine health status monitoring.

If the patient or potential patient **12**A plans to use the device **138** shown in FIGS. **67** and **68** as the remote diagnostic means **16**A, he or she must follow the steps **188** described above depending upon whether the device **138** includes a cellular or PCS wireless phone **16**B or a WiFi phone **16**J.

[0429] A functional block diagram **194**A of a first embodiment of an institutional structure or business model under which remote diagnostic and health status monitoring services may be provided is shown in FIG. **92**. In this embodiment the patient or potential patient **12**A takes the steps **196** of:

[0430] Signing up **196**A for health plan coverage;

[0431] Paying the fees **196**B for health plan coverage;

[0432] Utilizing remote diagnostic and health status monitoring services **196**C.

In the embodiment shown in FIG. **94** the health plan makes remote diagnostics and health status monitoring available as part of its health plan. In the embodiment shown in FIG. **94** remote diagnostics and health status monitoring are provided as part of the health plan fee.

[0433] In a second embodiment of a functional block diagram of an institutional structure or business model under which remote diagnostic and health status monitoring services may be provided **192**B, as shown in FIG. **95**, there is a charge for using remote diagnostics and health status monitoring services **194**D even though the patient or potential patient **12**A is covered by a health plan.

[0434] A large number of people do not have any health insurance, are under insured meaning they do not have enough medical insurance for their situation, or are self insured meaning they pay out of their pocket for health or medical services. These people, and others, may utilize a remote diagnostic and health status monitoring service if the charges are appropriate. A third embodiment of a functional block diagram of an institutional structure or business model under which remote diagnostic and health status monitoring services may be provided **192**C is shown in FIG. **96**. In this embodiment the patient or potential patient **12**A signs up for a remote diagnostic and health status monitoring only health plan **194**E; pays a nominal regular fee **194**F, for example, Ten Dollars ($10.00) per month; and pays a time-based fee **194**G for using such remote diagnostic and health status monitoring service, for example, Two Dollars ($2.00) per minute, which fees may be paid using a credit card **194**H.

VII. Internet Doctor

[0435] In another embodiment, the invention is employed to provide medical information and advice using a website, such as www.InternetDoctor.com. FIG. **97** shows a patient or potential patient **12**A who utilizes a personal computer **16**C to visit a website **198** to obtain medical information and/or advice. In FIG. **98**, the patient or potential patient **12**A requests information about a rash on her hand.

[0436] FIG. **99** illustrates the patient or potential patient **12**A placing her hand near the camera **34**C of the personal computer **16**C, which allows the health service practitioner **20**C to see the rash on a remote display.

[0437] FIGS. **100** and **101** reveal additional dialog between the patient or potential patient **12**A and the health service practitioner **20**C, which enables the health service practitioner **20**C to provide a remote diagnosis. FIGS. **102** through **104** portray the use of a data devices **88**, which are connected to the personal computer to enable the patient or potential patient **12**A to send medical data to the advisor through the personal computer **16**C and then over the Internet **30**I. FIGS. **105** and **106** provide views of the health service practitioner **20**C offering a preliminary diagnosis.

[0438] FIG. **107** is a flow chart which exhibits one method of the present invention. In the first step, a website is created **198**A and is made available over the Internet. Patients or potential patients **12**A then sign up for the "Internet Doctor"™ Service **198**B. These patients or potential patients **12**A pay a fee **198**C, such as a monthly fee of $9.95. Each patient or potential patient **12**A receives an access code **198**D that enables him or her to use the service.

[0439] When a patient or potential patient **12**A needs information, he or she places a call **198**E to a cell center **28** using a wired or wireless phone. A health service practitioner **20**C at the call center **28** provides information during the call **198**F, and may help to arrange local diagnosis and treatment **198**G for the patient or potential patient **12**A.

Conclusion

[0440] Although the present invention has been described in detail with reference to one or more preferred embodiments, persons possessing ordinary skill in the art to which this invention pertains will appreciate that various modifications and enhancements may be made without departing from the spirit and scope of the Claims that follow. The various alternatives that have been disclosed above are intended to educate the reader about preferred embodiments of the invention, and are not intended to constrain the limits of the invention or the scope of Claims.

