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(54) BLOOD PRESSURE MEASUREMENT DEVICE

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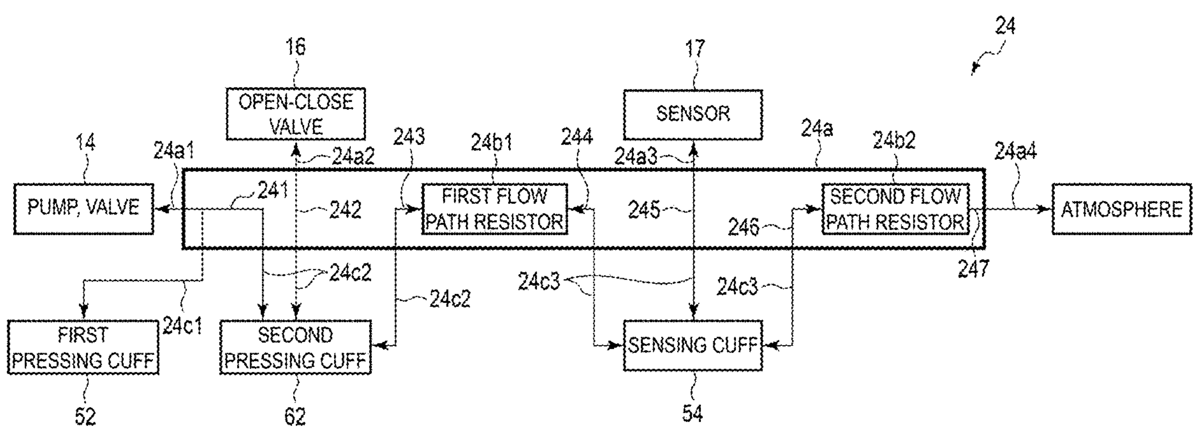
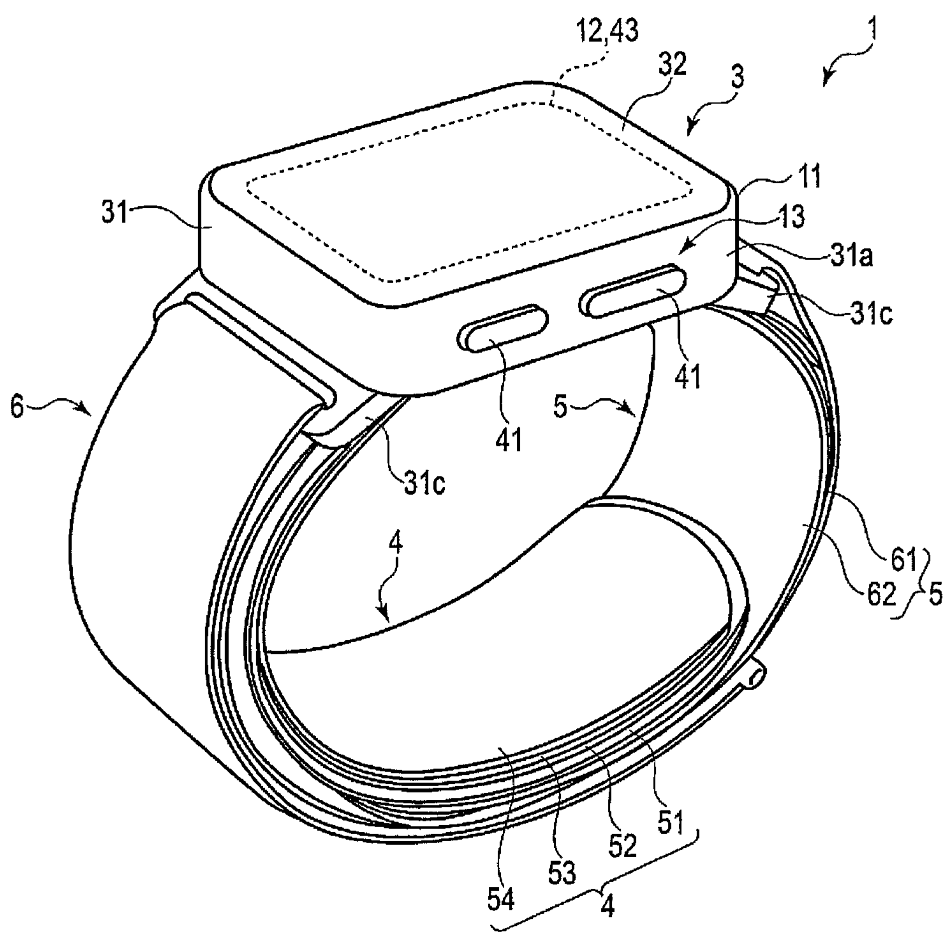
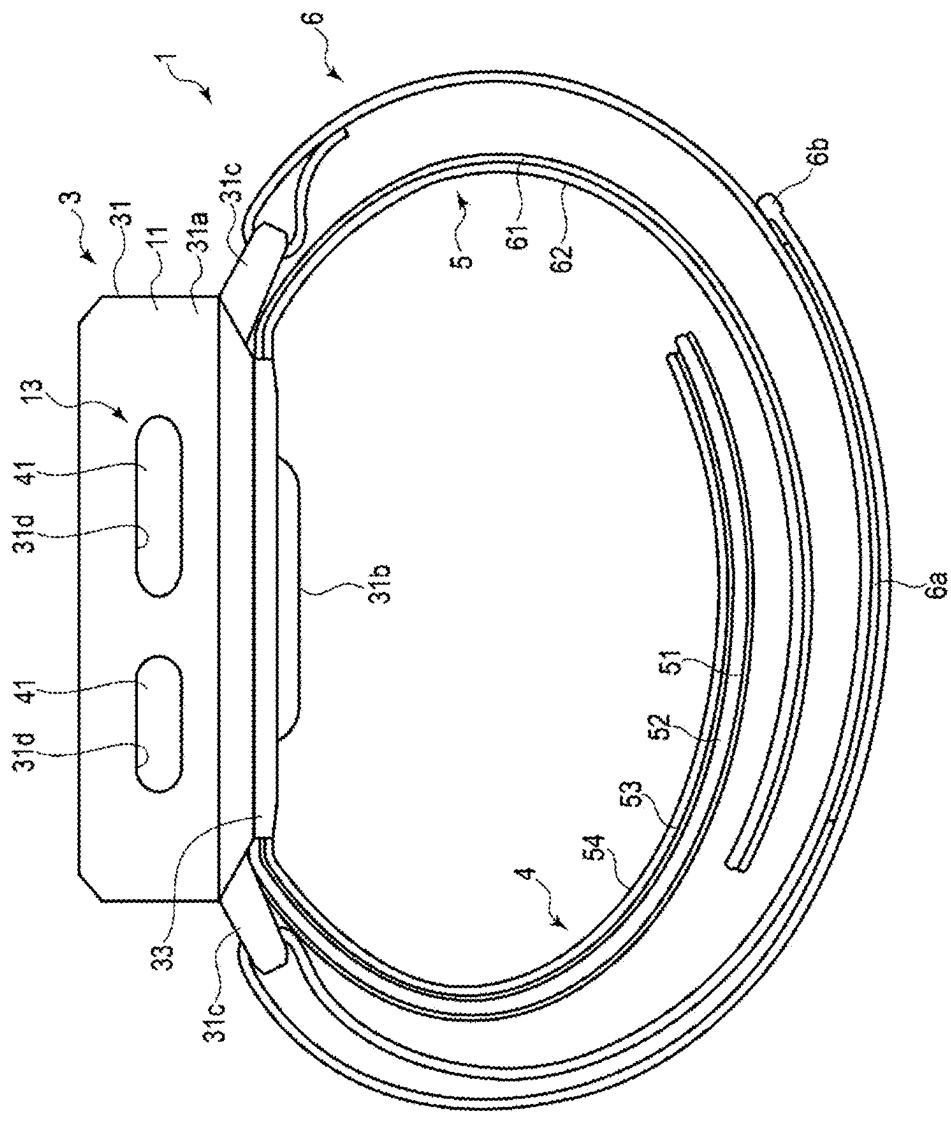
(57) **ABSTRACT**

A blood pressure measurement device includes a case, a plurality of components including a pump provided in the case, a valve provided in the case, and a pressure sensor provided in the case, and a flow path plate unit in which a plurality of internal flow paths are formed, first ends of the plurality of internal flow paths being respectively connected to the plurality of components and second ends of the plurality of the internal flow paths being selectively connected to at least one of a plurality of cuffs and a plurality of testers configured to respectively test the plurality of components.



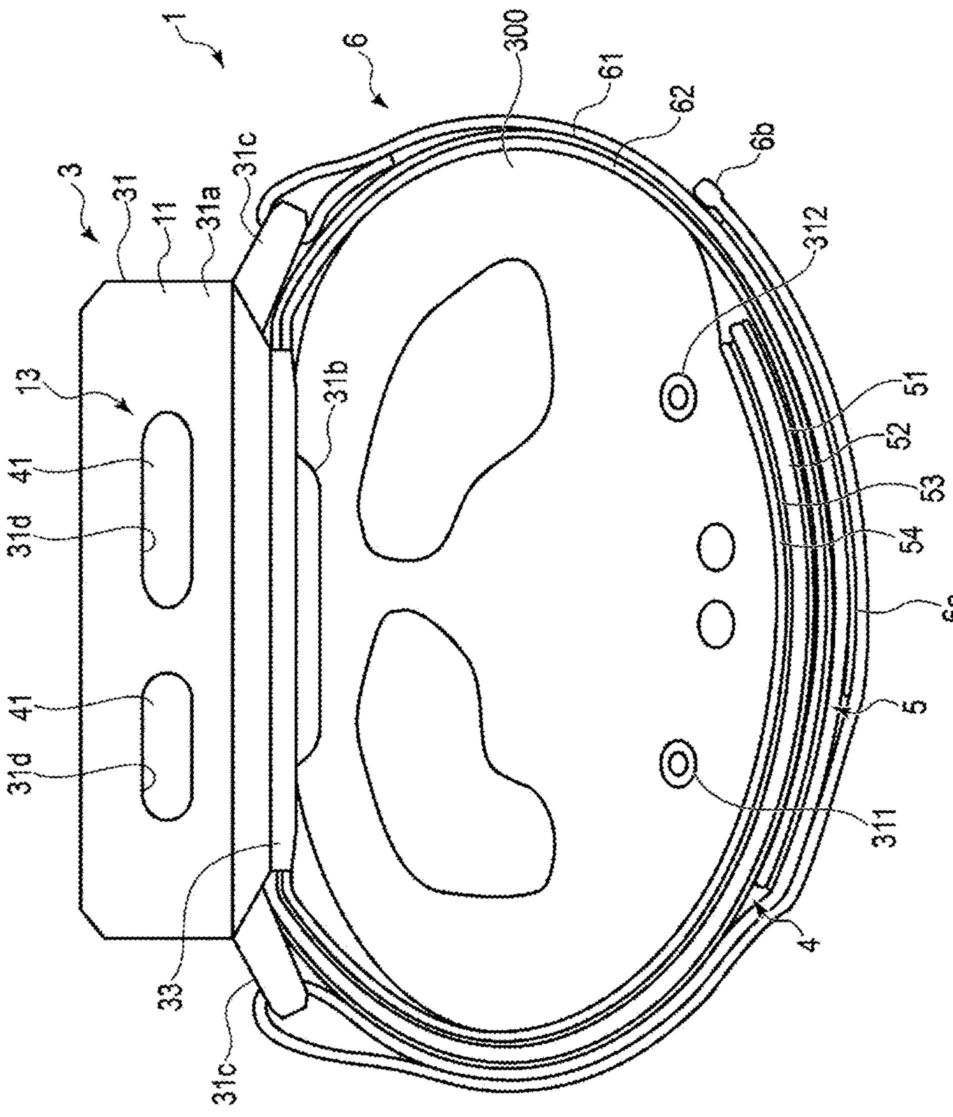
[FIG. 1]



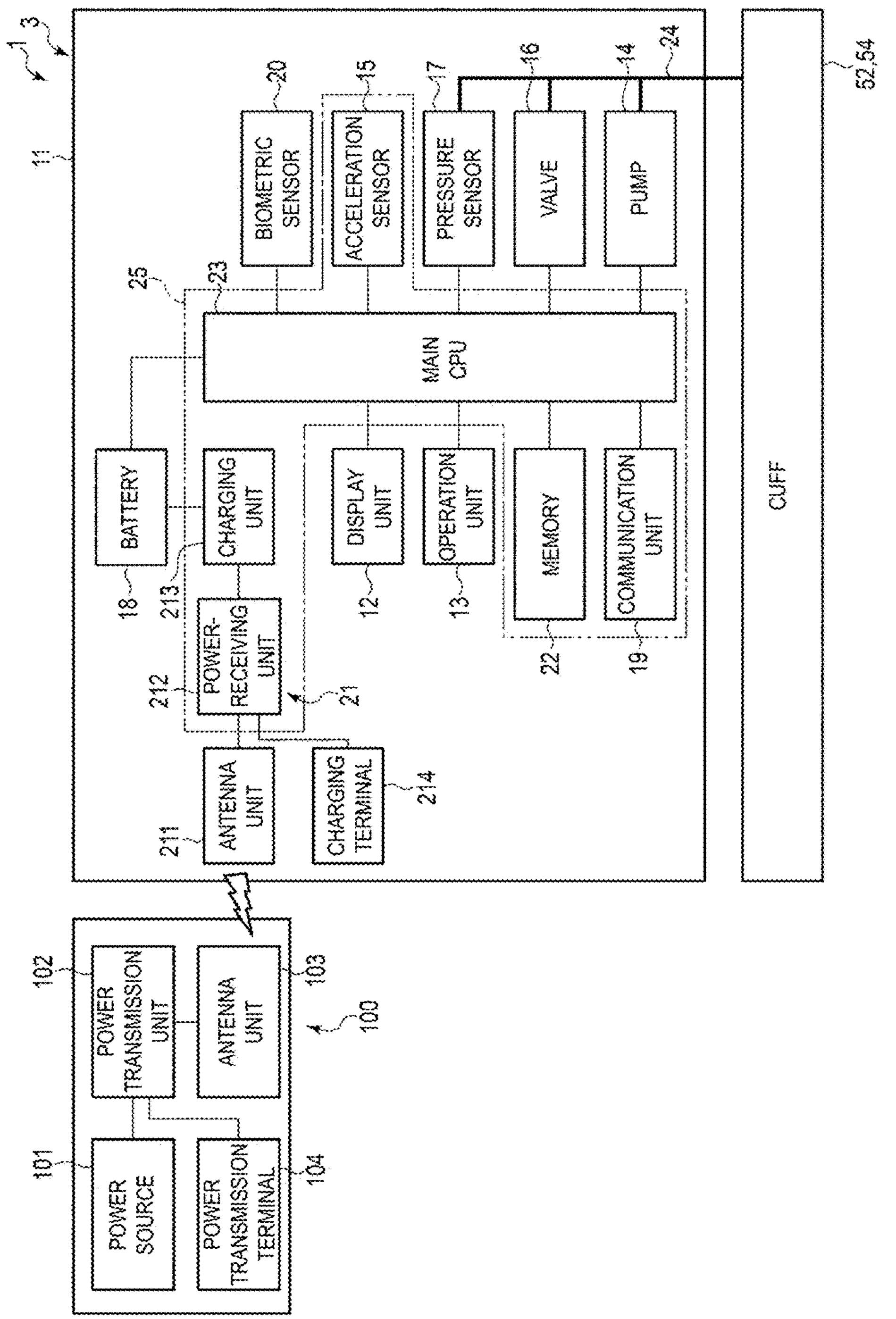

1
3
31
11
31a
31c
13
41
31d
41
31d
31b
33
31c
4
5
6
6a
6b
51
52
53
54
61
62

[FIG. 2]

[FIG. 3]

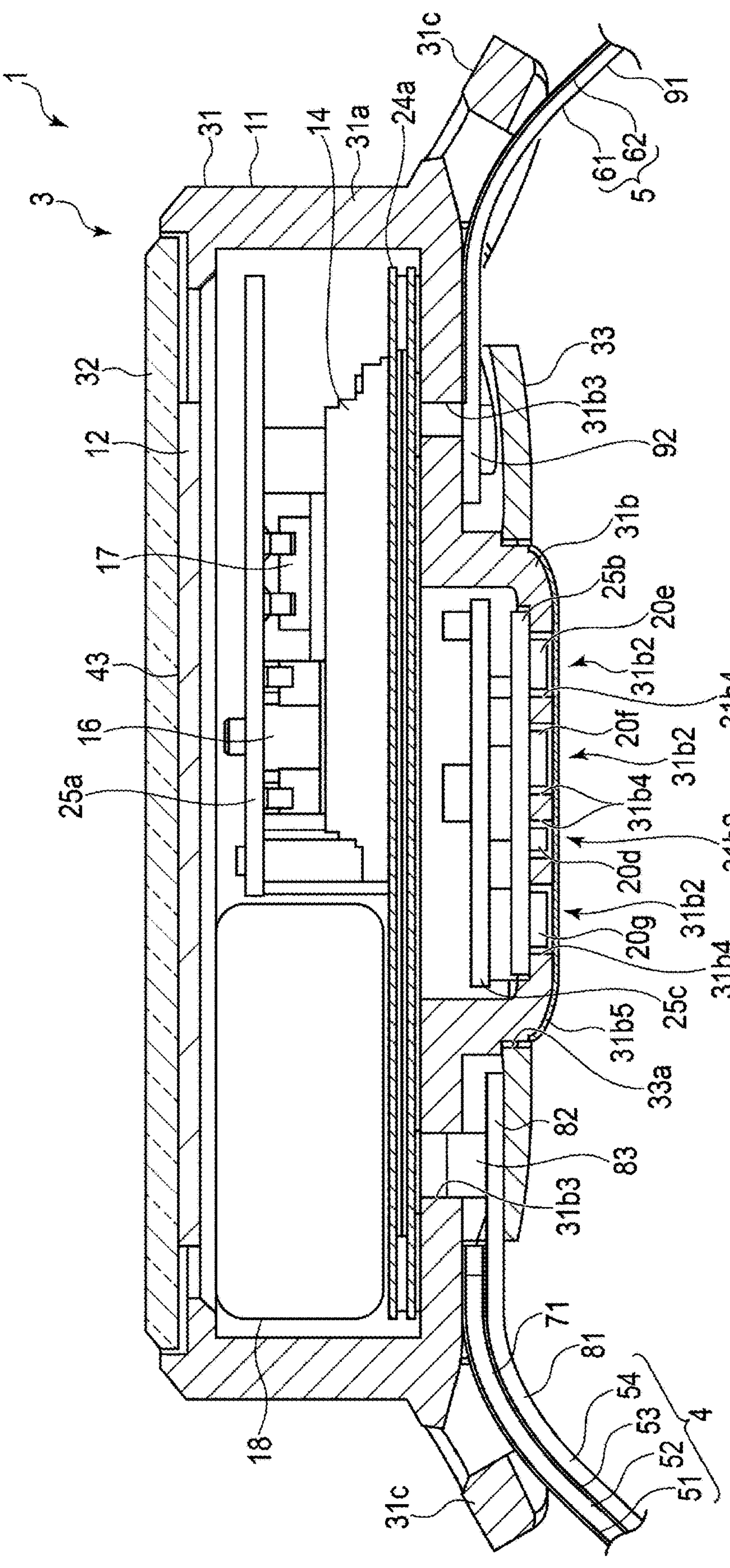

1
6
300
61
62
6b
312
51
52
53
54
6a
5
4
311
3
31
11
31a
31c
13
41
31d
41
31d
31b
33
31c

