



(11) **EP 3 479 760 A1**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:  
**08.05.2019 Bulletin 2019/19**

(51) Int Cl.:  
**A61B 5/021 (2006.01) A61B 5/00 (2006.01)**

(21) Application number: **18201155.1**

(22) Date of filing: **18.10.2018**

(84) Designated Contracting States:  
**AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR**  
Designated Extension States:  
**BA ME**  
Designated Validation States:  
**KH MA MD TN**

- **Chen, Shih-Chang**  
**Hsinchu, Taiwan, R.O.C. (TW)**
- **Liao, Jia-Yu**  
**Hsinchu, Taiwan, R.O.C. (TW)**
- **Han, Yung-Lung**  
**Hsinchu, Taiwan, R.O.C. (TW)**
- **Huang, Chi-Feng**  
**Hsinchu, Taiwan, R.O.C. (TW)**
- **Lee, Wei-Ming**  
**Hsinchu, Taiwan, R.O.C. (TW)**

(30) Priority: **07.11.2017 TW 10638512**

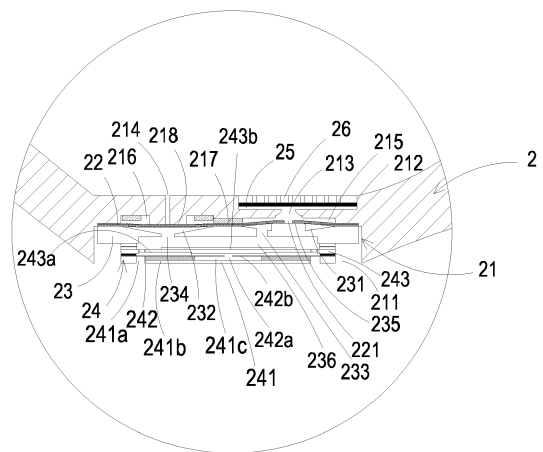
(71) Applicant: **Microjet Technology Co., Ltd**  
**Hsinchu (TW)**

(74) Representative: **Uexküll & Stolberg**  
**Partnerschaft von**  
**Patent- und Rechtsanwälten mbB**  
**Beselerstraße 4**  
**22607 Hamburg (DE)**

(72) Inventors:  
• **Mou, Hao-Jan**  
**Hsinchu, Taiwan, R.O.C. (TW)**

(54) **WEARABLE BLOOD PRESSURE MEASURING DEVICE**

(57) A wearable blood pressure measuring device (100) includes a wristband (2), a valve plate (22), a gas-collecting seat (23), a gas transportation device (24), an elastic medium (25) and a pressure sensor (26). The wristband (2) has a mounting zone (21). The mounting zone (21) has a first accommodation recess (211), a second accommodation recess (212), a gas-collecting hole (213) and a pressure-releasing hole (214). The first accommodation recess (211) and the second accommodation recess (212) are in fluid communication with each other through the gas-collecting hole (213). When the gas transportation device (24) is enabled to transport the gas to the elastic medium (25), the elastic medium (25) is inflated with the gas and expanded to push the pressure sensor (26) to be in close contact with a measurement part of a user's body, thereby measuring a blood pressure value of a target artery through a scanning operation.



**FIG. 2**

**EP 3 479 760 A1**

**Description**

## FIELD OF THE INVENTION

**[0001]** The present disclosure relates to a wearable device, and more particularly to a wearable blood pressure measuring device having a gas transportation device, an elastic medium and a pressure sensor combined together.

## BACKGROUND OF THE INVENTION

**[0002]** Nowadays, the pace of life becomes fast and the personal pressure is growing. As the awareness of the pursuit of personal health is gradually evolving, people want to regularly monitor or examine their health condition. Conventionally, the human physiological health information is measured through a fixed sphygmomanometer or a large-scale detection instrument. The detection instrument usually includes a motor-driven gas pump, an air bag, a sensor, a gas-releasing valve, a battery, and so on. During the operation of the motor-driven gas pump, the motor-driven gas pump is readily suffered from frictional loss. After these components are assembled, the volume of the product is large and thus the product is not suitable for frequent use. If a small-sized motor-driven gas pump is used, the frictional loss is increased and more energy is consumed.