List of Reference Characters

[0441] **10** Remote Diagnostic & Treatment System

[0442] **12** First person or user

[0443] **12**A Patient or potential patient

[0444] **12**B Animal

[0445] **12**C Fire investigator

[0446] **12**D Policeman

[0447] **12**E Engineer

[0448] **14** First person location

[0449] **16** First device or terminal

[0450] **16**A Remote diagnostic means

[0451] **16**B Cellular or Personal Communications Service (PCS) wireless phone

[0452] **16**C Laptop personal computer (PC)

[0453] **16**D Desktop personal computer (PC)

[0454] **16**E Satellite phone

[0455] **16**F Walkie-talkie phone

[0456] **16**G OnStar® phone

[0457] **16**H Purpose-built diagnostic means

[0458] **16**I Alternative purpose-built diagnostic means

[0459] **16**J Wireless fidelity (WiFi) wireless phone

[0460] **18** Embedded software that enables remote functional control of the first person device or terminal

[0461] **18**A Embedded software that enables remote functional control of a cellular or Personal Communications Service (PCS) wireless phone

[0462] **18**B Embedded software that enables remote functional control of a laptop personal computer used as a diagnostic means

[0463] **18**C Embedded software that enables remote functional control of a desktop personal computer used as a diagnostic means

[0464] **18**D Embedded software that enables remote functional control of a Wireless Fidelity (WiFi) phone used as a diagnostic means

[0465] **20** Second person or user

[0466] **20**A Call center live operator

[0467] **20**B Single person offering assistance

[0468] **20**C Health service practitioner

[0469] **20**D Physical therapist or athletic coach

[0470] **20**E Veterinarian

[0471] **20**F Laboratory technician

[0472] **20**G Fingerprint analyst

[0473] **20**H Firefighter

[0474] **22** Second person location

[0475] **24** Second device or terminal

[0476] **24**A Diagnostic, display and control means

[0477] **26** Embedded software that enables assistance to a first person and enables remote functional control of the first person device or terminal

[0478] **26**A Diagnostic, display and control software application for remotely controlling a cellular or Personal Communications Service (PCS) wireless phone

[0479] **26**B Diagnostic, display and control software application for remotely controlling a laptop or desktop personal computer

[0480] **28** Call center

[0481] **30** Network

[0482] **30**A Cellular or Personal Communications Service (PCS) network

[0483] **30**B Public Switched Telephone Network (PSTN)

[0484] **30**C Satellite network

[0485] **30**I Internet

[0486] **32** Connection to a network

[0487] **32**A Connection to a cellular or Personal Communications Service (PCS) network

[0488] **32**B Connection to a Public Switched Telephone Network (PSTN)

[0489] **32**C Connection to a satellite network

[0490] **32**D Walkie-talkie connection

[0491] **32**I Connection to the Internet

[0492] **34** Camera

[0493] **34**A Camera in a cellular or Personal Communications Service (PCS) wireless phone

[0494] **34**B Camera in an otoscope

[0495] **34**C Camera in a laptop personal computer

[0496] **34**D Camera attached to a desktop personal computer

[0497] **34**E Infrared camera

[0498] **34**F Camera in a Wireless Fidelity (WiFi) wireless phone

[0499] **36** Speaker phone

[0500] **36**A Speaker

[0501] **36**B Microphone

[0502] **36**C Speaker phone in a cellular or Personal Communications Service (PCS) wireless phone

[0503] **38** Camera image

[0504] **40** Device or terminal display screen

[0505] **44**A Display screen in a cellular or Personal Communications Service (PCS) wireless phone

[0506] **42** Picture

[0507] **44** Functional block diagram of embedded software that enables remote functional control of the diagnostic means

[0508] **44**A Functional block diagram of embedded software that enables remote functional control of a cellular or Personal Communications Service (PCS) wireless phone