[FIG. 4]

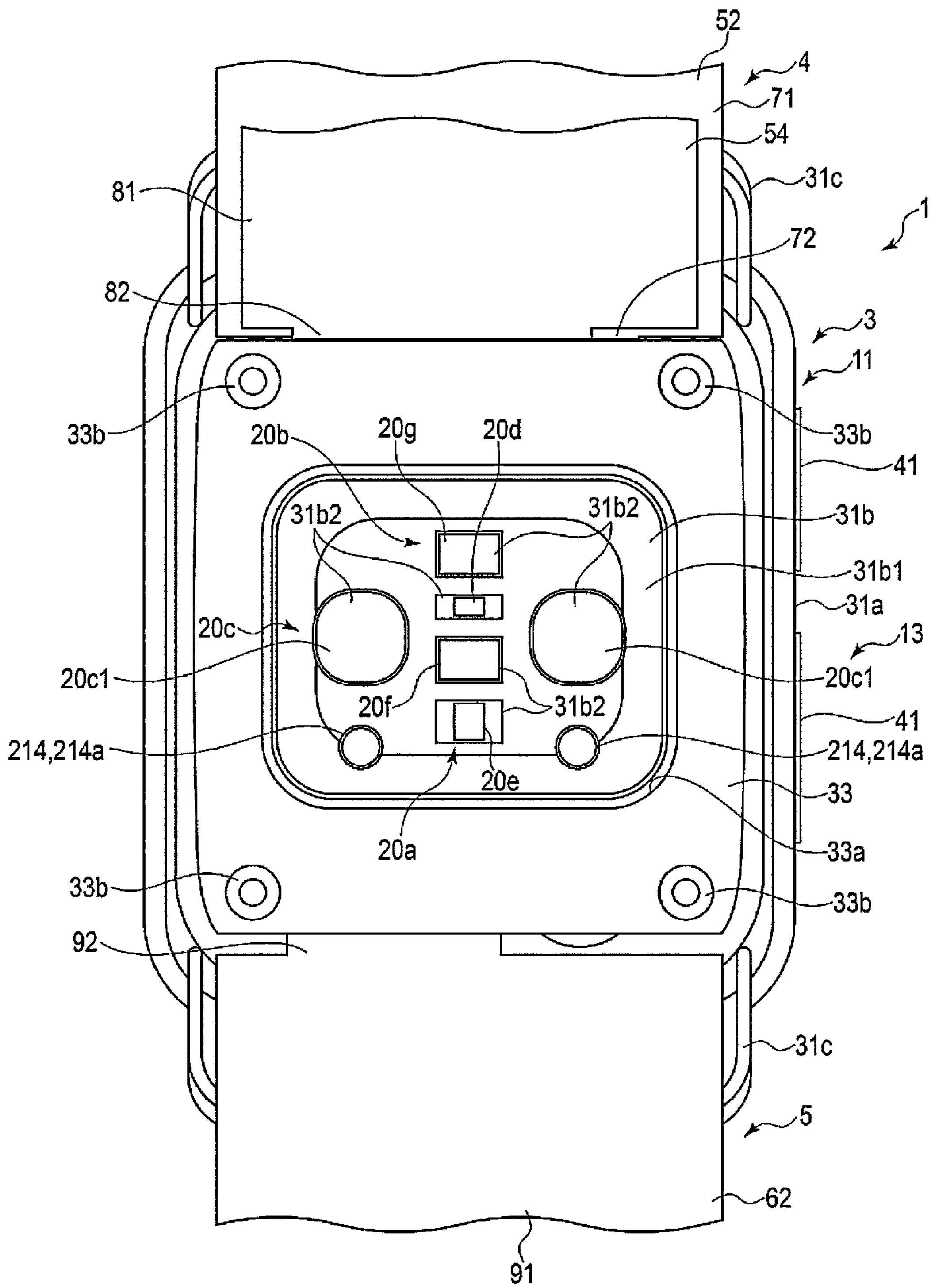


1
3
11
BIOMETRIC SENSOR
20
ACCELERATION SENSOR
15
PRESSURE SENSOR
17
VALVE
16
PUMP
14
24
52,54
25
23
MAIN CPU
BATTERY
18
CHARGING UNIT
213
DISPLAY UNIT
12
OPERATION UNIT
13
MEMORY
22
COMMUNICATION UNIT
19
CUFF
POWER-RECEIVING UNIT
212
21
ANTENNA UNIT
211
CHARGING TERMINAL
214
POWER SOURCE
101
POWER TRANSMISSION UNIT
102
ANTENNA UNIT
103
POWER TRANSMISSION TERMINAL
104
100

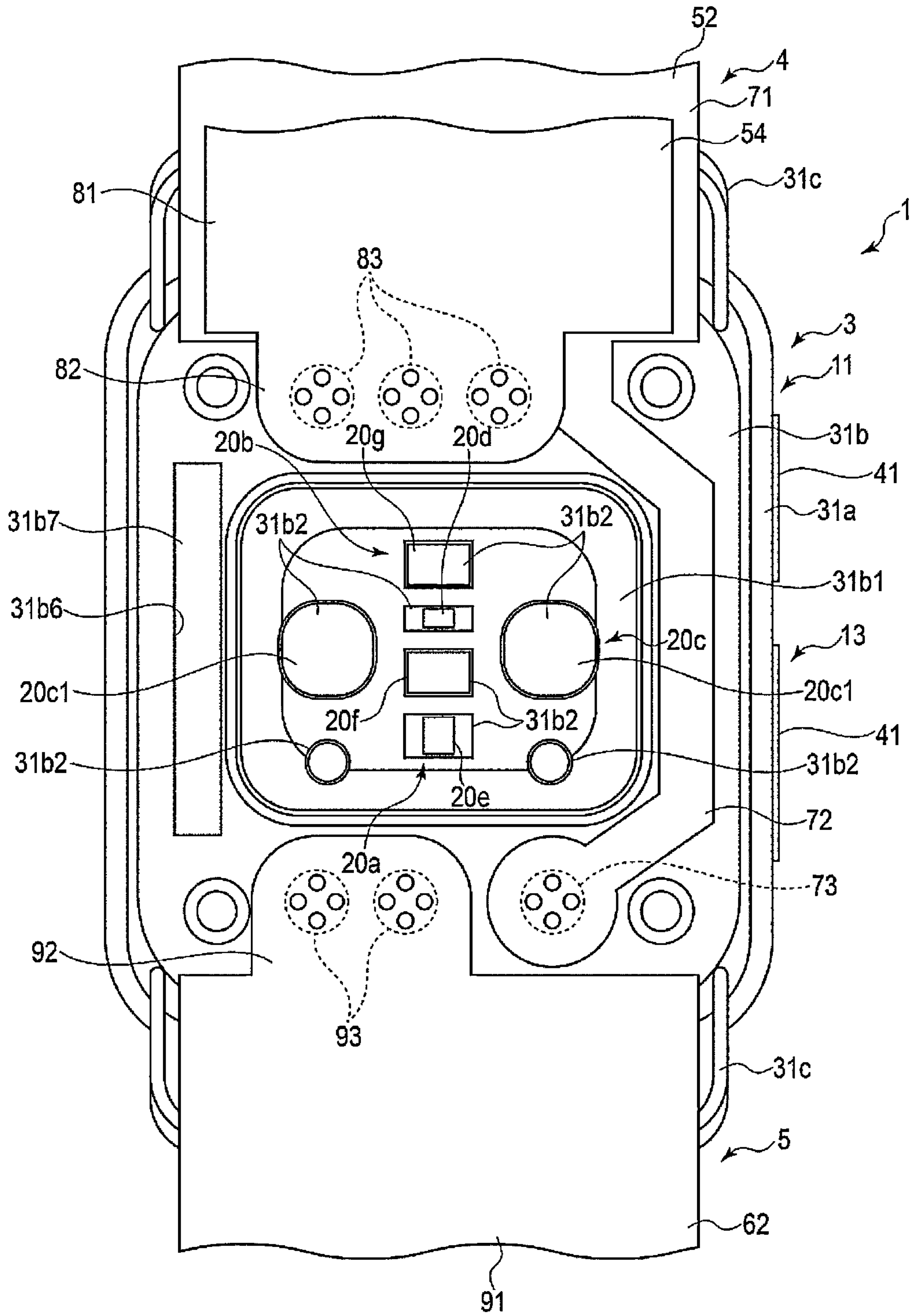
[FIG. 5]


1
3
31
11
14
31a
24a
31c
91
61
62
5
32
12
33
31b3
92
31b
17
25b
20e
31b2
43
31b4
16
20f
25a
20d
20g
25c
31b5
33a
82
83
18
71
81
54
53
52
51
4

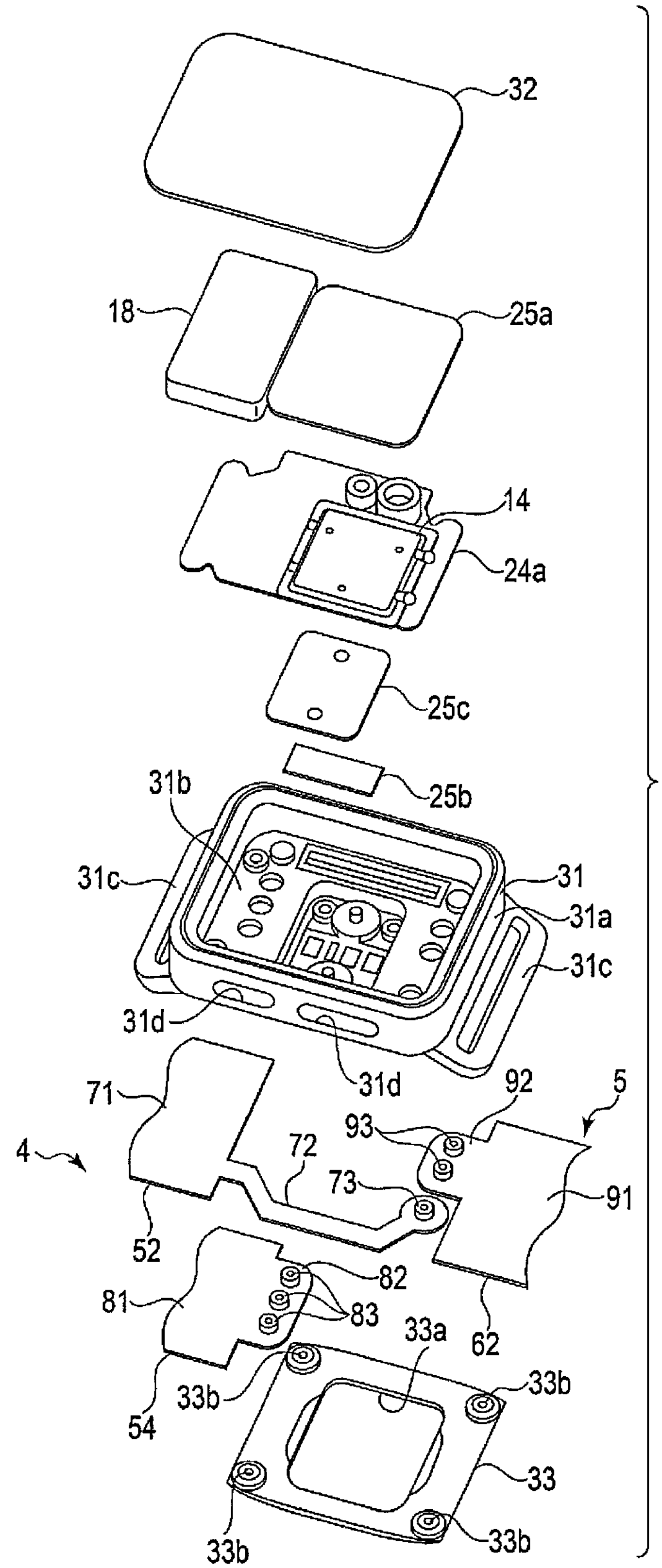
[FIG. 6]


52
4
71
54
31c
81
1
72
82
3
11
33b
33b
20b
20g
20d
41
31b2
31b2
31b
31b1
31a
20c
13
20c1
20c1
20f
31b2
41
214,214a
214,214a
20e
33
33a
20a
33b
33b
92
31c
5
62
91

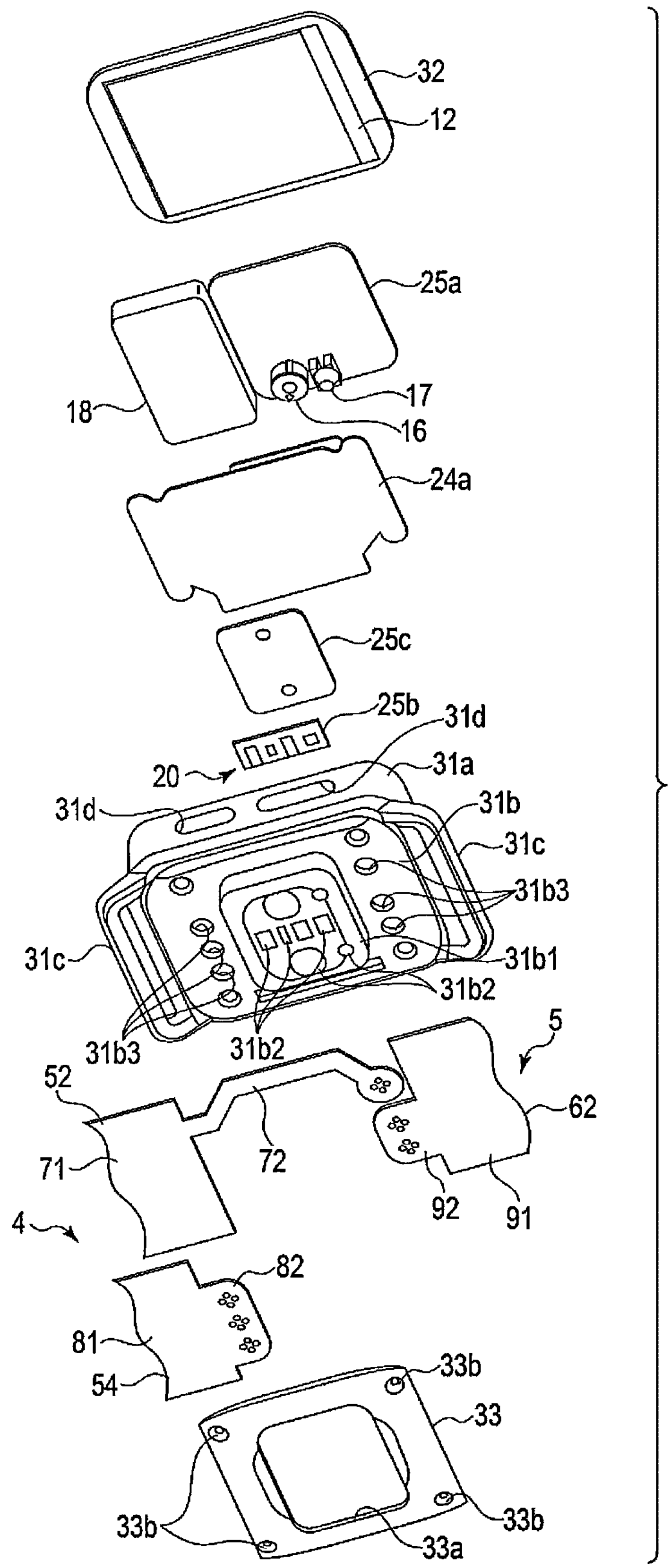
[FIG. 7]


52
4
71
54
31c
81
1
83
3
11
82
31b
20b
20g
20d
41
31b7
31b2
31b2
31a
31b1
31b6
20c
13
20c1
20c1
20f
31b2
41
31b2
31b2
20e
72
20a
73
92
93
31c
5
62
91

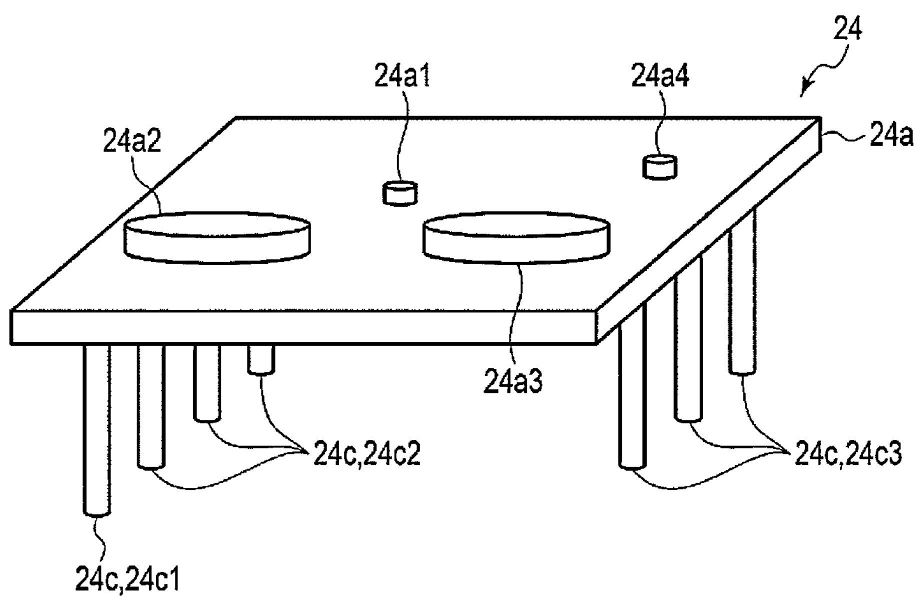
[FIG. 8]