[0509] **46** Diagnostic means functions to be controlled remotely

[0510] **46**A Turn a camera on or off

[0511] **46**B Change a camera image size

[0512] **46**C Adjust a camera focus

[0513] **46**D Adjust a camera color

[0514] **46**E Adjust a camera hue

[0515] **46**F Adjust a camera contrast

[0516] **46**G Take a picture

[0517] **46**H Turn a speaker phone on or off

[0518] **46**I Enter a phone number to which to send a picture

[0519] **46**J Enter an electronic mail address to which to send a picture

[0520] **46**K Turn a thermometer on or off

[0521] **46**L Capture and send a temperature reading

[0522] **46**M Turn the temperature reading display of the cellular and PCS wireless phone on or off

[0523] **46**N Turn a stethoscope or high fidelity microphone on or off

[0524] **46**O Adjust the volume of a stethoscope or high fidelity microphone

[0525] **46**P Adjust the tone of a stethoscope or high fidelity microphone using an equalizer

[0526] **46**Q Capture and send a pulse reading

[0527] **46**R Turn a scale on or off

[0528] **46**S Capture and send a weight reading

[0529] **46**T Turn a weight reading display on or off

[0530] **46**U Inflate or deflate a blood pressure cuff

[0531] **46**V Capture and send a blood pressure reading

[0532] **46**W Turn the blood pressure and pulse readings display on or off

[0533] **46**X Turn an oximeter on or off;

[0534] **46**Y Capture and send a reading of the percent of hemoglobin that is saturated with oxygen

[0535] **46**Z Turn a reading of the percent of hemoglobin that is saturated with oxygen and pulse reading display on or off

[0536] **46**AA Turn an electrocardiogram unit on or off

[0537] **46**AB Capture and send an electrocardiogram reading

[0538] **46**AC Turn the electrocardiogram reading display on or off.

[0539] **46**AD Turn a glucose meter on or off

[0540] **46**AE Capture and send a glucose reading

[0541] **46**AF Turn a glucose reading display on or off

[0542] **46**AG Turn a camera in an otoscope on or off

[0543] **46**AH Zoom a camera in an otoscope

[0544] **46**AI Focus the camera in an otoscope

[0545] **46**AJ Adjust the camera color in an otoscope

[0546] **46**AK Adjust the camera hue in an otoscope

[0547] **46**AL Adjust the camera contrast in an otoscope

[0548] **46**AM Take a picture with the camera in an otoscope

[0549] **46**AN Turn the otoscope camera display on or off

[0550] **46**AO Turn an ultrasound unit on or off

[0551] **46**AP Capture and send an ultrasound reading

[0552] **46**AQ Turn the ultrasound display on or off

[0553] **46**AR Turn an external camera on or off

[0554] **46**AS Zoom an external camera

[0555] **46**AT Focus an external camera

[0556] **46**AU Pan an external camera

[0557] **46**AV Tilt an external camera

[0558] **46**AW Adjust the color of an external camera

[0559] **46**AX Adjust the hue of an external camera

[0560] **46**AY Adjust the contrast of an external camera

[0561] **46**AZ Take a picture with an external camera

[0562] **46**BA Take a video with an external camera

[0563] **46**BB Turn an external camera display on or off

[0564] **46**BC Control a light

[0565] **48** Telephone number

[0566] **50** Electronic mail address

[0567] **52** First screen of a software application that enables remote functional control of the diagnostic means

[0568] **54** Incoming phone number

[0569] **56** Alternate phone number

[0570] **58** Patient or potential patient name

[0571] **60** Patient or potential patient date of birth

[0572] **62** Patient or potential patient Social Security Number (SSN)

[0573] **64** Health insurance carrier

[0574] **66** Pull-down menu

[0575] **68** Other patient information

[0576] **70** Note area

[0577] **72** Date of phone call

[0578] **74** Current time

[0579] **76** Start time and stop time of phone call

[0580] **78** Phone call duration

[0581] **80** Functional block diagram of a software application that enables remote functional control of the diagnostic means