32
18
25a
14
24a
25c
25b
31b
31c
31
31a
31c
31d
31d
71
92
5
93
4
72
73
91
52
82
81
83
33a
62
33b
33b
54
33
33b
33b

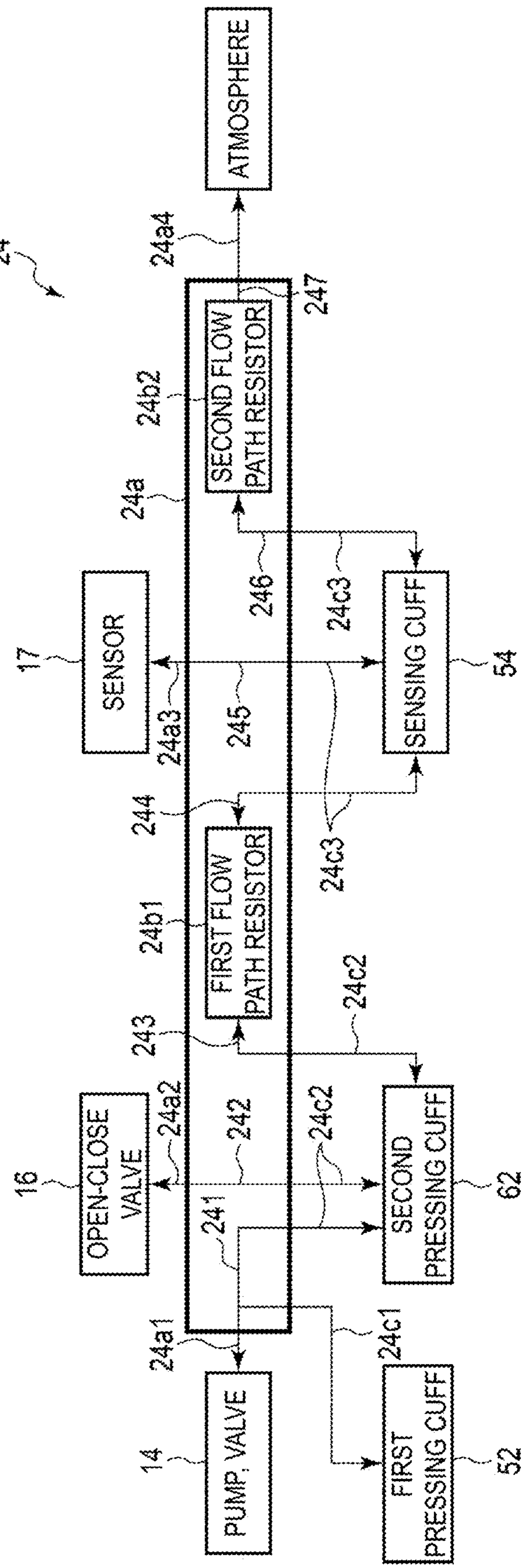
[FIG. 9]


32
12
25a
18
17
16
24a
25c
25b
31d
20
31a
31d
31b
31c
31b3
31c
31b1
31b2
31b3
31b2
5
52
62
71
72
92
91
4
82
81
54
33b
33
33b
33b
33a

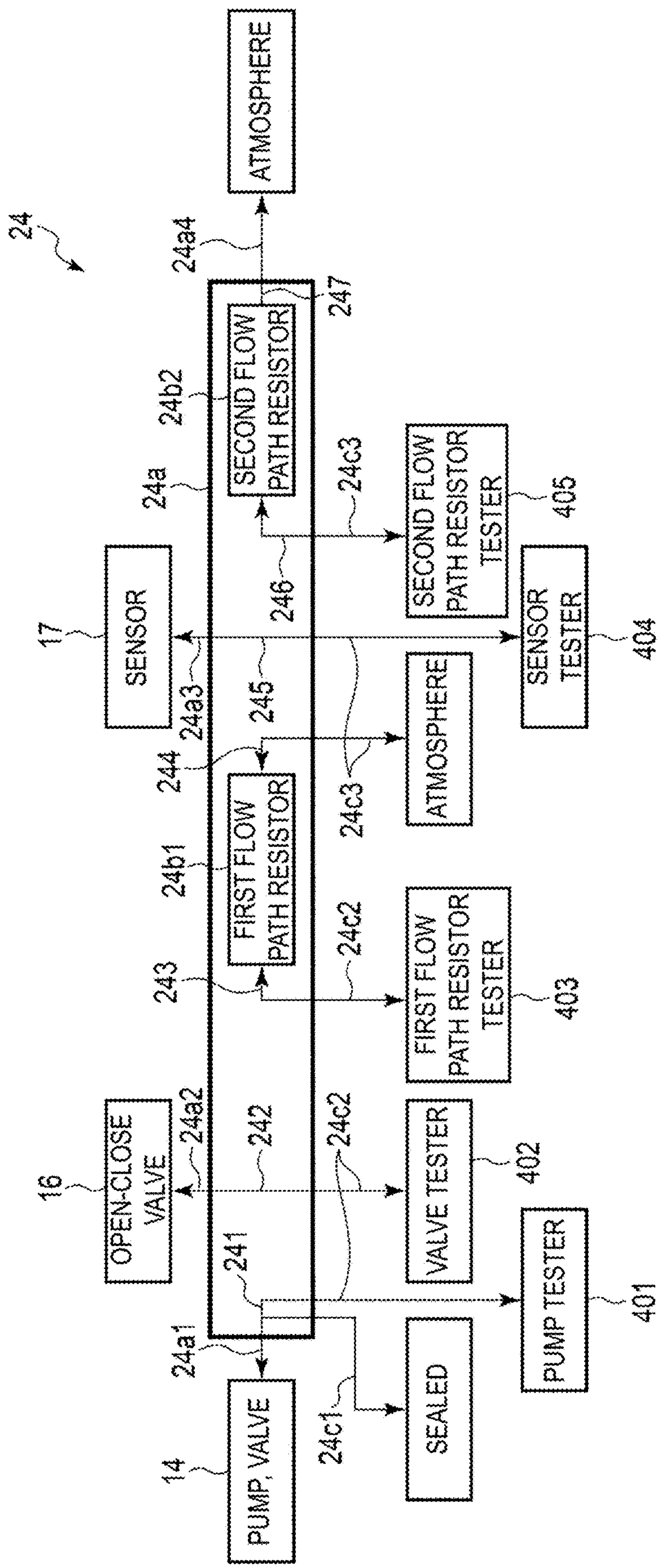
[FIG. 10]



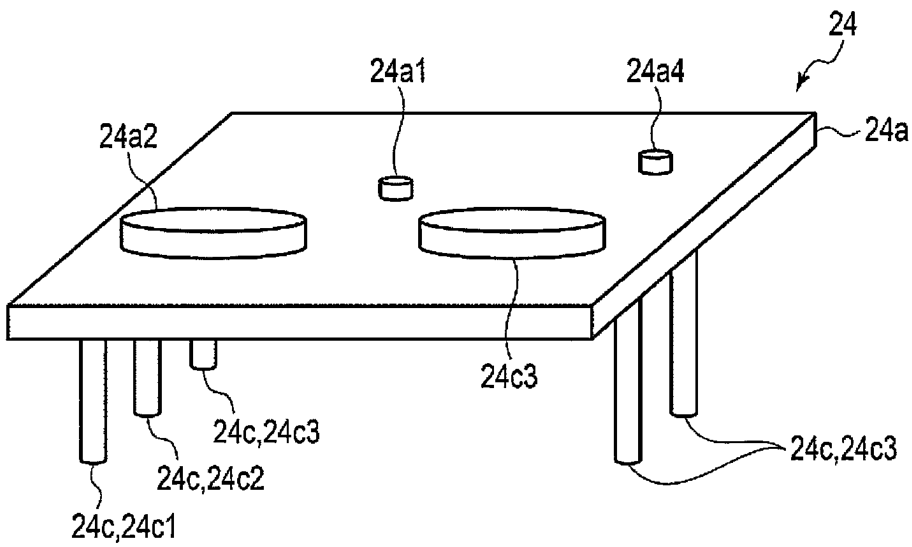
[FIG. 11]


24
ATMOSPHERE
24a4
247
SECOND FLOW PATH RESISTOR
24b2
24a
SENSOR
17
246
24c3
SENSING CUFF
54
24a3
245
244
FIRST FLOW PATH RESISTOR
24b1
24c3
24c2
243
OPEN-CLOSE VALVE
16
24a2
242
24c2
SECOND PRESSING CUFF
62
241
24a1
PUMP, VALVE
14
24c1
FIRST PRESSING CUFF
52

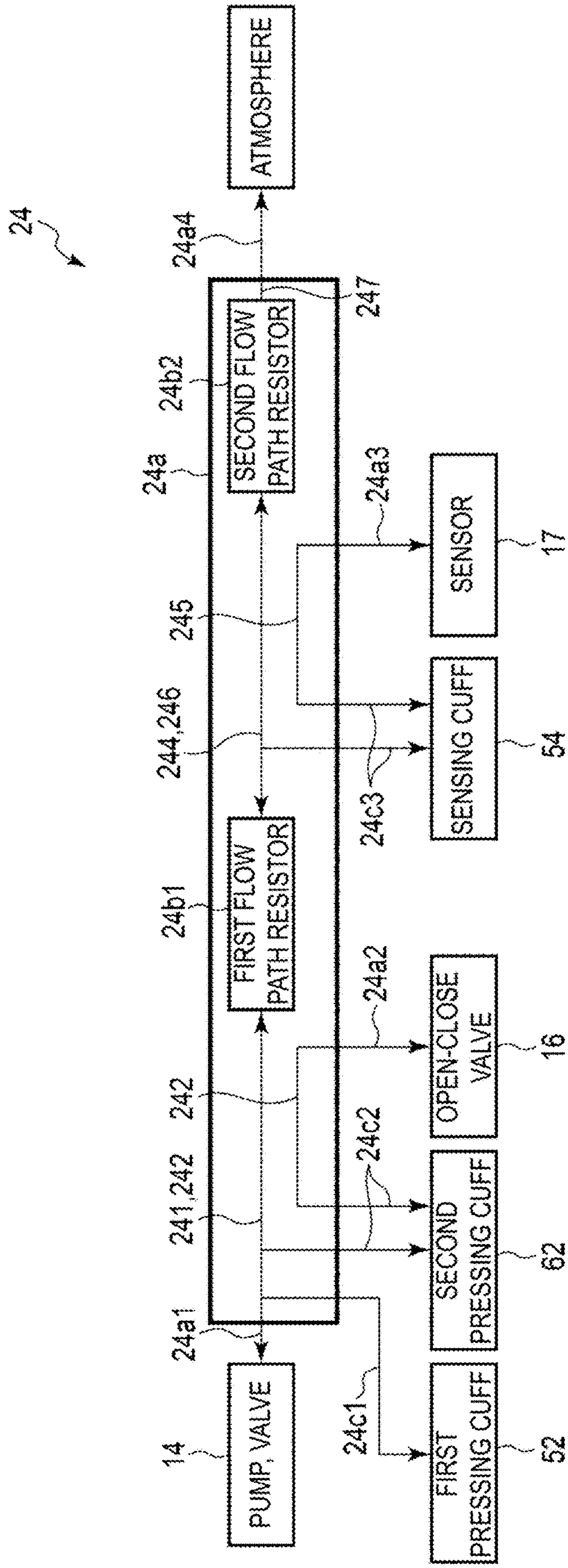
[FIG. 12]


24
ATMOSPHERE
24a4
247
SECOND FLOW PATH RESISTOR
24b2
24a
24c3
SECOND FLOW PATH RESISTOR TESTER
405
SENSOR
17
246
SENSOR TESTER
404
24a3
245
ATMOSPHERE
244
24c3
FIRST FLOW PATH RESISTOR
24b1
24c2
FIRST FLOW PATH RESISTOR TESTER
403
243
OPEN-CLOSE VALVE
16
24a2
242
24c2
VALVE TESTER
402
241
PUMP TESTER
401
24a1
PUMP, VALVE
14
24c1
SEALED

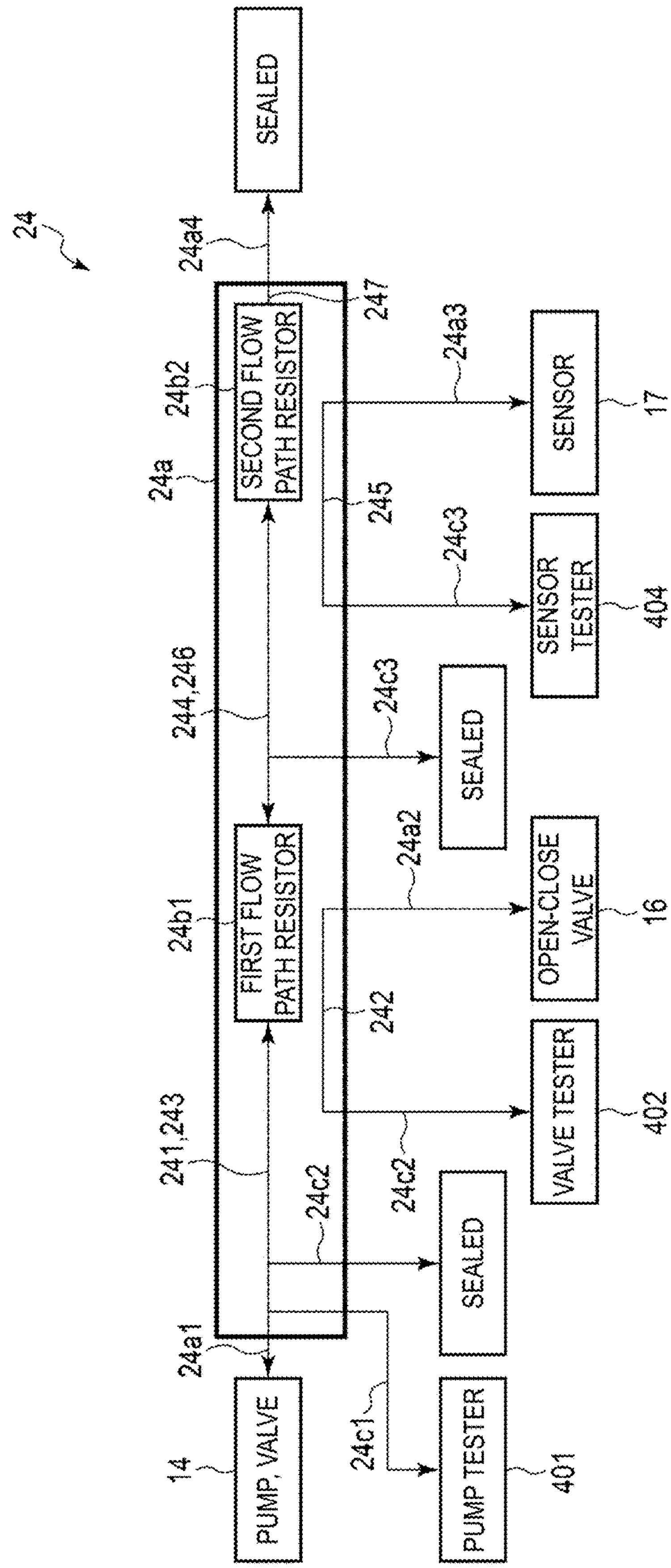
[FIG. 13]



[FIG. 14]

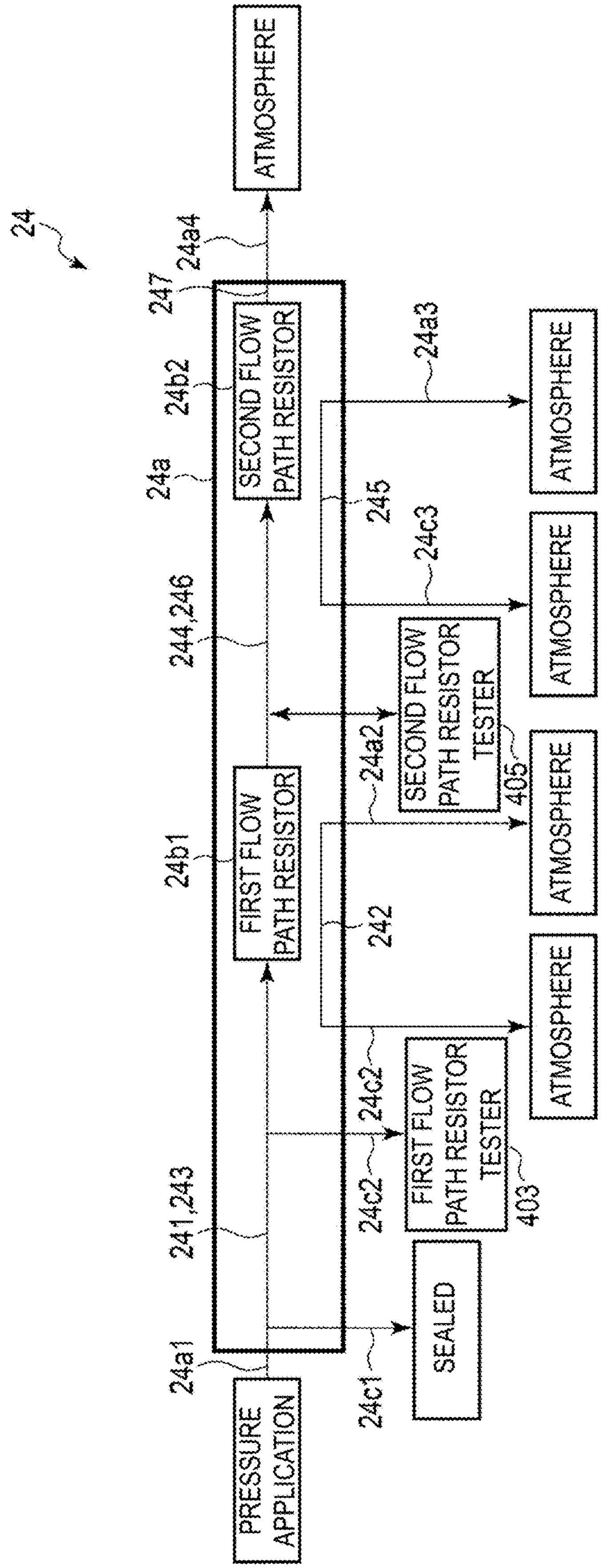

24
ATMOSPHERE
24a4
247
24b2
SECOND FLOW PATH RESISTOR
24a
24a3
SENSOR
17
245
244,246
SENSING CUFF
54
24c3
24b1
FIRST FLOW PATH RESISTOR
24a2
OPEN-CLOSE VALVE
16
242
241,242
24c2
SECOND PRESSING CUFF
62
24a1
PUMP, VALVE
14
24c1
FIRST PRESSING CUFF
52