[0582] **80**A Functional block diagram of a software application that enables remote functional control of a cellular or Personal Communications Service (PCS) wireless phone

[0583] **82** Functional control means

[0584] **82**A "Off" button and an "on" button for controlling a camera

[0585] **82**B Slider that "zooms" a camera image size from zero percent (0%) to one hundred percent (100%)

[0586] **82**C Slider that adjusts a camera focus from minus (−) to plus (+)

[0587] **82**D Slider that adjusts the color from zero percent (0%) to one hundred percent (100%)

[0588] **82**E Slider that adjusts the hue from zero percent (0%) to one hundred percent (100%)

[0589] **82**F Slider that adjusts the contrast from minus (−) to plus (+)

[0590] **82**G Button for taking a picture

[0591] **82**H "Off" button and an "on" button for controlling a speaker phone

[0592] **82**I Button for dialing a phone number to which the picture is to be sent

[0593] **82**J Button for sending a picture to an electronic mail address

[0594] **82**K "Off" button and an "on" button for controlling a thermometer

[0595] 82L Button for capturing or recapturing a temperature reading

[0596] 82M Button for sending a temperature reading to a health service practitioner

[0597] 82N "Off" button and an "on" button for controlling the display of a temperature reading on a cellular and PCS wireless phone

[0598] 82O Save a temperature reading to a patient's or potential patient's electronic medical file.

[0599] 82P "Off" button and an "on" button for controlling a stethoscope or high fidelity microphone

[0600] 82Q Slider that adjusts the volume of a stethoscope or high fidelity microphone from minus (−) to plus (+)

[0601] 82R Multiple sliders that adjust the tone of a stethoscope or high fidelity microphone from minus (−) to plus (+)

[0602] 82S Button for capturing or recapturing the pulse reading

[0603] 82T Button for sending the pulse reading from a stethoscope or high fidelity microphone to a health service practitioner

[0604] 82U Save the pulse reading from a stethoscope or high fidelity microphone to the patient's or potential patient's electronic medical file

[0605] 82V "Off" button and an "on" button for controlling a scale

[0606] 82W Button for capturing or recapturing a weight reading

[0607] 82X Button for sending a weight reading to a health service practitioner

[0608] 82Y "Off" button and an "on" button for controlling the display of a weight reading

[0609] 82Z Save a weight reading to a patient's or potential patient's electronic medical file

[0610] 82AA Button for inflating and deflating a blood pressure cuff

[0611] 82AB Button for capturing or recapturing a blood pressure reading

[0612] 82AC Button for sending the blood pressure reading to a health service practitioner

[0613] 82AD "Off" button and an "on" button for controlling the display of blood pressure and pulse readings

[0614] 82AE Save a blood pressure reading to a patient's or potential patient's electronic medical file

[0615] 82AF "off" button and an "on" button for controlling an oximeter

[0616] 82AG Button for capturing or recapturing a reading of the percent of hemoglobin that is saturated with oxygen

[0617] 82AH Button for sending a reading of the percent of hemoglobin that is saturated with oxygen to a health service practitioner

[0618] 82AI "Off" button and an "on" button for controlling a display of the reading of the percent of hemoglobin that is saturated with oxygen and pulse readings

[0619] 82AJ Save a reading of the percent of hemoglobin that is saturated with oxygen to the patient's or potential patient's electronic medical file

[0620] 82AK "Off" button and an "on" button for controlling an electrocardiogram unit

[0621] 82AL Button for capturing or recapturing an electrocardiogram reading

[0622] 82AM Button for sending an electrocardiogram reading to a health service practitioner

[0623] 82AN "Off" button and an "on" button for controlling a display of the electrocardiogram

[0624] 82AO Save an electrocardiogram reading to a patient's or potential patient's electronic medical file

[0625] 82AP "Off" button and an "on" button for controlling a glucose meter

[0626] 82AQ Button for capturing or recapturing a glucose reading

[0627] 82AR Button for sending a glucose reading to a health service practitioner

[0628] 82AS "Off" button and an "on" button for controlling the display of a glucose reading

[0629] 82AT Save a glucose reading to a patient's or potential patient's electronic medical file

[0630] 82AU "Off" button and an "on" button for controlling the camera in an otoscope

[0631] 82AV Slider that adjusts the zoom of a camera in an otoscope from zero percent (0%) to one hundred percent (100%)

[0632] 82AW Slider that adjusts the camera focus in an otoscope from minus (−) to plus (+)

[0633] 82AX Slider that adjusts the color of a camera in an otoscope from zero percent (0%) to one hundred percent (100%)

[0634] 82AY Slider that adjusts the hue of a camera in an otoscope from zero percent (0%) to one hundred percent (100%)

[0635] 82AZ Slider that adjusts the contrast of a camera in an otoscope from minus (−) to plus (+)

[0636] 82BA Button for taking a picture with a camera in an otoscope

[0637] 82BB Button for sending the picture taken with a camera in an otoscope to a health service practitioner

[0638] 82BC "Off" button and an "on" button for controlling the display of a camera in an otoscope

[0639] 82BD Save the picture from a camera in an otoscope to a patient's or potential patient's electronic medical file

[0640] 82BE "Off" button and an "on" button for controlling an ultrasound unit

[0641] **82**BF Button for capturing or recapturing an ultrasound readings

[0642] **82**BG Button for sending ultrasound readings to a health service practitioner

[0643] **82**BH "Off" button and an "on" button for controlling the ultrasound display

[0644] **82**BI Save ultrasound readings to a patient's or potential patient's electronic medical file

[0645] **82**BJ "Off" button and an "on" button for controlling an external camera

[0646] **82**BK Slider that adjusts the zoom of an external camera from zero percent (0%) to one hundred percent (100%)

[0647] **82**BL Slider that adjusts the focus of an external camera from minus (−) to plus (+)

[0648] **82**BM Slider that adjusts the pan of an external camera from minus (−) to plus (+)

[0649] **82**BN Slider that adjusts the tilt of an external camera from minus (−) to plus (+)

[0650] **82**BO Slider that adjusts the color of an external camera from zero percent (0%) to one hundred percent (100%)

[0651] **82**BP Slider that adjusts the hue of an external camera from zero percent (0%) to one hundred percent (100%)

[0652] **82**BQ Slider that adjusts the contrast of an external camera from minus (−) to plus (+)

[0653] **82**BR Button for taking a picture with an external camera

[0654] **82**BS Button for sending a picture taken with an external camera to a health service practitioner

[0655] **82**BT Button for capturing video with an external camera

[0656] **82**BU Button for sending a video taken with an external camera to a health service practitioner

[0657] **82**BV "Off" button and an "on" button for controlling the external camera display

[0658] **82**BW Save a picture taken with an external camera to a patient's or potential patient's electronic medical file

[0659] **82**BX Save video taken with an external camera to a patient's or potential patient's electronic medical file

[0660] **84** Screen displayed on a diagnostic, display and control means

[0661] **86** Picture window on a diagnostic, display and control means

[0662] **88** Data devices

[0663] **88**A Digital thermometer

[0664] **88**B Stethoscope or high fidelity microphone

[0665] **88**C Weight scale

[0666] **88**D Blood pressure cuff

[0667] **88**E Oximeter

[0668] **88**F Electrocardiogram (EKG)

[0669] **88**G Glucose meter

[0670] **88**H Otoscope

[0671] **88**I Ultrasound device

[0672] **88**J External camera

[0673] **88**K Heart rate monitor

[0674] **90** Connection between a data device and a diagnostic means

[0675] **90**A Bluetooth® wireless link

[0676] **90**B Wireless fidelity (WiFi) wireless local area network link, Institute of Electrical and Electronic Engineers (IEEE) 802.11