[FIG. 15]

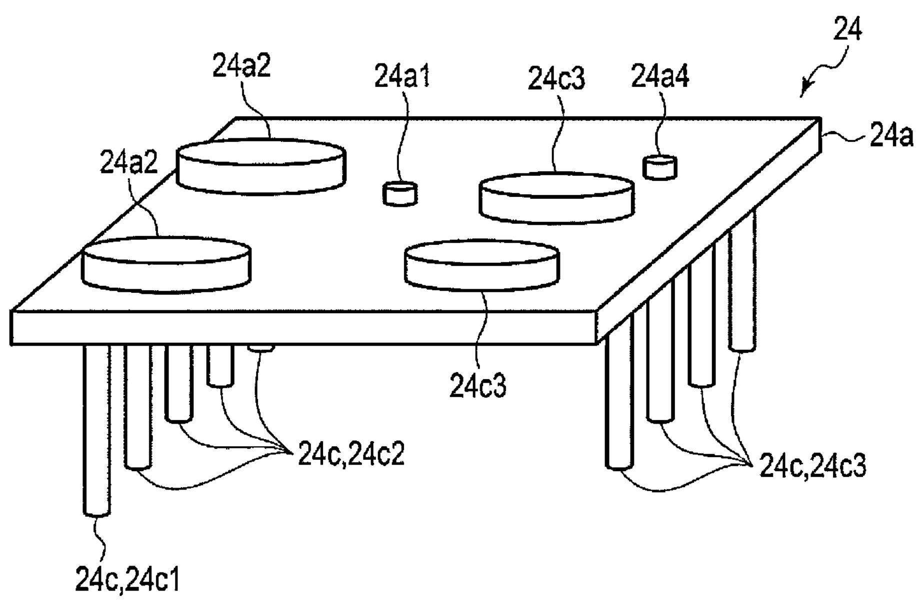


24
SEALED
24a4
247
24a3
SECOND FLOW PATH RESISTOR
24b2
24a
SENSOR
17
245
24c3
SENSOR TESTER
404
244,246
24c3
SEALED
24a2
FIRST FLOW PATH RESISTOR
24b1
OPEN-CLOSE VALVE
16
242
VALVE TESTER
402
241,243
24c2
24c2
SEALED
24a1
PUMP, VALVE
14
24c1
PUMP TESTER
401

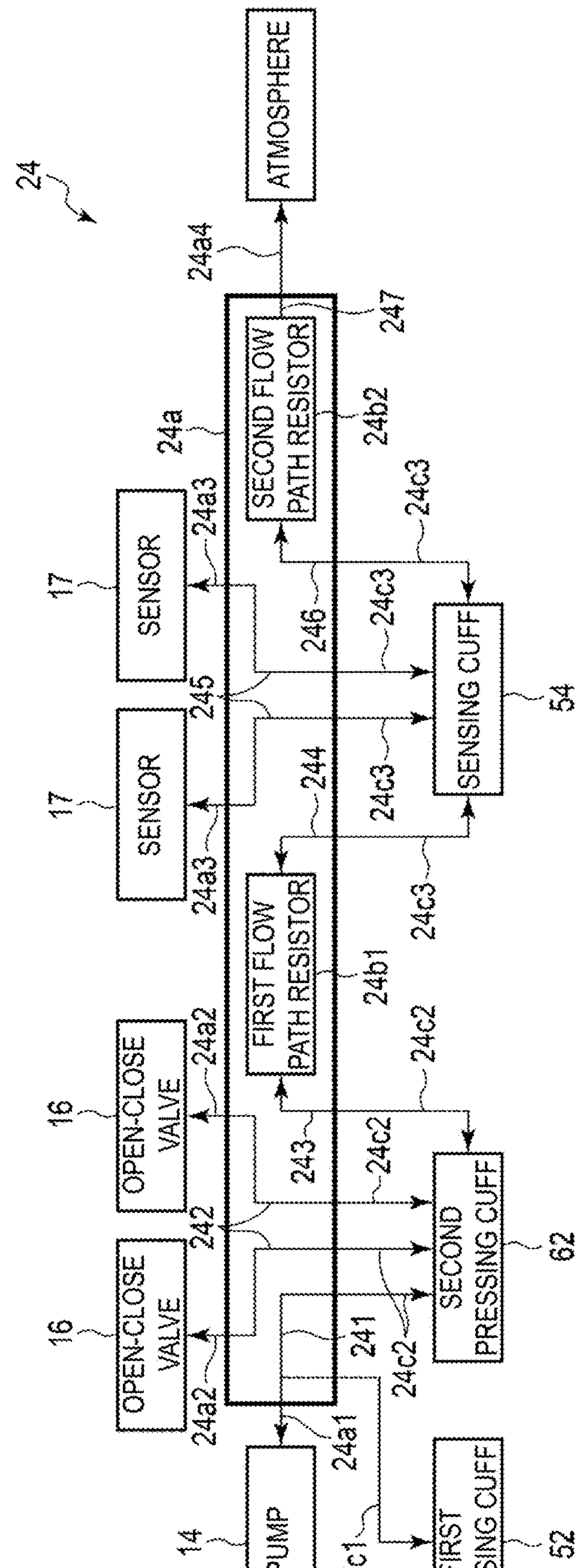
[FIG. 16]


24
PRESSURE APPLICATION
24a1
241,243
24b1
FIRST FLOW PATH RESISTOR
244,246
24a
24b2
SECOND FLOW PATH RESISTOR
247
24a4
ATMOSPHERE
SEALED
24c1
24c2
FIRST FLOW PATH RESISTOR TESTER
403
24c2
ATMOSPHERE
242
ATMOSPHERE
24a2
SECOND FLOW PATH RESISTOR TESTER
405
ATMOSPHERE
24c3
245
ATMOSPHERE
24a3

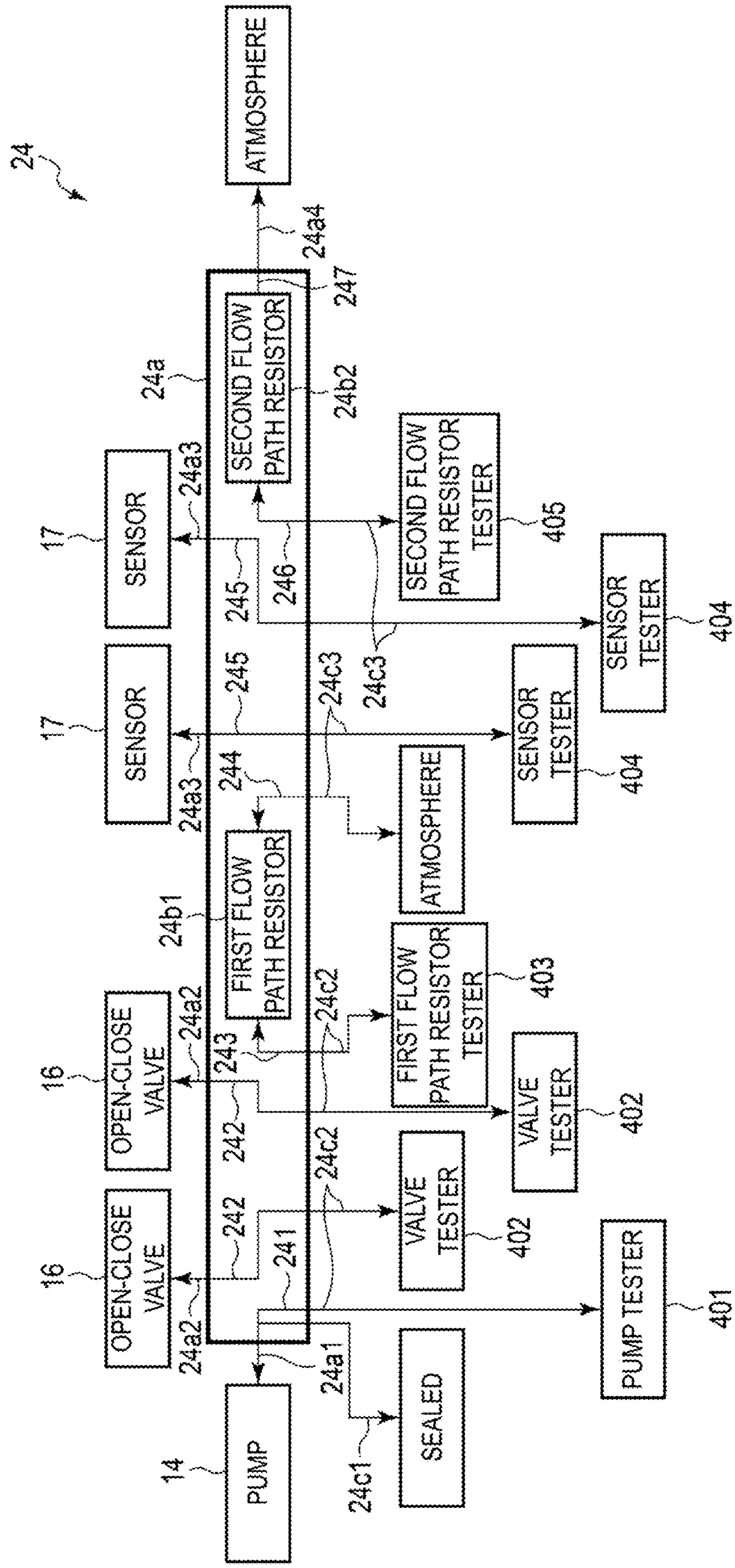
[FIG. 17]


24
24a2
24a1
24c3
24a4
24a
24a2
24c3
24c,24c2
24c,24c3
24c,24c1

[FIG. 18]


24
ATMOSPHERE
24a4
247
SECOND FLOW PATH RESISTOR
24b2
24a
SENSOR
17
24a3
246
24c3
SENSING CUFF
54
245
SENSOR
17
244
FIRST FLOW PATH RESISTOR
24b1
OPEN-CLOSE VALVE
16
24a2
243
24c2
SECOND PRESSING CUFF
62
242
OPEN-CLOSE VALVE
16
241
24a1
PUMP
14
24c1
FIRST PRESSING CUFF
52

[FIG. 19]


24
ATMOSPHERE
24a4
247
24a
SECOND FLOW PATH RESISTOR
24b2
SENSOR
17
24a3
SECOND FLOW PATH RESISTOR TESTER
405
245
246
SENSOR TESTER
404
24c3
SENSOR
17
245
24c3
SENSOR TESTER
404
24a3
244
ATMOSPHERE
FIRST FLOW PATH RESISTOR
24b1
FIRST FLOW PATH RESISTOR TESTER
403
OPEN-CLOSE VALVE
16
24a2
243
24c2
242
VALVE TESTER
402
24c2
242
VALVE TESTER
402
OPEN-CLOSE VALVE
16
241
24a2
PUMP TESTER
401
24a1
SEALED
24c1
PUMP
14

BLOOD PRESSURE MEASUREMENT DEVICE

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application is the U.S. national stage application filed pursuant to 35 U.S.C. 365 (c) and 120 as a continuation of International Patent Application No. PCT/JP2023/038731, filed Oct. 26, 2023, which application claims priority to Japanese Patent Application No. 2023-014296, filed Feb. 1, 2023, which applications are incorporated herein by reference in their entireties.

TECHNICAL FIELD

[0002] The present invention relates to a blood pressure measurement device.

BACKGROUND ART

[0003] In recent years, blood pressure measurement devices used for measuring blood pressure are being utilized as a means for checking a health state not only at a medical facility but also at home. A blood pressure measurement device detects vibration of the artery wall to measure blood pressure by, for example, inflating and contracting a cuff wound around the wrist or the like of a living body and detecting the pressure in the cuff by using a pressure sensor.

[0004] Further, as disclosed in JP 2022-116594 A, a wearable sphygmomanometer attached to the wrist is known as a blood pressure measurement device. Such a blood pressure measurement device uses a flow path plate unit for size reduction. Components such as a pressure sensor, an open-close valve, and a flow path resistor are connected to the flow path plate unit.

CITATION LIST

Patent Literature

[0005] Patent Document 1: JP 2022-116594 A

SUMMARY OF INVENTION

Technical Problem

[0006] In the blood pressure measurement device described above, after connecting each component, it is necessary to block unnecessary flow paths to test each component. However, when a mechanism that blocks unnecessary flow paths is provided in the flow path plate unit, the flow path plate unit increases in size, which poses the problem that testing cannot be performed without changing the size of the flow path plate unit.

[0007] It is therefore an object of the present invention to provide a blood pressure measurement device that enables individual testing of components provided in a flow path plate unit without an increase in size of the flow path plate unit.

Solution to Problem

[0008] According to an aspect, a blood pressure measurement device includes a case, a plurality of components including a pump provided in the case, a valve provided in the case, and a pressure sensor provided in the case, and a flow path plate unit in which a plurality of internal flow paths are formed, first ends of the plurality of internal flow paths being respectively connected to the plurality of components and second ends of the plurality of internal flow paths being selectively connected to at least one of a plurality of cuffs and a plurality of testers configured to respectively test the plurality of components.

[0009] According to this aspect, each of the plurality of internal flow paths of the flow path plate unit can connect any of the components and one of the cuffs or the testers. Accordingly, the internal flow paths connected to the respective components of the flow path plate unit are independent from each other. Thus, when the blood pressure measurement device is in a usable state, the flow path plate unit can connect the components and the cuffs. Further, the components and the testers can be connected when the blood pressure measurement device is in a test state at the time of manufacture or maintenance, and the components and the testers can be sealed when testing is not performed. Thus, the blood pressure measurement device enables individual testing of the components provided in the flow path plate unit without an increase in size of the flow path plate unit.

[0010] In the blood pressure measurement device according to the aspect described above, the plurality of cuffs include a pressing cuff and a sensing cuff, the flow path plate unit includes a first flow path resistor and a second flow path resistor, and the plurality of internal flow paths include an internal flow path connecting the pressing cuff and the first flow path resistor, an internal flow path connecting the first flow path resistor and the sensing cuff, an internal flow path connecting the sensing cuff and the second flow path resistor, and an internal flow path connecting the second flow path resistor and the atmosphere.

[0011] According to this aspect, the blood pressure measurement device includes the internal flow paths capable of connecting the pressing cuff and the first flow path resistor, the first flow path resistor and the sensing cuff, the sensing cuff and the second flow path resistor, and the second flow path resistor and the atmosphere, making it possible to test the first flow path resistor and the second flow path resistor by connecting the testers to the internal flow paths connected to the first flow path resistor and the second flow path resistor.

[0012] In the blood pressure measurement device according to the aspect described above, the internal flow path connecting the pressing cuff and the first flow path resistor is further connected to the pump, and the internal flow path connecting the first flow path resistor and the sensing cuff and the internal flow path connecting the sensing cuff and the second flow path resistor are continuously and integrally formed.

[0013] According to this aspect, the blood pressure measurement device facilitates connection of a tester in place of the pressing cuff to the internal flow path connecting the pump, the pressing cuff, and the first flow path resistor, and connection of a tester in place of the sensing cuff to the internal flow path connecting the first flow path resistor, the second flow path resistor, and the sensing cuff. Thus, the blood pressure measurement device is capable of testing the first flow path resistor and the second flow path resistor.

[0014] In the blood pressure measurement device according to the aspect described above, the flow path plate unit includes a plurality of ports respectively connectable to the plurality of cuffs and the plurality of testers, and respectively continuous with the plurality of internal flow paths.

[0015] According to this aspect, the blood pressure measurement device enables selective connection of each cuff and each tester to the flow path plate unit via the plurality of ports. Thus, the blood pressure measurement device facilitates the attachment and detachment of the cuffs and the testers and the sealing of the ports, making it possible to easily test the various components.

Advantageous Effects of Invention

[0016] According to the present invention, it is possible to provide a blood pressure measurement device that enables individual testing of components provided in a flow path plate unit without an increase in size of the flow path plate unit.

BRIEF DESCRIPTION OF DRAWINGS

[0017] FIG. **1** is a perspective view illustrating a configuration of a blood pressure measurement device according to an embodiment of the present invention.

[0018] FIG. **2** is a side view illustrating the configuration of the blood pressure measurement device.

[0019] FIG. **3** is a side view illustrating the configuration of the blood pressure measurement device in a state of being attached to a wrist.

[0020] FIG. **4** is a block diagram illustrating the configuration of the blood pressure measurement device.

[0021] FIG. **5** is a cross-sectional view illustrating a configuration of a main portion of the blood pressure measurement device.

[0022] FIG. **6** is a plan view illustrating the configuration of the main portion of the blood pressure measurement device from a rear surface side of a device body.

[0023] FIG. **7** is a plan view illustrating the configuration of the main portion of the blood pressure measurement device with some configurations omitted from the rear surface side of the device body.

[0024] FIG. **8** is an exploded perspective view illustrating a configuration of the device body.

[0025] FIG. **9** is an exploded perspective view illustrating the configuration of the device body.

[0026] FIG. **10** is a perspective view schematically illustrating an example of a flow path plate unit of the blood pressure measurement device.

[0027] FIG. **11** is a block diagram illustrating an example of a fluid circuit of the blood pressure measurement device.

[0028] FIG. **12** is a block diagram illustrating an example of components provided to the flow path plate unit of the blood pressure measurement device during testing.

[0029] FIG. **13** is a perspective view schematically illustrating an example of the flow path plate unit of the blood pressure measurement device according to another embodiment of the present invention.

[0030] FIG. **14** is a block diagram illustrating an example of the fluid circuit of the blood pressure measurement device.

[0031] FIG. **15** is a block diagram illustrating an example of the components provided to the flow path plate unit of the blood pressure measurement device during testing.

[0032] FIG. **16** is a block diagram illustrating an example of the components provided to the flow path plate unit of the blood pressure measurement device during testing.

[0033] FIG. **17** is a perspective view schematically illustrating an example of the flow path plate unit of the blood pressure measurement device according to another embodiment of the present invention.