[0677] **90**C Ultra Wide Band (UWB) connection

[0678] **90**D Universal Serial Bus (USB) connection

[0679] **90**E FireWire connection, Institute of Electrical and Electronic Engineers (IEEE) 1394

[0680] **92** Connection interface device

[0681] **94** Functional block diagram of connection interface device

[0682] **96** Data device input to connection interface device

[0683] **98** Preamplifier in connection interface device

[0684] **100** Amplifier in connection interface device

[0685] **102** Connection interface in connection interface device

[0686] **102**A Bluetooth® interface in connection interface device

[0687] **102**B Wireless fidelity (WiFi) interface in connection interface device

[0688] **102**C Ultra Wide Band (UWB) interface in connection interface device

[0689] **102**D Universal Serial Bus (USB) interface in connection interface device

[0690] **102**E FireWire interface in connection interface device

[0691] **104** Radio system

[0692] **104**A Bluetooth® radio system in connection interface device

[0693] **104**B Wireless fidelity (WiFi) radio system in connection interface device

[0694] **104**C Ultra Wide Band (UWB) radio system in connection interface device

[0695] **104**D Cellular or Personal Communications Service (PCS) radio system in connection interface device

[0696] **106** Antenna systems

[0697] **108** Functional block diagram of embedded software that enables remote functional control of data devices for the diagnostic means as well as the corre-

sponding software application that enables remote functional control of the data devices for the diagnostic means

[0698] **108**A Functional block diagram of software embedded in a diagnostic means that enables remote functional control of data devices via the diagnostic means

[0699] **108**B Software application deploy on the diagnostic, display and control means that enables remote functional control of the data devices via the diagnostic means

[0700] **110** Temperature pop-up window

[0701] **112** Temperature location on body

[0702] **112**A Temperature taken in the ear

[0703] **112**B Temperature taken on the ear lobe

[0704] **112**C Temperature taken rectally

[0705] **112**D Temperature taken in other location

[0706] **114**"Done" button

[0707] **116** Temperature window on screen displayed on a diagnostic, display and control means

[0708] **118** Pulse window on screen displayed on a diagnostic, display and control means

[0709] **120** Transducer for converting stethoscope sounds to electrical signals

[0710] **122** Weight window on screen displayed on a diagnostic, display and control means

[0711] **124** Blood pressure window on screen displayed on a diagnostic, display and control means

[0712] **126** Oximeter window on screen displayed on a diagnostic, display and control means

[0713] **128** Electrocardiogram window on screen displayed on a diagnostic, display and control means

[0714] **130** Glucose window on screen displayed on a diagnostic, display and control means

[0715] **132** Otoscope (picture) window on screen displayed on a diagnostic, display and control means

[0716] **134** Ultrasound (video) window on screen displayed on a diagnostic, display and control means

[0717] **136** Video

[0718] **138** Health status monitoring device

[0719] **140** Watch

[0720] **142** Emergency call button

[0721] **144** Global Positioning System (GPS)

[0722] **146** Global Positioning System (GPS) window on screen displayed on a diagnostic, display and control means

[0723] **148** Stop watch

[0724] **150** Ship

[0725] **152** Satellite

[0726] **154** Earth station

[0727] **156** Airplane

[0728] **158** Police suspect

[0729] **160** Grandparent

[0730] **162** Mother

[0731] **164** Home diagnostic device

[0732] **164**A Alternative home diagnostic device

[0733] **166** Telephone

[0734] **168**"On" and "off" switch for home diagnostic device

[0735] **170** Power "on" Light Emitting Diode (LED)

[0736] **172** Household power plug

[0737] **174** Data mixer

[0738] **176** Amplifier

[0739] **178** Modem

[0740] **180** RJ11 connector

[0741] **182** Battery backup

[0742] **184** Light

[0743] **186** Data storage

[0744] **188** Macro lens

[0745] **190** Steps that must be taken by a patient or potential patient to receive remote diagnostic or health status monitoring services