[0034] FIG. **18** is a block diagram illustrating an example of the fluid circuit of the blood pressure measurement device.

[0035] FIG. **19** is a block diagram illustrating an example of the components provided to the flow path plate unit of the blood pressure measurement device during testing.

DESCRIPTION OF EMBODIMENTS

[0036] An example of a blood pressure measurement device **1** according to an embodiment of the present invention will be described below with reference to FIG. **1** to FIG. **12**.

[0037] FIG. **1** is a perspective view illustrating a configuration of the blood pressure measurement device **1** according to the embodiment of the present invention. FIG. **2** is a side view illustrating the configuration of the blood pressure measurement device **1**, and FIG. **3** is a side view illustrating the configuration of the blood pressure measurement device **1** in a state of being attached to a wrist **300**. FIG. **4** is a block diagram illustrating the configuration of the blood pressure measurement device **1**. FIG. **5** is a cross-sectional view illustrating a configuration of a device body **3**, a portion of a first cuff structure **4**, and a portion of a second cuff structure **5** of the blood pressure measurement device **1**. FIG. **6** is a plan view illustrating the configuration of the device body **3**, a portion of the first cuff structure **4**, and a portion of the second cuff structure **5** of the blood pressure measurement device **1**, and FIG. **7** is a plan view illustrating the configuration of the device body **3**, a portion of the first cuff structure **4**, and a portion of the second cuff structure **5** of the blood pressure measurement device **1** with a cuff cover **33** omitted.

[0038] FIG. **8** is an exploded perspective view illustrating the configuration of the device body **3** from an upper surface side, and FIG. **9** is an exploded perspective view illustrating the configuration of the device body **3** from a lower surface side. FIG. **10** is a perspective view schematically illustrating an example of a flow path plate unit **24** of the blood pressure measurement device **1**, FIG. **11** is a block diagram illustrating an example of the fluid circuit **24** of the blood pressure measurement device **1**, and FIG. **12** is a block diagram illustrating an example of components provided to the flow path plate unit **24** of the blood pressure measurement device **1** during testing.

[0039] As illustrated in FIG. **1** to FIG. **3**, the blood pressure measurement device **1** includes, for example, the device body **3**, the first cuff structure **4**, the second cuff structure **5**, and a band **6**. The blood pressure measurement device **1** is configured such that the first cuff structure **4** and the second cuff structure **5** extend from the device body **3** in opposite directions of the device body **3**, with the band **6** covering the first cuff structure **4** and the second cuff structure **5**, and is formed fixable to the wrist **300** that is a living body by the band **6**.

[0040] As illustrated in FIG. **1** to FIG. **5**, FIG. **8**, and FIG. **9**, the device body **3** includes, for example, a case **11**, a display unit **12**, an operation unit **13**, a pump **14**, an acceleration sensor **15**, a valve **16**, a pressure sensor **17**, a battery **18**, a communication unit **19**, biometric sensors **20**, a charging circuit unit **21**, a memory **22**, a processor **23**, the fluid circuit **24**, and a substrate **25**.

[0041] The case **11** is a case that accommodates components of the device body **3**. The case **11** accommodates, for example, the display unit **12**, the operation unit **13**, the pump **14**, the acceleration sensor **15**, the valve **16**, the pressure sensor **17**, the battery **18**, the communication unit **19**, the biometric sensors **20**, the charging circuit unit **21**, the memory **22**, the processor **23**, the fluid circuit **24**, and the substrate **25**.

[0042] As illustrated in FIG. **5** to FIG. **7**, the case **11** includes, for example, an outer case **31**, a windshield **32** that covers an upper opening of the outer case **31**, and the cuff cover **33** provided below the outer case **31**.

[0043] The outer case **31** is formed in a bottomed tubular shape such as, for example, a cylindrical, rectangular tubular, or polygonal tubular shape with a bottom portion. In the present embodiment, an example is illustrated in which the outer case **31** is formed in a bottomed rectangular tubular shape. As a specific example, the outer case **31** includes a peripheral wall portion **31***a* having a rectangular tubular shape, a bottom portion **31***b* provided at the peripheral wall portion **31***a*, and a pair of loop portions **31***c* provided at a pair of surfaces among four outer peripheral surfaces of the peripheral wall portion **31***a*.

[0044] In the peripheral wall portion **31***a*, for example, an opening **31***d* in which part of the operation unit **13** is disposed is formed. For example, the opening **31***d* is formed in one surface of the peripheral wall portion **31***a* that is different from the two surfaces provided with the pair of loop portions **31***c*. Further, for example, two of the openings **31***d* are formed in one surface of the peripheral wall portion **31***a*.

[0045] The bottom portion **31***b* constitutes a rear surface (bottom portion **31***b*) of the case **11** (outer case **31**). The bottom portion **31***b*, for example, partially projects, facilitating contact with the wrist **300**. For example, the bottom portion **31***b* includes a projection portion **31***b***1** formed by a center side of an outer surface side being projected in a rectangular shape and then a center side of an inner surface side of the bottom portion **31***b* being recessed in a rectangular shape. Further, in the bottom portion **31***b* are formed a plurality of window portions **31***b***2** in which the biometric sensors **20** are disposed and a plurality of hole portions **31***b***3** in which connection portions **73**, **83** described below are disposed as members that fluidly connect the first cuff structure **4** and the second cuff structure **5** to the pump **14**.

[0046] The biometric sensors **20** are disposed on the inner surface side of the projection portion **31***b***1**. The projection portion **31***b***1** constitutes a sensor unit including at least one of the biometric sensors **20** or a charging terminal **214** disposed on the rear surface of the case **11**. Here, the biometric sensors **20** and the charging terminal **214** being disposed on the rear surface of the case **11** means that some of the components constituting the biometric sensors **20** are exposed on the rear surface of the case **11** or are disposed on the rear surface of the case **11** with a member (for example, a cover **31***b***5** described below) other than the first cuff structure **4** and the second cuff structure **5** interposed therebetween.

[0047] The window portions **31***b***2** are formed in the projection portion **31***b***1**. For example, as illustrated in FIG. **5**, the window portions **31***b***2** are formed by a plurality of openings **31***b***4** formed at a plurality of locations of the projection portion **31***b***1** and by the cover **31***b***5** having transparency, made of glass, a resin material, or the like, and covering these openings **31***b***4**. The cover **31***b***5** covers, for example, an outer surface of the projection portion **31***b***1**.

[0048] The plurality of hole portions **31***b***3** are respectively formed between the projection portion **31***b***1** and each loop portion **31***c* in the bottom portion **31***b*. In the present embodiment, the plurality of hole portions **31***b***3** are formed between the projection portion **31***b***1** and one loop portion **31***c*, and then a plurality of hole portions **31***b***3** are formed between the projection portion **31***b***1** and the other loop portion **31***c*. The plurality of hole portions **31***b***3** provided adjacent to each loop portion **31***c* are aligned in one direction such as, for example, a direction orthogonal to an opposing direction of the pair of loop portions **31***c*. That is, in the bottom portion **31***b* which is the rear surface of the case **11**, the plurality of hole portions **31***b***3** to which a portion of the configuration of the first cuff structure **4** is fixed at one end portion in the one direction are disposed at positions away from the projection portion **31***b***1**, and then the plurality of hole portions **31***b***3** to which another portion of the configuration of the first cuff structure **4** as well as the second cuff structure **5** are fixed at the other end portion in the one direction are disposed at positions away from the projection portion **31***b***1** toward the one direction. Note that the number and the arrangement of the hole portions **31***b***3** are set as appropriate in accordance with a number and an arrangement of a plurality of ports **24***c* described below formed in a flow path plate **24***a*.

[0049] Further, a vent **31***b***6** having a slit shape long in the one direction is formed in the bottom portion **31***b*, and the bottom portion **31***b* includes a waterproof moisture-permeable sheet **31***b***7** covering this vent **31***b***6**. The waterproof moisture-permeable sheet **31***b***7** is formed so as to prevent moisture from entering the case **11** from the outside through the vent **31***b***6** of the bottom portion **31***b* and to facilitate ventilation between the inside and the outside of the case **11**. Here, the vent **31***b***6** and the waterproof moisture-permeable sheet **31***b***7** are provided at positions not overlapping the first cuff structure **4** and the second cuff structure **5** fixed to the bottom portion **31***b*, that is, at positions separated from the first cuff structure **4** and the second cuff structure **5**. For example, in the direction orthogonal to the opposing direction of the pair of loop portions **31***c*, a flow path body **72** of a first pressing cuff **52** described below of the first cuff structure **4** is provided adjacent to one side of the projection portion **31***b***1**, and the vent **31***b***6** and the waterproof moisture-permeable sheet **31***b***7** are provided adjacent to the other side of the projection portion **31***b***1**.

[0050] The loop portion **31***c* is formed so that the band **6** can be passed therethrough and the band **6** can be fixed or the band **6** can be folded back. For example, the loop portion **31***c* is a member having a rectangular ring shape including an opening long in one direction through which the band **6** can be inserted. The loop portion **31***c* is integrally formed on an outer side surface of the outer case **31**. One end of the band **6** is fixed to one loop portion **31***c* of the pair of loop portions **31***c*, and then the band **6** is folded back to the other loop portion **31***c*.

[0051] The windshield **32** is a glass plate having a shape similar to that of an outer peripheral edge of the outer case **31**, and is a rectangular shape in the present embodiment. Note that the windshield **32** is not limited to a glass plate as long as the material has transparency or translucency.

[0052] The cuff cover **33** covers the bottom portion **31***b* of the outer case **31**. In the cuff cover **33**, the projection portion

31b**1** of the bottom portion **31**b is disposed and an opening **33**a exposing the projection portion **31**b**1** to the outside is formed. For example, when the cuff cover **33** is fixed to the bottom portion **31**b, the projection portion **31**b**1** is formed to a thickness and into a shape projecting from a main surface of the cuff cover **33** facing the wrist **300**. Further, for example, the cuff cover **33** is formed with holes **33**b in which screws are disposed at four corners, and is detachably fixed to the bottom portion **31**b of the outer case **31** of the case **11** by screws or the like.

[0053] The cuff cover **33** covers end portions of the first cuff structure **4** and the second cuff structure **5** disposed on the bottom portion **31**b, and thus the end portions of the first cuff structure **4** and the second cuff structure **5** are disposed in gaps that occur with the bottom surface **31**b and the first cuff structure **4** and the second cuff structure **5** are fixed to the bottom surface **31**b. As a specific example, the cuff cover **33** covers part of the flow path body **72** and the connection portion **73** of the first pressing cuff **52**, a flow path body **82** and the plurality of connection portions **83** of a sensing cuff **54**, and a flow path body **92** and a plurality of connection portions **93** of a second pressing cuff **62** described below. Then, the cuff cover **33** fixes the first cuff structure **4** and the second cuff structure **5** by restricting movement of the covered portion of part of the first pressing cuff **52**, the sensing cuff **54**, and the second pressing cuff **62** in a direction away from the bottom portion **31**b. Note that a configuration may be adopted in which the cuff cover **33** includes a buffer material between the first cuff structure **4** and the second cuff structure **5**.

[0054] The display unit **12** is disposed directly below the windshield **32**. The display unit **12** is electrically connected to the processor **23**. The display unit **12** is, for example, a liquid crystal display or an organic electroluminescence display. As a specific example, the display unit **12** is an organic light-emitting diode (OLED). The display unit **12** displays various information including the date and time, measurement results of blood pressure values such as the systolic blood pressure and diastolic blood pressure, heart rate, and the like, and information such as the charge state and remaining charge of the battery **18**. The display unit **12** is formed in, for example, the same shape as that of the windshield **32** or a shape slightly smaller than that of the windshield **32** in plan view.

[0055] The operation unit **13** is configured to enable input of a command from a user. The operation unit **13** includes, for example, a plurality of buttons **41** provided on the case **11**, a sensor that detects operation of the buttons **41**, and a touch panel **43** provided on the display unit **12** or the windshield **32**. When operated by the user, the operation unit **13** converts a command into an electrical signal. The sensor and the touch panel **43** are electrically connected to the processor **23** and output electrical signals to the processor **23**.

[0056] The pump **14** is, for example, a piezoelectric pump. The pump **14**, for example, compresses air as a fluid and supplies the compressed air through the fluid circuit **24** to an air bag **71** of the first pressing cuff **52** described below and an air bag **81** of the sensing cuff **54** of the first cuff structure **4**, and an air bag **91** of the second pressing cuff **62** described below of the second cuff structure **5**. The pump **14** is electrically connected to the processor **23**. The pump **14** includes therein a valve mechanism that opens and closes flow paths connected to the flow path plate **24**a.

[0057] The acceleration sensor **15** is, for example, a 3-axis acceleration sensor. The acceleration sensor **15** measures acceleration and outputs an analog signal, for example. The acceleration sensor **15** is connected to the processor **23** via, for example, an A/D conversion circuit.

[0058] The valve **16** is, for example, an open-close valve. The valve **16** opens and closes a fluid circuit connecting the pump **14** and the first cuff structure **4** and/or the second cuff structure **5** and/or a fluid circuit connecting the first cuff structure **4** and the outside (atmosphere) in the fluid circuit **24**. In the present embodiment, the valve **16** opens and closes a fluid circuit (a second internal flow path **242** described below) connected to the second pressing cuff **62** described below of the second cuff structure **5**. The valve **16** is electrically connected to the processor **23**. For example, the valve **16** is opened and closed by the control of the processor **23**.

[0059] As a specific example, the valve **16** is a valve that releases air supplied to the first cuff structure **4** and the second cuff structure **5** to the atmosphere. When air is to be supplied to the first pressing cuff **52**, the second pressing cuff **62**, and the sensing cuff **54** during blood pressure measurement, for example, the valve **16** is controlled by the processor **23** so as to be switched to the closed state. Further, when the air in the first pressing cuff **52**, the second pressing cuff **62**, and the sensing cuff **54** is to be exhausted, the valve **16** is controlled by the processor **23** so as to be switched from the closed state to the open state. Further, the valve **16** may be formed so that the opening degree is adjustable.

[0060] The pressure sensor **17** is provided, for example, in the fluid circuit **24**. The pressure sensor **17** detects the pressures of the first pressing cuff **52** and/or the sensing cuff **54**. The pressure sensor **17** detects the pressure of the sensing cuff **54**, for example. The pressure sensor **17** is electrically connected to the processor **23** via an A/D conversion circuit, for example, converts the detected pressure into an electrical signal, and outputs the electrical signal to the processor **23**.

[0061] The battery **18** is, for example, a secondary battery such as a rechargeable lithium ion battery. The battery **18** is electrically connected to the processor **23**. The battery **18** supplies power to the processor **23**. The battery **18** supplies power for driving to the respective configurations of the processor **23** and to the display unit **12**, the operation unit **13**, the pump **14**, the acceleration sensor **15**, the valve **16**, the pressure sensor **17**, the communication unit **19**, and the biometric sensors **20** via the processor **23**.

[0062] The communication unit **19** is configured to be capable of transmitting and receiving information to and from an external device wirelessly and/or by wire. The communication unit **19** is, for example, a wireless communication module conforming to a wireless communication standard. The communication unit **19**, for example, transmits information, such as information controlled by the processor **23** and measured blood pressure values and pulse, to an external device, and receives a program for software updates or the like from an external device and transmits the program and the like to a control unit. In the present embodiment, the external device is, for example, an external terminal such as a smartphone, a tablet terminal, a personal computer, or a smart watch.

[0063] In the present embodiment, the communication unit **19** and the external terminal may be directly connected, or may be connected over a network. The communication unit **19** and the external terminal may be connected via a mobile communication network, such as 4G or 5G, and a wireless communication line, such as WiMAX or Wi-Fi (trade names). Further, the communication unit **19** and the external device may be connected by a wireless communication means, such as Bluetooth Low Energy (BLE; trade name), near field communication (NFC), and infrared communication. Further, the communication unit **19** may include, for example, a general-purpose connector such as a micro-universal serial bus (USB) in addition to a wireless communication module, and a dedicated connector for the blood pressure measurement device **1**, and may be connected to the external terminal directly or via a wired communication line such as a local area network (LAN) connection using various cables such as a USB cable. Thus, a configuration may be adopted in which the communication unit **19** includes a plurality of communication means, such as a wireless antenna and a micro-USB connector. Note that the connector for wired communication may be a dedicated connector for the blood pressure measurement device **1**.

[0064] The biometric sensors **20** are sensors formed so as to be capable of detecting biological information by being in contact with or by facing the wrist **300**. The biometric sensors **20** each convert the detected biological information into an electrical signal and output the electrical signal to the processor **23**. The biometric sensor **20** may be, for example, a sensor that measures a physical quantity such as a heart rate or a body temperature, or may be a sensor that measures a chemical value such as a blood sugar level or a blood oxygen concentration. In the present embodiment, the biometric sensors **20** include, for example, a photoplethysmography (PPG) sensor **20***a*, a peripheral oxygen saturation (SpO2) sensor **20***b*, and an electrocardiogram (ECG) sensor **20***c*.

[0065] For example, the PPG sensor **20***a* measures the heart rate by photoplethysmography. For example, the PPG sensor **20***a* includes a first LED **20***d*, a second LED **20***e*, and a first photodiode (PD) **20***f*.

[0066] For example, the SpO2 sensor **20***b* measures a saturation (transcutaneous arterial oxygen saturation). The SpO2 sensor **20***b* includes the second LED **20***e* and a second PD **20***g*. Here, for example, the PPG sensor **20***a* and the SpO2 sensor **20***b* share the second LED **20***e*.

[0067] For example, the ECG sensor **20***c* measures a flow of electricity in the heart to acquire an electrocardiographic waveform. For example, the ECG sensor **20***c* includes a pair of electrocardiogram.

[0068] The charging circuit unit **21** includes, for example, an antenna unit **211**, a power-receiving unit **212**, a charging unit **213**, and the charging terminal **214**. The charging circuit unit **21** charges the battery **18** by wire power transfer and/or wireless power transfer. For example, the charging circuit unit **21** receives transmission power transmitted by the antenna unit **211** from an antenna unit **103** of a power transmission device **100** externally provided, and charges the battery **18**. Further, for example, the charging circuit unit **21** receives transmission power transmitted by the charging terminal **214** from a power transmission terminal **104** of the power transmission device **100** externally provided, and charges the battery **18**. That is, the charging circuit unit **21** charges the battery **18** by selectively using the antenna unit **211** and the charging terminal **214** and receiving power from the power transmission device **100**. Note that the charging circuit unit **21** may be formed so as to be capable of both wire power transfer and wireless power transfer or may be formed so as to be capable of only one of wire power transfer or wireless power transfer.

[0069] The antenna unit **211** receives transmission power from the antenna unit **103** of the power transmission device **100**. The antenna unit **211** is, for example, a receiver coil as a power-receiving resonance circuit. The antenna unit **211** supplies the received power to the power-receiving unit **212**. A power-receiving surface of the antenna unit **211** is formed in a planar shape. The antenna unit **211** is disposed, for example, in the case **11**. As a specific example, the antenna unit **211** is provided adjacent to the display unit **12** on a side opposite to the windshield **32** of the display unit **12** in the case **11**. The antenna unit **211** includes, for example, a resonance capacitor and constitutes the power-receiving resonance circuit.

[0070] The power-receiving unit **212** rectifies power received by the antenna unit **211** or the charging terminal **214**, and supplies the rectified power to the charging unit **213**. As a specific example, the power-receiving unit **212** rectifies the received power supplied from the antenna unit **211** and converts the rectified power from alternating current (AC) to direct current (DC). For example, the power-receiving unit **212** includes a rectifying circuit and a control circuit, controls the operation of the rectifying circuit by the control circuit, and outputs rectified DC power to the charging unit **213**.

[0071] The charging unit **213** supplies the electric power supplied from the power-receiving unit **212** to the battery **18** as electric power for charging. For example, the charging unit **213** converts the electric power supplied from the power-receiving unit **212** into a predetermined current value and a predetermined voltage value and supplies the converted electric power to the battery **18**. Further, for example, the charging unit **213** may include a circuit that outputs the charge state of the battery **18** to the power-receiving unit **212** and/or the processor **23**.

[0072] The charging terminal **214** includes, for example, a pair of terminals **214***a*, and receives transmission power from the power transmission terminal **104** of the power transmission device **100** via the pair of terminals **214***a*.

[0073] The memory **22** includes, for example, a random access memory (RAM) and a read only memory (ROM). The memory **22** stores various data. For example, the memory **22** pre-stores, in a changeable manner, for example, various program data such as programs and applications for controlling the overall blood pressure measurement device **1** and the pump **14**, settings data for setting various functions of the blood pressure measurement device **1**, calculation data for calculating blood pressure values from the pressure measured by the pressure sensor **17**, calculation data for calculating biological information such as a heart rate, a saturation, and an electrocardiographic waveform from the information measured by the biometric sensors **20**.

[0074] The processor **23** controls the operation of the overall blood pressure measurement device **1** and the operations of the pump **14** and the valve **16** on the basis of the programs stored in the memory **22** and executes a predetermined operation (function). Further, the processor **23** executes the predetermined calculation, analysis, processing, or the like according to the read program. The processor **23** is an arithmetic device such as a central processing unit (CPU). The processor **23** may include, for example, a sub-CPU in addition to a main CPU. Further, the processor

23 displays a state or a result of the executed various operations, calculations, analyses, processing, and the like on the display unit 12 by a program or an application.

[0075] The fluid circuit 24 fluidly connects at least two or more of the pump 14, the valve 16, the pressure sensor 17, the first cuff structure 4, and the second cuff structure 5 provided in the case 11. The fluid circuit 24 may include, for example, components such as the flow path plate 24a that forms a flow path for the fluid supplied from the pump 14 to the first cuff structure 4, one or more orifices 24b serving as flow path resistors that control a supply amount and a pressure of the fluid supplied to the first cuff structure 4 and/or the second cuff structure 5, and a check valve that controls a flow direction of the fluid. In the present embodiment, the fluid circuit 24 is a flow path plate unit including the flow path plate 24a and a plurality of the orifices 24b.

[0076] The flow path plate 24a is formed by joining a plurality of plates formed of a resin material or a metal material and sheets or double-sided tape disposed between the plates adjacent to each other and in which slits that form the flow path are formed. The plurality of orifices 24b are provided in the flow path plate 24a. Hereinafter, in the present embodiment, the orifice 24b connected between the first pressing cuff 52 and the sensing cuff 54 described below of the first cuff structure 4 will be described as a first flow path resistor 24b1, and the orifice 24b connected to a secondary side of the sensing cuff 54 will be described as a second flow path resistor 24b2.

[0077] The substrate 25 includes, for example, a control board 25a, a sensor main board 25b, and a sensor sub-board 25c.

[0078] On the control board 25a, for example, the acceleration sensor 15, the valve 16, the pressure sensor 17, the communication unit 19, the circuit configuration of the charging circuit unit 21, the memory 22, and the processor 23 are mounted.

[0079] On the sensor main board 25b, the first LED 20d, the second LED 20e, the first PD 20f, and the second PD 20g used for the PPG sensor 20a and the SpO2 sensor 20b are mounted.

[0080] On the sensor sub-board 25c, various circuits and electronic components for configuring the PPG sensor 20a, the SpO2 sensor 20b, and the ECG sensor 20c are mounted. For example, the control board 25a, the sensor main board 25b, and the sensor sub-board 25c are electrically connected to one another.

[0081] Hereinafter, a specific example of the first cuff structure 4 will be described with reference to FIG. 1 to FIG. 3 and FIG. 5. As illustrated in FIG. 1 to FIG. 3 and FIG. 5, the first cuff structure 4 includes a first curler 51, the first pressing cuff 52, a back plate 53, and the sensing cuff 54. The first cuff structure 4 includes, for example, the first curler 51, the first pressing cuff 52, the back plate 53, and the sensing cuff 54. The first cuff structure 4 is configured by sequentially layering the first curler 51, the first pressing cuff 52, the back plate 53, and the sensing cuff 54 toward the wrist 300. Note that a configuration may be adopted in which the first cuff structure 4 does not include the first curler 51 and/or the back plate 53.

[0082] The first curler 51 is, for example, fixed, at one end side, to the bottom portion 31b provided on the wrist 300 side of the case 11. The first curler 51 is formed in a band-like shape that curves in a shape following a circumferential direction of the wrist 300. The first curler 51 is constituted by a resin material. The first curler 51 is formed of a material having a low hardness appropriate to provide flexibility and shape retainability. Here, "flexibility" refers to deformation of the shape of the first curler 51 in a radial direction at the time of application of an external force from the band 6 to the first curler 51. "Shape retainability" refers to the ability of the first curler 51 to maintain a pre-imparted shape when no external force is applied to the first curler 51. That is, the first curler 51 is formed of a resin material having a hardness that does not undergo compression deformation or is substantially without compression deformation but allows elastic deformation such as bending deformation in which the shape, particularly a curvature of a curved portion, changes. Accordingly, the first curler 51 is formed elastically deformable so as to be bent and deformed by application of an external force and to increase or decrease the internal space in which the wrist 300 is disposed in accordance with the shape of the wrist to which the first curler 51 is attached. For example, the first curler 51 is formed of a thermoplastic polyurethane resin (hereinafter referred to as TPU) or a polypropylene resin.

[0083] Further, the first curler 51, on one end side, is fixed to the case 11. Further, the first curler 51 is formed to such a length so as to face at least one of two arteries 311, 312 when the blood pressure measurement device 1 is attached to the wrist 300 having the longest circumference among the users who are expected to attach the device. Preferably, the first curler 51 is formed to such a length so as to face the two arteries 311, 312 when the blood pressure measurement device 1 is attached to the wrist 300 having the longest circumference among the users who are expected to attach the device. Further, the first curler 51 is set to such a length that the other end of the first curler 51 does not come into contact with the device body 3 when the blood pressure measurement device 1 is attached to the wrist 300 having the shortest circumference among the users who are expected to attach the device. In the first curler 51, for example, a portion extending from the case 11 of the device body 3 is curved by a predetermined radius of curvature so as to follow shapes of a side of one wrist 300 of the left and right wrists 300 and a palm side of the wrist 300.

[0084] The first pressing cuff 52 is fixed to an inner peripheral surface of the first curler 51 by double-sided tape, an adhesive, thermal welding, or the like. The first pressing cuff 52 is fluidly connected to the pump 14 through the fluid circuit 24. The first pressing cuff 52, at one main surface, is fixed to an inner surface of the first curler 51. The first pressing cuff 52, by being inflated, presses the back side of the wrist 300 and presses the back plate 53 and the sensing cuff 54 toward the wrist 300.

[0085] The first pressing cuff 52 includes, for example, one or more of the air bags 71, the flow path body 72 provided at an end portion of the air bag 71, and the connection portion 73 such as a nipple provided in the flow path body 72 and connected to the fluid circuit 24. Here, the air bag 71 is a bag-like structure and, in the present embodiment, the blood pressure measurement device 1 is configured to use air by the pump 14, and thus the present embodiment will be described using the air bag. However, in a case in which a fluid other than air is used, the bag-like structure need only be any fluid bag inflated by the fluid. The air bag 71 is formed in a rectangular bag shape that is long in one direction.

[0086] The air bag **71** is made by forming a plurality of sheet members into a bag shape by thermal welding or the like. For example, when a configuration is adopted in which the first pressing cuff **52** is configured to include a plurality of the air bags **71**, the plurality of air bags **71** are layered, integrally formed by welding or the like, and fluidly continuous. The sheet members forming the air bag **71** are made of a thermoplastic elastomer, for example. The thermoplastic elastomer is, for example, TPU.

[0087] The flow path body **72** is, for example, integrally provided at a part of one edge portion of the air bag **71** in a longitudinal direction. The flow path body **72** is formed by a portion of two sheet members of the plurality of sheet members forming the air bag **71**. Further, the flow path body **72** is formed in a shape that is long in one direction with a width smaller than a width of the air bag **71** in a lateral direction. The flow path body **72** is integrally provided with the connection portion **73** at a tip end. The flow path body **72** is connected to the fluid circuit **24** via the connection portion **73** and constitutes a flow path between the fluid circuit **24** and the air bag **71**. A thickness of the flow path body **72** at the time of inflation is smaller than a thickness of the air bag **71** at the time of inflation.

[0088] For example, one connection portion **73** is provided. The one connection portion **73** is connected to the fluid circuit **24** via one hole portion **31*b*3** formed in the bottom portion **31*b***.

[0089] Note that, for example, the flow path body **72** extends from one end side to the other end side of the bottom portion **31*b*** in the opposing direction of the pair of loop portions **31*c*** adjacent to the projection portion **31*b*1** so as to avoid the projection portion **31*b*1** formed at the bottom portion **31*b***, and the connection portion **73** is connected to one hole portion **31*b*3** among the plurality of hole portions **31*b*3** formed at an end portion of the bottom portion **31*b*** on the side where the second cuff structure **5** projects.

[0090] The back plate **53** is fixed to the surface of the first pressing cuff **52** on the wrist **300** side by double-sided tape, an adhesive, or the like. The back plate **53** is formed of a resin material. The back plate **53** is formed in a rectangular plate shape that is long in one direction, for example. Note that the back plate **53** may, for example, be configured to be divided, that is, may be formed by aligning a plurality of small rectangular pieces in one direction. The back plate **53** has shape followability.

[0091] This "shape followability" refers to a function in which the back plate **53** can be deformed in such a manner as to follow the shape of a contacted portion of the wrist **300** to be disposed. This contacted portion of the wrist **300** refers to a region of the wrist **300** that comes into contact with the back plate **53**. This contact includes both direct contact with the back plate **53** and indirect contact with the back plate **53** with the sensing cuff **54** interposed therebetween.

[0092] The sensing cuff **54** is fixed to a main surface of the back plate **53** on the wrist side. The sensing cuff **54** comes into contact with a region of the wrist **300** where the arteries **311**, **312** are present, directly or indirectly with a cover or the like interposed therebetween. The sensing cuff **54** is formed into a rectangular shape that is long in one direction. Note that a configuration may be adopted in which the sensing cuff **54** comes into contact with a region of the wrist **300** where one of the arteries **311**, **312** is present. The sensing cuff **54** is the same size as the first pressing cuff **52** or smaller than the first pressing cuff **52** in the longitudinal direction. Further, the sensing cuff **54** is the same size as the first pressing cuff **52** or smaller than the first pressing cuff **52** in the lateral direction. The sensing cuff **54** has the same shape as that of the back plate **53** or is smaller than the back plate **53** or is larger than the back plate **53** in the longitudinal direction and a width direction of the back plate **53**. The sensing cuff **54** compresses the region of the wrist on the palm side where the artery is present by being inflated. The sensing cuff **54** is pressed by the inflated first pressing cuff **52** toward the living body with the back plate **53** interposed therebetween.

[0093] As a specific example, the sensing cuff **54** includes the air bag **81**, the flow path body **82** fluidly connected to the air bag **81**, and the connection portion **83** such as a nipple provided at the flow path body **82**. The air bag **81** and the flow path body **82** are made by forming a plurality of sheet members into a bag shape by thermal welding or the like. The sheet members forming the air bag **81** and the flow path body **82** are formed of, for example, a thermoplastic elastomer. The thermoplastic elastomer is, for example, TPU.

[0094] Here, the air bag **81** is a bag-like structure and, in the present embodiment, a configuration is adopted in which the blood pressure measurement device **1** uses air with the pump **14**, and thus the present embodiment will be described using the air bag. However, in a case in which a fluid other than air is used, the bag-like structure may be a fluid bag or the like that is inflated by the fluid. The air bag **81** is constituted in a rectangular shape that is long in one direction.

[0095] The flow path body **82** is, for example, integrally provided at a part of one edge portion of the air bag **81** in the longitudinal direction. The flow path body **82** is formed by a portion of two sheet members of the plurality of sheet members forming the air bag **81**. Further, the flow path body **82** is formed in a shape that is long in one direction with a width smaller than a width of the air bag **81** in the lateral direction. The flow path body **82** is integrally provided with the connection portion **83** at a tip end. The flow path body **82** is connected to the fluid circuit **24** via the connection portion **83** and constitutes a flow path between the fluid circuit **24** and the air bag **81**. A thickness of the flow path body **82** at the time of inflation is smaller than a thickness of the air bag **81** at the time of inflation.

[0096] A plurality of the connection portions **83** are provided. The plurality of connection portions **83** are connected to the plurality of hole portions **31*b*3** formed at an end portion of the bottom portion **31*b*** on the side from which the first cuff structure **4** projects. The plurality of connection portions **83** are connected to the fluid circuit **24**.

[0097] Hereinafter, a specific example of the second cuff structure **5** will be described with reference to FIG. **1** to FIG. **3** and FIG. **5**. As illustrated in FIG. **1** to FIG. **3** and FIG. **5**, the second cuff structure **5** includes a second curler **61** and the second pressing cuff **62**. The second cuff structure **5** is configured by sequentially layering the second curler **61** and the second pressing cuff **62** toward the wrist **300**.

[0098] The second curler **61** is, for example, fixed, at one end side, to the bottom portion **31*b*** provided on the wrist **300** side of the case **11**. The second curler **61** is formed in a band-like shape that curves in a shape following the circumferential direction of the wrist **300**. The second curler **61** is constituted by a resin material. The second curler **61** is formed of a material having a low hardness appropriate to provide flexibility and shape retainability. Here, "flexibility" refers to deformation of the shape of the second curler **61** in the radial direction at the time of application of an external force from the band **6** to the second curler **61**. "Shape retainability" refers to the ability of the second curler **61** to maintain a pre-imparted shape when no external force is applied to the second curler **61**. That is, the second curler **61** is formed of a resin material having a hardness that does not undergo compression deformation or is substantially without compression deformation but allows elastic deformation such as bending deformation in which the shape, particularly the curvature of a curved portion, changes. Accordingly, the second curler **61** is formed to be elastically deformable so as to be bent and deformed by application of an external force and to increase or decrease the internal space in which the wrist **300** is disposed in accordance with the shape of the wrist to which second curler **61** is attached. For example, the second curler **61** is formed of a thermoplastic polyurethane resin (hereinafter referred to as TPU) or a polypropylene resin.

[0099] Further, the second curler **61** is, on one end side, fixed to the case **11**. Further, the second curler **61** is formed to such a length so as to face at least one of the two arteries **311**, **312** and overlap the first cuff structure **4** at an end portion side when the blood pressure measurement device **1** is attached to the wrist **300** having the longest circumference among the users who are expected to attach the device. Here, one of the two arteries **311**, **312** is the radial artery **311** and the other is the ulnar artery **312**. Preferably, the second curler **61** is formed to such a length so as to face the two arteries **311**, **312** when the blood pressure measurement device **1** is attached to the wrist **300** having the longest circumference among the users who are expected to attach the device. Further, the second curler **61** is set to such a length that the other end of the second curler **61** does not come into contact with the device body **3** when the blood pressure measurement device **1** is attached to the wrist **300** having the shortest circumference among the users who are expected to attach the device. In the second curler **61**, for example, a portion extending from the case **11** of the device body **3** is curved with a predetermined radius of curvature so as to follow the shape of the side of one wrist **300** of the left and right wrists **300** or the palm side of the wrist **300**.

[0100] The second pressing cuff **62** is fixed to an inner peripheral surface of the second curler **61** by double-sided tape, an adhesive, thermal welding, or the like. The second pressing cuff **62** is fluidly connected to the pump **14** through the fluid circuit **24**. The second pressing cuff **62**, at one main surface, is fixed to an inner surface of the second curler **61**. The second pressing cuff **62**, by being inflated, presses the opposing wrist **300** and presses the overlapped first cuff structure **4** toward the wrist **300**. A thickness of the second pressing cuff **62** when inflated is the same as a thickness of the first pressing cuff **52** or greater than the thickness of the first pressing cuff **52** when inflated.

[0101] The second pressing cuff **62** includes, for example, one or more of the air bags **91**, the flow path body **92** provided at an end portion of the air bag **91**, and the connection portion **93** such as a nipple provided in the flow path body **92** and connected to the fluid circuit **24**. Here, the air bag **91** is a bag-like structure, and in the present embodiment, a configuration is adopted in which the blood pressure measurement device **1** uses air with the pump **14**, and thus the present embodiment will be described using the air bag. However, in a case in which a fluid other than air is used, the bag-like structure need only be a fluid bag that is inflated by a fluid. The air bag **91** is formed in a rectangular bag shape that is long in one direction.

[0102] The air bag **91** is made by forming a plurality of sheet members into a bag shape by thermal welding or the like. For example, when a configuration is adopted in which the second pressing cuff **62** includes a plurality of the air bags **91**, the plurality of air bags **91** are layered, integrally formed by welding or the like, and fluidly continuous. The sheet members forming the air bag **91** are made of a thermoplastic elastomer, for example. The thermoplastic elastomer is, for example, TPU.