[0746] **190**A Acquire remote diagnostic means

[0747] **190**B Acquire embedded control software for remote diagnostic means

[0748] **190**C Establish remote diagnostic means connectivity

[0749] **190**D Pay charges for remote diagnostic means connectivity

[0750] **190**E Have remote diagnostic means available

[0751] **190**F Acquire one or more data devices

[0752] **190**G Purchase a cellular or Personal Communications Service (PCS) wireless phone that includes a camera

[0753] **190**H Download and install diagnostic means software to a cellular or Personal Communications Service (PCS) wireless phone

[0754] **190**I Sign up for cellular or Personal Communications Service (PCS) wireless service

[0755] **190**J Pay the monthly charges for the cellular or Personal Communications Service (PCS) wireless service

[0756] **190**K Have the camera-equipped cellular or Personal Communications Service (PCS) wireless phone available in case of an emergency or for routine health status monitoring

[0757] **190**L Purchase a Wireless Fidelity (WiFi) wireless phone that has a camera in it and a WiFi router

[0758] **190**M Download and install diagnostic means software to a Wireless Fidelity (WiFi) wireless phone

[0759] **190**N Install a Wireless Fidelity (WiFi) router

[0760] **190**O Sign up for Internet access

[0761] **190**P Pay the monthly charges for Internet access

[0762] **190**Q Have the camera-equipped Wireless Fidelity (WiFi) wireless phone available in case of an emergency or for routine health status monitoring

[0763] **192** Wireless router

[0764] **194** Functional block diagram of an institutional structure or business model under which remote diagnostic and health status monitoring services may be provided

[0765] **194**A Functional block diagram of an institutional structure or business model under which remote diagnostic and health status monitoring services are provided as part of a health insurance plan

[0766] **194**B Functional block diagram of an institutional structure or business model under which remote diagnostic and health status monitoring services are provided for an additional fee as part of a health insurance plan

[0767] **194**C Functional block diagram of an institutional structure or business model under which remote diagnostic and health status monitoring services are provided for a recurring fee and a time-based utilization fee.

[0768] **196** Steps a patient or potential patient takes to get remote diagnostic and health status monitoring services

[0769] **196**A Sign up for health plan coverage

[0770] **196**B Pay the fees for health plan coverage

[0771] **196**C Utilize remote diagnostic and health status monitoring services

[0772] **196**D Charge for using remote diagnostics and health status monitoring services

[0773] **196**E Sign up for a remote diagnostic and health status monitoring only health plan

[0774] **196**F Pays a recurring fee

[0775] **196**G Pay a time-based fee for using such remote diagnostic and health status monitoring service

[0776] **196**H Credit card payment

[0777] **198** Elements of business model for Internet Doctor

[0778] **198**A Create Web site

[0779] **198**B Customers sign up for Internet Doctor service

[0780] **198**C Customers pay monthly charges for Internet Doctor service

[0781] **198**D Customers receive access code

[0782] **198**E Customer contacts call center

[0783] **198**F Call center provides diagnosis and advice

[0784] **198**G Call center provides local diagnosis and treatment options

What is claimed is:

1. An apparatus comprising:

a cellular telephone (**16**A);

said cellular telephone (**16**A) including a camera (**34**), a display (**40**), a speaker(**36**A), a microphone (**36**B), and a diagnostic software program (**18**);

a call center (**28**) operated by a call center operator (**20**A);

said call center (**28**) for receiving a telephone call from said user (**12**) of said cellular telephone (**16**A);

said call center operator (**20**A) for providing advice concerning said user (**12**) and for partially controlling said cellular telephone (**16**A).

2. An apparatus as recited in claim 1, in which said cellular telephone (**16**A) is used to provide triage for a patient (**12**A).

3. An apparatus as recited in claim 1, in which said cellular telephone (**16**A) is used for health monitoring.

4. An apparatus as recited in claim 1, further comprising a data device (**88**).

5. An apparatus as recited in claim 1, in which said data device (**88**) is connected to said cellular telephone (**16**A) by a wireless connection (**30**A).