[0103] The flow path body **92** is, for example, integrally provided at a part of one edge portion of the air bag **91** in the longitudinal direction. The flow path body **92** is formed by a portion of two sheet members of the plurality of sheet members forming the air bag **91**. Further, the flow path body **92** is formed into a shape that is long in one direction with a width smaller than a width of the air bag **91** in the lateral direction. The flow path body **92** is integrally provided with the connection portion **93** at a tip end. The flow path body **92** is connected to the fluid circuit **24** via the connection portion **93** and constitutes a flow path between the fluid circuit **24** and the air bag **91**. A thickness of the flow path body **92** at the time of inflation is smaller than a thickness of the air bag **91** at the time of inflation.

[0104] For example, a plurality of the connection portions **93** are provided. The plurality of connection portions **93** are connected to the fluid circuit **24** via the plurality of hole portions **31*b*3** formed in the bottom portion **31*b***.

[0105] Note that, for example, the connection portions **93** are connected to any one or more hole portions **31*b*3** among the plurality of hole portions **31*b*3** formed in the end portion of the bottom portion **31*b*** on the side from which the second cuff structure **5** projects.

[0106] The first pressing cuff **52** and the second pressing cuff **62** of the first cuff structure **4** and the second cuff structure **5** thus configured are formed to such a length that, when the blood pressure measurement device **1** is attached to the wrist **300** having the maximum circumferential length, the inflated portion of the air bag **71** of the first pressing cuff **52** can cover at least one of the two arteries **311**, **312**, and the air bag **91** of the second pressing cuff **62** can overlap the air bag **71**. Further, the air bag **91** of the second pressing cuff **62** is formed to such a length that, when the blood pressure measurement device **1** is attached to the wrist **300** having the maximum circumferential length and the air bag **91** overlaps the air bag **71** of the first pressing cuff **52**, an end edge of the air bag **91** on the side opposite to the flow path body **92** does not overlap the air bag **71** of the first pressing cuff **52** on the artery covered by the air bag **71** of the first pressing cuff **52**. That is, the air bag **91** of the second pressing cuff **62** is set to such a length that, when the blood pressure measurement device **1** is attached to the wrist **300** having the maximum circumferential length and the air bag **91** overlaps the air bag **71** of the first pressing cuff **52**, the inflated portion of the air bag **91** of the second pressing cuff **62** overlaps the air bag **71** of the first pressing cuff **52** on the artery covered by the air bag **71** of the first pressing cuff **52**.

[0107] The band **6** is formed in a belt-like shape on an outer peripheral side, on the side opposite to the wrist **300**, of the first cuff structure **4** and the second cuff structure **5**. The band **6** is not fixed to the first cuff structure **4** and the second cuff structure **5**. The band **6** is, at one end portion, fixed to one loop portion **31**c. Further, the band **6** includes a pair of hook-and-loop fasteners **6**a in which a hook is formed on one side and a loop is formed on the other side, and the band **6** with an end portion side inserted into the other loop portion **31**c is fixed by engaging the hook and the loop with each other. Further, the band **6** includes, at the other end portion, a grip **6**b that facilitates gripping by the user.

[0108] For example, the band **6** is fixed to the loop portion **31**c formed on the side from which the second cuff structure **5** extends, is inserted into the loop portion **31**c formed on the side from which the first cuff structure **4** extends, and is then folded back. The band **6** has such a length that, when the blood pressure measurement device **1** is attached to the wrist **300** having the maximum circumferential length at which attachment is expected, the band **6** can be inserted into the loop portion **31**c provided at the outer case **31**. Further, the hook-and-loop fastener **6**a is provided at the band **6** at such a length and in such an arrangement that the band **6** can be folded back and fastened at the wrists **300** having the maximum circumferential length and the minimum circumferential length at which attachment is expected. The end portion of the band **6** folded back at the loop portion **31**c is pulled in a direction away from the loop portion **31**c, attaching the blood pressure measurement device **1** onto the wrist **300** in a state in which the first cuff structure **4** and the second cuff structure **5** are wound around the wrist **300** as illustrated in FIG. **3**. The band **6** is fixed by the hook-and-loop fastener **6**a, restricting the first pressing cuff **52** and the second pressing cuff **62**, when inflated, from expanding outwardly away toward a side opposite to the wrist, and thus making it possible for the first pressing cuff **52** and the second pressing cuff **62** to compress the wrist. This allows the blood pressure measurement device **1** to perform blood pressure measurement by a known oscillometric method.

[0109] Next, an example of a fluid configuration of the fluid circuit **24** of the blood pressure measurement device **1** thus configured will be described with reference to FIG. **10** to FIG. **12**. Note that, in this example, one connection portion **73** of the first pressing cuff **52** is provided, three connection portions **83** of the sensing cuff **54** are provided, and three connection portions **93** of the second pressing cuff **62** are provided.

[0110] First, a configuration of the flow path plate unit (fluid circuit) **24** will be described with reference to FIG. **10** to FIG. **12**. The flow path plate unit **24** includes the flow path plate **24**a and the two flow path resistors **24**b**1**, **24**b**2** provided in the flow path plate **24**a.

[0111] A plurality of internal flow paths are formed in the flow path plate **24**a. As a specific example, the flow path plate **24**a includes a first internal flow path **241**, the second internal flow path **242**, a third internal flow path **243**, a fourth internal flow path **244**, a fifth internal flow path **245**, a sixth internal flow path **246**, and a seventh internal flow path **247**.

[0112] The first internal flow path **241** connects the pump **14** and the first pressing cuff **52** as well as the second pressing cuff **62**. The first internal flow path **241** is a flow path branched in three directions. The second internal flow path **242** connects the second pressing cuff **61** and the valve **16**. The third internal flow path **243** connects the second pressing cuff **61** and the first flow path resistor **24**b**1**. The fourth internal flow path **244** connects the first flow path resistor **24**b**1** and the sensing cuff **54**. The fifth internal flow path **245** connects the sensing cuff **54** and the pressure sensor **17**. The sixth internal flow path **246** connects the sensing cuff **54** and the second flow path resistor **24**b**2**. The seventh internal flow path **247** connects the second flow path resistor **24**b**2** and the atmosphere, and opens a secondary side of the second flow path resistor **24**b**2** to the atmosphere.

[0113] The plurality of internal flow paths **241** to **247** are formed in the flow path plate **24**a as independent flow paths.

[0114] The flow path plate **24**a includes, for example, a first port **24**a**1** connecting the pump **14**, a second port **24**a**2** connecting the valve **16**, a third port **24**a**3** connecting the pressure sensor **17**, and a fourth port **24**a**4** open to the atmosphere. For example, the first port **24**a**1** to the fourth port **24**a**4** are provided in an upper surface of the flow path plate **24**a, that is, in a main surface of the flow path plate **24**a on the windshield **32** side.

[0115] The first port **24**a**1** is formed in one end portion of three end portions of the first internal flow path **241**. The second port **24**a**2** is formed at one end portion of the second internal flow path **242**. The third port **24**a**3** is formed at one end portion of the fifth internal flow path **245**. The fourth port **24**a**4** is formed at one end portion of the seventh internal flow path **247**.

[0116] The flow path plate **24**a includes, for example, the plurality of ports **24**c selectively connected to the cuffs of the first cuff structure **4** and the second cuff structure **5** and the testers or sealed. The plurality of ports **24**c are disposed facing the plurality of hole portions **31**b**3** formed in the bottom portion **31**b of the outer case **31**.

[0117] For example, the plurality of ports **24**c include one fifth port **24**cl connectable to the connection portion **73** of the first pressing cuff **52**, three sixth ports **24**c**2** connectable to the three connection portions **93** of the second pressing cuff **62**, and three seventh ports **24**c**3** connectable to the three connection portions **83** of the sensing cuff **54**. For example, the fifth port **24**cl to the seventh ports **24**c**3** are provided in a lower surface of the flow path plate **24**a, that is, in a main surface of the flow path plate **24**a on the bottom portion **31**b side.

[0118] The fifth port **24**cl is formed in, among the three end portions of the first internal flow path **241**, an end portion different from the end portion to which the first port **24**a**1** is connected. The three sixth ports **24**c**2** are respectively formed in, among the three end portions of the first internal flow path **241**, an end portion different from the end portions to which the first port **24**a**1** and the fifth port **24**cl are connected, the other end portion of the second internal flow path **242**, and the other end portion of the third internal flow path **243**. The three seventh ports **24**c**3** are formed in the other end portion of the fourth internal flow path **244**, the other end portion of the fifth internal flow path **245**, and the other end portion of the sixth internal flow path **246**.

[0119] The plurality of ports **24**c are formed so as to be selectively connectable to the connection portions **73**, **83**, **93** of the respective cuffs **52**, **54**, **62** and various testers. Further, the plurality of ports **24**c are sealably formed.

[0120] Next, as the blood pressure measurement device **1**, a configuration of the fluid circuit **24** to which the first cuff structure **4** and the second cuff structure **5** are connected will be described with reference to FIG. **11**. The first pressing cuff **52** is fixed to the fifth port **24**cl at the connection portion **73**, and the second pressing cuff **62** is fixed to one sixth port **24**c**2** at the connection portion **93**. Thus, the first pressing cuff **52** and the second pressing cuff **62** are connected to the pump **14** through the first internal flow path **241** of the flow path plate **24***a*.

[0121] The second pressing cuff **62** is connected to the valve **16** through the second internal flow path **242** of the flow path plate **24***a* by the connection portion **93** being fixed to one sixth port **24***c***2**. Further, the second pressing cuff **62** is connected to the first flow path resistor **24***b***1** through the third internal flow path **243** of the flow path plate **24***a* by the connection portion **93** being fixed to one sixth port **24***c***2**.

[0122] The sensing cuff **54** is connected to the first flow path resistor **24***b***1** through the fourth internal flow path **244** of the flow path plate **24***a* by the connection portion **83** being fixed to one seventh port **24***c***3**. Thus, the sensing cuff **54** is connected to the second pressing cuff **62** through the first flow path resistor **24***b***1**. Further, the sensing cuff **54** is connected to the pressure sensor **17** through the fifth internal flow path **245** of the flow path plate **24***a* by the connection portion **83** being fixed to one seventh port **24***c***3**. Further, the sensing cuff **54** is connected to the second flow path resistor **24***b***2** through the sixth internal flow path **246** of the flow path plate **24***a* by the connection portion **83** being fixed to one seventh port **24***c***3**, thereby connecting the sensing cuff **54** to the atmosphere through the second flow path resistor **24***b***2**. Here, the first flow path resistor **24***b***1** between the first pressing cuff **52** and the sensing cuff **54** and the second flow path resistor **24***b***2** between the sensing cuff **54** and the atmosphere are set to flow path resistances at which the first pressing cuff **52** and the sensing cuff **54** have a desired difference in pressure.

[0123] Next, a configuration of the fluid circuit **24** to which the blood pressure measurement device **1** and the testers are connected when testing each component will be described with reference to FIG. **12**.

[0124] One of the fifth port **24***cl* or one sixth port **24***c***2** connected to the first internal flow path **241** is sealed, and the other is connected to a pump tester **401** that tests a performance of the pump **14**. Note that the example illustrated in FIG. **12** illustrates an example in which the fifth port **24***cl* is sealed and the pump tester **401** is connected to the sixth port **24***c***2**. Thus, with the pump tester **401** connected only to the pump **14** through the first internal flow path **241**, it is possible to test the pump **14**.

[0125] The sixth port **24***c***2** connected to the second internal flow path **242** is connected to a valve tester **402** that tests the valve **16**. Thus, with the valve tester **402** connected only to the valve **16** through the second internal flow path **242**, it is possible to test the valve **16**.

[0126] The sixth port **24***c***2** connected to the third internal flow path **243** is connected to a first flow path resistor tester **403** that tests the first flow path resistor **24***b***1**, and the seventh port **24***c***3** connected to the fourth internal flow path **244** is opened to the atmosphere. Accordingly, the first flow path resistor tester **403** is connected to the atmosphere through the first flow path resistor **24***b***1** by the third internal flow path **243** and the fourth internal flow path **244**, making it possible to test the first flow path resistor **24***b***1**.

[0127] The seventh port **24***c***3** connected to the fifth internal flow path **245** is connected to a sensor tester **404** that tests the pressure sensor **17**. Thus, with the sensor tester **404** connected only to the pressure sensor **17** through the fifth internal flow path **245**, it is possible to test the pressure sensor **17**.

[0128] The seventh port **24***c***3** connected to the sixth internal flow path **246** is connected to a second flow path resistor tester **405** that tests the second flow path resistor **24***b***2**, and the fourth port **24***a***4** connected to the seventh internal flow path **247** is opened to the atmosphere. Thus, with the second flow path resistor tester **405** connected to the atmosphere through the second flow path resistor **24***b***2** by the sixth internal flow path **246** and the seventh internal flow path **247**, it is possible to test the second flow path resistor **24***b***2**.

[0129] Thus, the various testers **401** to **405** are respectively connected to testing targets through the internal flow paths **241** to **247**, making it possible to test the testing targets independently. Further, the various testers **401** to **405** need only be connected to the plurality of ports **24***c* to which the cuffs **52**, **54**, **62** are connected, simplifying connection. That is, the plurality of ports **24***c* are selectively connectable to the respective cuffs **52**, **54**, **62** and the respective testers **401** to **405**, facilitating the attachment/detachment and the sealing of the respective cuffs **52**, **54**, **62** and the respective testers **401** to **405** during blood pressure measurement and testing.

[0130] Next, an example of the power transmission device **100** that transmits power to the charging circuit unit **21** of the device body **3** will be described.

[0131] As illustrated in FIG. **4**, the power transmission device **100** includes a power source **101**, a power transmission unit **102**, the antenna unit **103**, and the power transmission terminal **104**. Note that a configuration may be adopted in which the power transmission device **100** includes one of the antenna unit **103** or the power transmission terminal **104**. The power source **101** is, for example, an AC adapter connected to a commercial power source or the like. The power source **101** converts AC power input from a commercial power source into DC power and supplies the DC power to the power transmission unit **102**.

[0132] The power transmission unit **102** generates AC power as transmission power from the DC power supplied from the power source **101**, and supplies the AC power to the antenna unit **103**. For example, the power transmission unit **102** generates AC power having a frequency that is the same or substantially the same as a resonance frequency of the power transmission resonance circuit of the antenna unit **103**.

[0133] The antenna unit **103** is, for example, a transmitter coil of a power transmission resonance circuit. A power transmission surface of the antenna unit **103** is formed into a planar shape. The antenna unit **103** transmits power to the antenna unit **211** of the device body **3**. The antenna unit **103** includes, for example, a resonance capacitor and constitutes a power transmission resonance circuit.

[0134] The power transmission terminal **104** comes into contact with the charging terminal **214** provided in the device body **3** and is formed so as to be fixable to the charging terminal **214**.

[0135] In the blood pressure measurement device **1** thus configured, the plurality of internal flow paths **241** to **247** formed in the flow path plate **24***a* of the flow path plate unit (fluid circuit) **24** respectively connect the pump **14** and the first pressing cuff **52** as well as the second pressing cuff **62**, the valve **16** and the second pressing cuff **62**, the second pressing cuff **62** and the first flow path resistor **24***b***1**, the first flow path resistor **24***b***1** and the sensing cuff **54**, the pressure sensor **17** and the sensing cuff **54**, the sensing cuff **54** and the second flow path resistor **24*b*2**, and the second flow path resistor **24*b*2** and the atmosphere. Further, the internal flow paths **241** to **247** are independent from one another. Thus, when the blood pressure measurement device **1** is in a usable state in which the blood pressure can be measured, the flow path plate unit **24** can connect the pump **14**, the valve **16**, and the pressure sensor **17** serving as components to the cuffs **52**, **54**, **62**. Further, at the time of manufacture or at the time of maintenance of the blood pressure measurement device **1**, the components **14**, **16**, **17** and the testers **401** to **405** can be connected to each other in a testing state in which the components **14**, **16**, **17** are tested, and can be sealed or opened to the atmosphere when testing is not performed. Thus, the blood pressure measurement device **1** can individually test the pump **14**, the valve **16**, and the pressure sensor **17** provided in the flow path plate unit **24** without increasing a size of the flow path plate **24*a*** in which the flow path resistors **24*b*1**, **24*b*2** are provided, that is, the flow path plate unit **24**.

[0136] Further, in the blood pressure measurement device **1**, the second pressing cuff **62** and the first flow path resistor **24*b*1**, the first flow path resistor **24*b*1** and the sensing cuff **54**, the sensing cuff **54** and the second flow path resistor **24*b*2**, and the second flow path resistor **24*b*2** and the atmosphere can be connected by the third internal flow path **243**, the fourth internal flow path **244**, the sixth internal flow path **246**, and the seventh internal flow path **247**, respectively. Thus, the blood pressure measurement device **1** can also test the first flow path resistor **24*b*1** and the second flow path resistor **24*b*2** by connecting the first flow path resistor tester **403** and the second flow path resistor tester **405** to the third internal flow path **243** and the sixth internal flow path **246**, respectively, and opening the fourth internal flow path **244** to the atmosphere.

[0137] Further, a configuration is adopted in which the flow path plate **24*a*** includes the plurality of ports **24*c*** selectively connectable to the connection portions **73**, **83**, **93** of the cuffs **52**, **54**, and **62** and the testers **401** to **405**. That is, in the flow path plate **24*a***, the plurality of ports **24*c*** can be used for blood pressure measurement as well as testing without providing ports to which the cuffs **52**, **54**, **62** and the testers **401** to **405** are respectively connected, making it possible to prevent an enlargement in shape and facilitating sealing and atmosphere release. That is, the cuffs **52**, **54**, **62**, the testers **401** to **405**, and sealing plugs are selectively connectable to the ports **24*c*** from the hole portions **31*b*3** in a state in which the cuff cover **33** is removed, making it possible to simplify the internal flow paths **241** to **247** and thus impart high workability to the blood pressure measurement device **1**.

[0138] Further, in the blood pressure measurement device **1**, the first cuff structure **4** and the second cuff structure **5** extending from the device body **3** and fluidly connected to each other are respectively disposed on both sides of the device body **3** in one direction. Further, the device body **3** includes, at the bottom portion **31*b*** of the case **11** that is the rear surface side, the projection portion (sensor unit) **31*b*1** as a space in which at least one of the biometric sensors **20** or the charging terminal **214** is disposed at a position separated from the first cuff structure **4** and the second cuff structure **5**, for example, on a center side of the bottom portion **31*b***. Accordingly, the first cuff structure **4**, the second cuff structure **5**, and at least one of the biometric sensors **20** or the charging terminal **214** can each be disposed on the rear surface side of the device body **3**.