6. An apparatus as recited in claim 5, in which said wireless connection (**30**A) is a Bluetooth® connection (**84**A).

7. An apparatus as recited in claim 5, in which said wireless connection (**30**A) is a Wi-Fi connection (**84**B).

8. An apparatus as recited in claim 5, in which said wireless connection (**30**A) is an ultra-wide band connection (**84**C).

9. An apparatus as recited in claim 1, in which said data device (**88**) is connected to said cellular telephone (**16**A) by a wired connection (**30**B).

10. An apparatus as recited in claim 1, in which said wired connection (**30**B) uses a USB connector (**84**D).

11. An apparatus as recited in claim 1, in which said wired connection (**30**B) uses a FireWire connector (**84**E).

12. An apparatus as recited in claim 4, in which said data device (**88**) is controlled remotely by said call center operator (**20**A).

13. An apparatus as recited in claim 4, in which said data device (**88**) is a thermometer (**82**A).

14. An apparatus as recited in claim 4, in which said data device (**88**) is an acoustic sensor (**88**B).

15. An apparatus as recited in claim 4, in which said data device (**88**) is a weight measurement device (**88**C).

16. An apparatus as recited in claim 4, in which said data device (**88**) is a blood pressure measurement device (**88**D).

17. An apparatus as recited in claim 4, in which said data device (**88**) is a device (**88**E) which measures the level of oxygen in the blood.

18. An apparatus as recited in claim 4, in which said data device (**88**) is a device for obtaining an electrocardiograph (**88**F).

19. An apparatus as recited in claim 4, in which said data device (**88**) is a glucose measurement device (**88**G).

20. An apparatus as recited in claim 4, in which said data device (**88**) is an otoscope (**88**H).

21. An apparatus as recited in claim 4, in which said data device (**88**) is an ultrasound imaging device (**88**I).

23. An apparatus as recited in claim 4, in which said data device (**88**) is an external camera (**88**J).

24. An apparatus as recited in claim 1, in which said cellular telephone (**16**A) is used for conveying information in a veterinary practice.

25. A method comprising the steps of:

using a diagnostic means (**16**A) for collecting a set of data;

said diagnostic means (**16**A) for collecting said set of data including an embedded software application (**18**); and

conveying said set of data from said diagnostic means (**16**A) to a diagnostic display and control means (**24**);

said diagnostic display and control means (**24**) including a software application (**26**).

26. A method as recited in claim 25, further comprising the step of:

controlling said diagnostic means (**16**A) using said diagnostic display and control means (**24**).

27. A method comprising the steps of:

providing a website; said website including a database of medical information;

offering a service which furnishes a user (**12**) with an access code; said access code enabling said user to utilize said database of medical information on said website;

calling a call center (**28**); said call center (**28**) being staffed by a health service practitioner (**20**C); and

supplying interactive advice to said user from said call center (**28**).

28. A method as recited in claim 27, further comprising the step of:

using a cellular telephone (**16**A) to provide information to said call center (**28**); said cellular telephone (**16**A) including a microphone (**36**B), a speaker (**36**A) and a camera (**34**).

29. A method as recited in claim 27, further comprising the step of:

providing data to said call center (**28**) using a data device (**88**); said data device (**88**) being connected to said cellular telephone (**16**A).

30. A method as recited in claim 1, in which said data device (**88**) is partially controlled by said call center (**28**).

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专利名称(译)	远程诊断和治疗系统		
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[标]发明人	ANGLIN RICHARD L JR TIPLER BRADLEY T		
发明人	ANGLIN, RICHARD L. JR. TIPLER, BRADLEY T.		
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外部链接	Espacenet USPTO		

摘要(译)

公开了用于提供远程诊断和治疗的方法和装置。本发明的一个实施例包括蜂窝电话（16A），其包括摄像机（34），显示器（40），扬声器（36A），麦克风（36B）和嵌入式诊断和治疗软件（18）。替代实施例还可以包括可以使用无线（30A）或有线（30B）连接连接到蜂窝电话（16A）的一个或多个数据设备（88）。