[0139] Further, the first cuff structure **4** and the second cuff structure **5** are fluidly connected to each other through the fluid circuit **24** including the flow path plate **24*a***. Note that the first cuff structure **4** and the second cuff structure **5** may directly fluidly connect the first pressing cuff **52** and the second pressing cuff **62**. With these configurations, even when the first cuff structure **4** and the second cuff structure **5** are provided and fixed to the case **11** away from each other in one direction, it is possible to fluidly connect the first cuff structure **4** and the second cuff structure **5**.

[0140] Further, when the blood pressure measurement device **1** is attached to the wrist **300** having the maximum circumferential length expected for attachment, the air bag **71** of the first pressing cuff **52** covers the region where at least one artery of the two arteries **311**, **312** is present, and the air bag **91** of the second pressing cuff **62** can overlap at least part of the air bag **71** of the first pressing cuff **52**.

[0141] Thus, the wrist **300** can be pressed by the first pressing cuff **52** and the second pressing cuff **62** and, even if the air bag **71** of the first pressing cuff **52** and the air bag **91** of the second pressing cuff **62** are not disposed at the rear surface of the device body **3**, a sufficient pressing force for compressing the artery can be secured.

[0142] Thus, when the blood pressure measurement device **1** is attached to the wrist **300** having the maximum circumferential length expected for attachment, the air bag **71** of the first pressing cuff **52** and the air bag **91** of the second pressing cuff **62** can overlap by a predetermined length. Further, when the blood pressure measurement device **1** is attached to the wrist **300** having the minimum circumferential length, the first cuff structure **4** and the second cuff structure **5** each have such a length so as to not come into contact with the device body **3**. Further, the first cuff structure **4** and the second cuff structure **5** are not directly joined to the band **6**.

[0143] With these configurations, the blood pressure measurement device **1**, with the air bags **71**, **91** of the first pressing cuff **52** and the second pressing cuff **62** being inflated in an overlapping manner, makes it possible to suitably press the artery by the first pressing cuff **52** and the second pressing cuff **62**. Thus, the blood pressure measurement device **1** makes it possible to dispose the biometric sensors **20** on the rear surface side of the device body **3** and, even if the air bags **71**, **91** of the first pressing cuff **52** and the second pressing cuff **62** are not disposed at the rear surface of the device body **3**, measure blood pressure with favorable accuracy.

[0144] Further, the case **11** includes the vent **31*b*6** covered with the waterproof moisture-permeable sheet **31*b*7** at the bottom portion **31*b***, facilitating ventilation in the case **11**. Further, the vent **31*b*6** and the first cuff structure **4** as well as the second cuff structure **5** are disposed at positions separated from each other in a portion of the bottom portion **31*b*** other than the projection portion **31*b*1**, making it possible to prevent the vent **31*b*6** from being blocked by the first cuff structure **4** and the second cuff structure **5**. Further, the vent **31*b*6** is provided at a position covered with the cuff cover **33** disposed spaced apart from the bottom portion **31*b***, thereby protecting the vent **31*b*6** with the cuff cover **33**. Thus, the blood pressure measurement device **1** can prevent dirt from adhering to the vent **31*b*6** and the waterproof moisture-permeable sheet **31*b*7**, making it possible to prevent impairment of the ventilation function.

[0145] Further, the first cuff structure **4** and the second cuff structure **5** are covered with the cuff cover **33** at end portions disposed at the bottom portion **31*b*** of the case **11**, and are thus restricted in movement in a direction away from the bottom portion **31*b*** by the cuff cover **33**. This makes it possible to prevent the first cuff structure **4** and the second cuff structure **5** from being readily detached from the device body **3**.

[0146] Further, a configuration is adopted in which the blood pressure measurement device **1** is provided with the various sensors **20*a*** to **20*c*** as the biometric sensors **20** and the charging terminal **214** at the bottom portion **31*b*** of the device body **3**. Thus, the device body **3** enables simplification of wiring and the like, increasing a degree of freedom in arrangement, by not requiring the biometric sensors **20** and the charging terminal **214** to be provided from the substrate **25** provided inside the case **11** to a position far from the device body. Further, the biometric sensors **20** are provided in the case **11** having high rigidity, and can stably come into contact with the wrist **300** when the blood pressure measurement device **1** is attached to the wrist **300**, making it possible to suitably acquire biological information by the biometric sensors **20**. Further, the charging terminal **214** is provided at the bottom portion **31*b*** and thus, when the blood pressure measurement device **1** is removed from the wrist **300**, the charging terminal **214** is exposed to the outside, facilitating charging using the charging terminal **214**.

[0147] Further, in the blood pressure measurement device **1**, the first pressing cuff **52** and the second pressing cuff **62** are fluidly connected through the fluid circuit **24** provided inside the device body **3**, making it possible simplify the arrangement of the first pressing cuff **52** and the second pressing cuff **62** at the bottom portion **31*b***.

[0148] The blood pressure measurement device **1** thus configured makes it possible to individually test, by the testers **401** to **405**, the pump **14**, the valve **16**, the pressure sensor **17**, the first flow path resistor **24*b*1**, and the second flow path resistor **24*b*2**, which are components provided in the flow path plate unit **24**, without increasing the size of the flow path plate unit **24**.

[0149] Note that the present invention is not limited to the embodiment described above. For example, in the above-described example, an example is described in which the flow path plate unit **24** that is the fluid circuit includes the first internal flow path **241** connecting the pump **14**, the first pressing cuff **52**, and the second pressing cuff **62**, and the third internal flow path **243** connecting the second pressing cuff **62** and the first flow path resistor **24*b*1** as independent flow paths, and includes the fourth internal flow path **244** connecting the first flow path resistor **24*b*1** and the sensing cuff **54**, and the sixth internal flow path **246** connecting the sensing cuff **54** and the second flow path resistor **24*b*2** as independent flow paths.

[0150] However, as illustrated in FIG. **13** to FIG. **16**, a configuration may be adopted in which the flow path plate unit **24** is provided with an eighth internal flow path **241**, **243** obtained by integrating the first internal flow path **241** and the third internal flow path **243**, and a ninth internal flow path **244**, **246** obtained by integrating the fourth internal flow path **244** and the sixth internal flow path **246**.

[0151] The blood pressure measurement device **1** having such a configuration is provided with one connection portion **73** of the first pressing cuff **52**, two connection portions **83** of the sensing cuff **54**, and two connection portions **93** of the second pressing cuff **62**. That is, as illustrated in FIG. **14**, two connection portions **83** of the sensing cuff **54** and two connection portions **93** of the second pressing cuff **62** can be provided and, as illustrated in FIG. **13** and FIG. **14**, two sixth ports **24*c*2** and two seventh ports **24*c*3** can be provided.

[0152] For example, as illustrated in FIG. **14**, the eighth internal flow path **241**, **243** is connected to the pump **14**, the first pressing cuff **52**, the second pressing cuff **62**, and the first flow path resistor **24*b*1** through the first port **24*a*1**, the fifth port **24*cl***, and the sixth port **24*c*2**. Further, as illustrated in FIG. **14**, the ninth internal flow path **244**, **246** is connected to the first flow path resistor **24*b*1**, the second flow path resistor **24*b*2**, and the sensing cuff **54** through the seventh port **24*c*3**.

[0153] Further, during the testing of the pump **14**, as illustrated in FIG. **15**, the pump tester **401** need only be connected to the fifth port **24*cl*** and the one sixth port **24*c*2** connected to the eighth internal flow path **241**, **243**, and the other of the sixth ports **24*c*2**, the seventh port **24*c*3** connected to the ninth internal flow path **244**, **246**, and the fourth port **24*a*4** opened to the atmosphere need only be sealed. Further, during testing of the first flow path resistor **24*b*1** and the second flow path resistor **24*b*2**, as illustrated in FIG. **16**, the first flow path resistor tester **403** need only be connected to the fifth port **24*cl*** and the one sixth port **24*c*2** connected to the eighth internal flow path **241**, **243**, the second flow path resistor tester **405** need only be connected to the other of the sixth ports **24*c*2** and the seventh port **24*c*3** connected to the ninth internal flow path **244**, **246**, the pump **14** need only apply pressure from the first port **24*a*1**, and the fourth port **24*a*4** need only be opened to the atmosphere.

[0154] According to the blood pressure measurement device **1** having such a configuration, it is possible to reduce the number of connection points between the flow path plate unit **24** and the cuffs **54**, **62**, and to test the pump **14**, the valve **16**, and the pressure sensor **17**. Further, the resistance values due to the first flow path resistor **24*b*1** and the second flow path resistor **24*b*2** can be obtained from a pressure difference measured by the first flow path resistor tester **403** and the second flow path resistor tester **405**.

[0155] Further, in the example described above, an example is described in which the pump **14** has a configuration including the valve mechanism as an open-close valve. However, the configuration is not limited thereto, and the pump **14** may have a configuration not including the valve mechanism. For example, FIG. **17** to FIG. **19** illustrate an example of the flow path plate unit **24** in the case of adopting a configuration in which the pump **14** does not include a valve mechanism.

[0156] For example, in the case of adopting a configuration in which the pump **14** does not include a valve mechanism, the blood pressure measurement device **1** includes, for example, two valves **16** and two pressure sensors **17**. Further, as illustrated in FIG. **17** and FIG. **18**, the flow path plate unit **24** includes two second ports **24*a*2** and two third ports **24*a*3**, includes two independent second internal flow paths **242** and two independent fifth internal flow paths **245**, and includes four sixth ports **24*c*2** and four seventh ports **24*c*3**.

Further, the sensing cuff **54** includes four connection portions **83**, and the second pressing cuff **62** includes four connection portions **93**.

[0157] Further, during testing, in the blood pressure measurement device **1**, the valve tester **402** is connected to each of the two second internal flow paths **242**, and the sensor tester **404** is connected to each of the two fifth internal flow paths **245**. In this way, the blood pressure measurement device **1** may have a configuration in which the pump **14** does not include a valve mechanism.

[0158] Further, in the example described above, a configuration in which the flow path plate **24***a* includes the plurality of ports **24***c* by which the cuffs **52**, **54**, **62** and the testers **401** to **405** are selectively connected has been described, but the arrangement of the plurality of ports **24***c* can be set as appropriate. However, collectively disposing the plurality of ports **24***c* for each of the cuffs **52**, **54**, **62** to be connected makes it possible to simplify the shapes of the flow path bodies **72**, **82**, **92** of the cuffs **52**, **54**, **62**, and thus is preferred.

[0159] Further, in the example described above, an example is described in which the band **6** is not fixed to the first cuff structure **4** and the second cuff structure **5**. However, a configuration may be adopted in which the band **6** is fixed to the second cuff structure **5** which is on the outer side when the first cuff structure **4** and the second cuff structure **5** overlap. That is, even if the band **6** is fixed to the second cuff structure **5**, if the first cuff structure **4** closer to the wrist **300** than the second cuff structure **5** is not fixed to the band **6**, when the band **6** is tightened, the first cuff structure **4** and the second cuff structure **5** can be tightened and brought into close contact with the wrist **300**.

[0160] Further, in the example described above, a configuration is adopted in which the device body **3** is provided with the PPG sensor **20***a*, the SpO2 sensor **20***b*, and the ECG sensor **20***c* as the biometric sensors **20** at the bottom portion **31***b* of the outer case **31** forming the rear surface side of the case **11**. However, a configuration may be adopted in which the biometric sensor **20** is any one of the PPG sensor **20***a*, the SpO2 sensor **20***b*, and the ECG sensor **20***c*, or includes a sensor that acquires other biological information in addition to these sensors **20***a* to **20***c* or in place of these sensors **20***a* to **20***c*.

[0161] That is, the present invention is not limited to the above-described embodiments, and various modifications can be made in an implementation stage without departing from the gist thereof. Furthermore, each of the embodiments may be carried out as appropriate in a combination to the extent possible, and combined effects can be obtained in such a case. Furthermore, the inventions at various stages are included in the above-described embodiments, and the various inventions can be extracted in accordance with appropriate combinations in the plurality of disclosed constituent elements. Note that the present invention is not limited to the above-described embodiments, and various modifications can be made in an implementation stage without departing from the gist. Further, embodiments may be carried out as appropriate in a combination, and combined effects can be obtained in such case. Further, the various inventions are included in the embodiment, and the various inventions may be extracted in accordance with combinations selected from the plurality of disclosed constituent elements. For example, in a case in which the problem can be solved and the effects can be obtained even when some constituent elements are removed from the entire constituent elements given in the embodiment, the configuration obtained by removing the constituent elements may be extracted as an invention.

REFERENCE NUMERALS LIST

[0162] **1** Blood pressure measurement device
[0163] **3** Device body
[0164] **4** First cuff structure
[0165] **5** Second cuff structure
[0166] **6** Band
[0167] **6***a* Hook-and-loop fastener
[0168] **6***b* Knob
[0169] **11** Case
[0170] **12** Display unit
[0171] **13** Operation unit
[0172] **14** Pump
[0173] **15** Acceleration sensor
[0174] **16** Valve
[0175] **17** Pressure sensor
[0176] **18** Battery
[0177] **19** Communication unit
[0178] **20** Biometric sensor
[0179] **20***a* PPG sensor
[0180] **20***b* SpO2 sensor
[0181] **20***c* ECG sensor
[0182] **20***c***1** Electrocardiogra
[0183] **20***d* First LED
[0184] **20***e* Second LED
[0185] **20***f* First PD
[0186] **20***g* Second PD
[0187] **21** Charging circuit unit
[0188] **22** Memory
[0189] **23** Processor
[0190] **24** Flow path plate unit (fluid circuit)
[0191] **24***a* Flow path plate
[0192] **24***a***1** First port
[0193] **24***a***2** Second port
[0194] **24***a***3** Third port
[0195] **24***a***4** Fourth port
[0196] **24***b* Flow path resistor (orifice)
[0197] **24***b***1** First flow path resistor
[0198] **24***b***2** Second flow path resistor
[0199] **24***cl* Fifth port
[0200] **24***c***2** Sixth port
[0201] **24***c***3** Seventh port
[0202] **25** Substrate
[0203] **25***a* Control board
[0204] **25***b* Sensor main board
[0205] **25***c* Sensor sub-board
[0206] **31** Outer case
[0207] **31***a* Peripheral wall portion
[0208] **31***b* Bottom portion (rear surface)
[0209] **31***b***1** Projection portion (sensor unit)
[0210] **31***b***1** Sensor unit
[0211] **31***b***2** Window portion
[0212] **31***b***3** Hole portion
[0213] **31***b***4** Opening
[0214] **31***b***5** Cover
[0215] **31***b***6** Vent
[0216] **31***b***7** Waterproof moisture-permeable sheet
[0217] **31***c* Loop portion
[0218] **31***d* Opening
[0219] **32** Windshield

[0220] **33** Cuff cover
[0221] **33***a* Opening
[0222] **33***b* Hole
[0223] **41** Button
[0224] **43** Touch panel
[0225] **51** First curler
[0226] **52** First pressing cuff
[0227] **53** Back plate
[0228] **54** Sensing cuff
[0229] **61** Second curler
[0230] **62** Second pressing cuff
[0231] **71** Air bag
[0232] **72** Flow path body
[0233] **73** Connection portion
[0234] **81** Air bag
[0235] **82** Flow path body
[0236] **83** Connection portion
[0237] **91** Air bag
[0238] **92** Flow path body
[0239] **93** Connection portion
[0240] **100** Power transmission device
[0241] **101** Power source
[0242] **102** Power transmission unit
[0243] **103** Antenna unit
[0244] **104** Power transmission terminal
[0245] **211** Antenna unit
[0246] **212** Power-receiving unit
[0247] **213** Charging unit
[0248] **214** Charging terminal
[0249] **214***a* Terminal
[0250] **241** First internal flow path
[0251] **242** Second internal flow path
[0252] **243** Third internal flow path
[0253] **244** Fourth internal flow path
[0254] **245** Fifth internal flow path
[0255] **246** Sixth internal flow path
[0256] **247** Seventh internal flow path
[0257] **300** Wrist
[0258] **311** Radial artery
[0259] **312** Ulnar artery
[0260] **401** Pump tester
[0261] **402** Valve tester
[0262] **403** First flow path resistor tester
[0263] **404** Sensor tester
[0264] **405** Second flow path resistor tester

What is claimed is:

1. A blood pressure measurement device comprising:
a case;
a plurality of components including
a pump provided in the case,
a valve provided in the case, and
a pressure sensor provided in the case; and
a flow path plate unit in which a plurality of internal flow paths are formed, first ends of the plurality of internal flow paths being respectively connected to the plurality of components and second ends of the plurality of internal flow paths being selectively connected to at least one of a plurality of cuffs and a plurality of testers configured to respectively test the plurality of components.

2. The blood pressure measurement device according to claim **1**, wherein
the plurality of cuffs include a pressing cuff and a sensing cuff,
the flow path plate unit includes a first flow path resistor and a second flow path resistor, and
the plurality of internal flow paths include
an internal flow path connecting the pressing cuff and the first flow path resistor,
an internal flow path connecting the first flow path resistor and the sensing cuff,
an internal flow path connecting the sensing cuff and the second flow path resistor, and
an internal flow path connecting the second flow path resistor and the atmosphere.

3. The blood pressure measurement device according to claim **2**, wherein
the internal flow path connecting the pressing cuff and the first flow path resistor is further connected to the pump, and
the internal flow path connecting the first flow path resistor and the sensing cuff and the internal flow path connecting the sensing cuff and the second flow path resistor are continuously and integrally formed.

4. The blood pressure measurement device according to claim **1**, wherein
the flow path plate unit includes a plurality of ports respectively connectable to the plurality of cuffs and the plurality of testers, and respectively continuous with the plurality of internal flow paths.

5. The blood pressure measurement device according to claim **2**, wherein
the flow path plate unit includes a plurality of ports respectively connectable to the plurality of cuffs and the plurality of testers, and respectively continuous with the plurality of internal flow paths.

6. The blood pressure measurement device according to claim **3**, wherein
the flow path plate unit includes a plurality of ports respectively connectable to the plurality of cuffs and the plurality of testers, and respectively continuous with the plurality of internal flow paths.

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