**[0003]** For facilitating the ordinary persons to regularly monitor their own health conditions and allowing the monitoring device to be easily carried, many wearable health monitoring devices are introduced into the market. Generally, the wearable health monitoring devices are used for measuring the health conditions according to the optical detection technologies. Since the precision of the optical detection is not high enough, the detected value is possible erroneous so that reliable data cannot be obtained effectively. Since the users fail to acquire accurate data relative to their health condition, the users may misjudge their health condition.

**[0004]** Generally, for measuring the physiological information of a user, a specified part of the user's body (e.g., head, heart, wrist or ankle) is monitored by a measuring device. At the specified part, the pulse blood pressure and heartbeat in the human body are sensed the most easily. By sensing the specified part, the physiological health information can be rapidly and effectively realized. As mentioned above, the precision of the wearable health monitoring device operated according to the optical detection technology is not high and the measured data is usually not reliable. Moreover, the commercially-available sphygmomanometers or other measuring instruments with higher reliability have bulky volume and fail to meet the requirements of small size, light weightiness and easy portability.

**[0005]** Therefore, there is a need of providing a wearable blood pressure measuring device in order to address the above-mentioned issues. The wearable blood pres-

sure measuring device is small-sized, miniaturized, portable, power-saving and high-precise.

## SUMMARY OF THE INVENTION

**[0006]** An object of the present disclosure provides a wearable blood pressure measuring device. The wearable blood pressure measuring device includes a gas transportation device, an elastic medium and a pressure sensor combined together. By transporting gas to the elastic medium through the piezoelectric-actuated gas transportation device, the elastic medium is inflated with the gas and expanded to raise the pressure sensor. Then, the pressure sensor disposed relative to the elastic medium is utilized to measure the blood pressure information of the user wearing the device. Thus, it solves the problems of the measuring instrument used in the prior art, which has a large volume, is difficult to be thinned, consumes much power and cannot achieve the purpose of being portable. At the same time, it further solves the problem of low precision caused by the health monitoring device in the prior art, which detects through the optical detection method.

**[0007]** In accordance with an aspect of the present disclosure, a wearable blood pressure measuring device is provided. The wearable blood pressure measuring device includes a wristband, a valve plate, a gas-collecting seat, a gas transportation device, an elastic medium and a pressure sensor. The wristband has a mounting zone. The mounting zone includes a first accommodation recess, a second accommodation recess, a gas-collecting hole and a pressure-releasing hole. The first accommodation recess and the second accommodation recess are in fluid communication with each other through the gas-collecting hole. The first accommodation recess is in fluid communication with an environment outside the wristband through the pressure-releasing hole. The valve plate is stacked on an inner surface of the first accommodation recess. The valve plate has a valve opening aligned with the gas-collecting hole. The gas-collecting seat is disposed within the first accommodation recess and stacked on the valve plate. The gas-collecting seat has plural perforations. The gas transportation device covers and seals the gas-collecting seat for introducing gas through the plural perforations of the gas-collecting seat into the wearable blood pressure measuring device. The gas is introduced to push the valve plate that causes the valve opening of the valve plate to be in fluid communication with the gas-collecting hole so that the gas is further guided into and collected in the second accommodation recess. The elastic medium covers and seals the second accommodation recess and is configured to be inflated with the gas. The pressure sensor is stacked on the elastic medium. When the gas transportation device is enabled to transport the gas to the elastic medium, the elastic medium is inflated with the gas and expanded so as to push the pressure sensor to be in close contact with a measurement part of a user's body, thereby meas-

uring a blood pressure value of a target artery through a scanning operation by pressing against the measurement part of the user's body.

**[0008]** The above contents of the present disclosure will become more readily apparent to those ordinarily skilled in the art after reviewing the following detailed description and accompanying drawings, in which:

#### BRIEF DESCRIPTION OF THE DRAWINGS

##### **[0009]**

FIG. 1 schematically illustrates a wearable blood pressure measuring device according to an embodiment of the present disclosure;

FIG. 2 is a schematic enlarged fragmentary view of the wearable blood pressure measuring device as shown in FIG. 1;

FIG. 3A is a schematic perspective view illustrating the gas transportation device of the wearable blood pressure measuring device according to the embodiment of the present disclosure and taken along the front side;

FIG. 3B is a schematic exploded view illustrating the gas transportation device as shown in FIG. 3A and taken along the front side;

FIG. 3C is a schematic exploded view illustrating the gas transportation device as shown in FIG. 3A and taken along the rear side;

FIGS. 4A and 4B are schematic cross-sectional views illustrating the gas-collecting action of the gas transportation device of the wearable blood pressure measuring device according to the embodiment of the present disclosure;

FIG. 5 schematically illustrates the scenario of wearing the wearable blood pressure measuring device on the wrist of the user;

FIG. 6 schematically illustrates the scenario of using the blood pressure measuring device to measure the blood pressure value; and

FIG. 7 is a schematic cross-sectional view illustrating the pressure-releasing action of the gas transportation device of the wearable blood pressure measuring device according to the embodiment of the present disclosure.

#### DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

**[0010]** The present disclosure will now be described more specifically with reference to the following embodiments. It is to be noted that the following descriptions of preferred embodiments of this disclosure are presented herein for purpose of illustration and description only. It is not intended to be exhaustive or to be limited to the precise form disclosed.

**[0011]** Please refer to FIGS. 1 and 2. The present disclosure provides a wearable blood pressure measuring

device 100 including at least one wristband 2, at least one mounting zone 21, at least one first accommodation recess 211, at least one second accommodation recess 212, at least one gas-collecting hole 213, at least one pressure-releasing hole 214, at least one valve plate 22, at least one valve opening 221, at least one gas-collecting seat 23, at least one gas transportation device 24, at least one elastic medium 25 and at least one pressure sensor 26. The number of the wristband 2, the mounting zone 21, the first accommodation recess 211, the second accommodation recess 212, the gas-collecting hole 213, the pressure-releasing hole 214, the valve plate 22, the valve opening 221, the gas-collecting seat 23, the gas transportation device 24, the elastic medium 25 and the pressure sensor 26 is exemplified by one for each in the following embodiments but not limited thereto. It is noted that each of the wristband 2, the mounting zone 21, the first accommodation recess 211, the second accommodation recess 212, the gas-collecting hole 213, the pressure-releasing hole 214, the valve plate 22, the valve opening 221, the gas-collecting seat 23, the gas transportation device 24, the elastic medium 25 and the pressure sensor 26 can also be provided in plural numbers.

**[0012]** Please refer to FIGS. 1 and 2. FIG. 1 schematically illustrates a wearable blood pressure measuring device according to an embodiment of the present disclosure. FIG. 2 is a schematic enlarged fragmentary view of the wearable blood pressure measuring device as shown in FIG. 1. The wearable blood pressure measuring device 100 may be worn on a wrist of the user, but not limited thereto. In this embodiment, the wearable blood pressure measuring device 100 includes a driving-and-control module 1 and a wristband 2. The wristband 2 of the wearable blood pressure measuring device 100 may be ring-shaped strap structure made of a soft material or a hard material. For example, the wristband 2 is made of a silicone material, a plastic material, a metallic material or any other appropriate material, but not limited thereto. The wristband 2 may be wrapped around a specified part of the user's body (e.g., the wrist or an ankle). The two ends of the wristband 2 are attached on each other through Velcro fasteners, engaged with each other through convex-concave structures, or coupled with each other through the buckle rings often used in wristbands. Moreover, the wristband 2 may be a ring-shaped structure integrally formed from one piece. It is noted that the way of connecting the wristband 2 is not restricted and can be varied according to the practical requirements.

**[0013]** The wristband 2 of the wearable blood pressure measuring device 100 is not only wrapped around the specified part of the user's body but also used to carry the driving-and-control module 1 thereon. The connection between the wristband 2 and the driving-and-control module 1 may be undetachable or detachable. For example, the driving-and-control module 1 is integrated into the wristband 2, or the driving-and-control module 1 is locked on the wristband 2, but not limited thereto. In this

embodiment, the driving-and-control module 1 further includes a display screen 11 disposed on the driving-and-control module 1 for displaying the blood pressure information, but not limited thereto. In an embodiment, the display screen 11 is a touch screen. The user may touch the screen display 11 to select the information to be displayed. The information contains at least one selected from the group consisting of the blood pressure information of the user, the time information, the incoming call information and so on.

**[0014]** In this embodiment, the wearable blood pressure measuring device 100 further includes a transmission module 12 disposed on the driving-and-control module 1 for transmitting the measured blood pressure information to an external device (not shown). The external device may analyze and process the measured blood pressure information to further learn the health condition of the user. It is noted that the position of the transmission module 12 is not restricted and can be varied according to the practical requirements. In some embodiments, the transmission module 12 is a wired transmission module. An example of the wired transmission module includes but is not limited to a USB transmission module, a mini-USB transmission module or a micro-USB transmission module. In some other embodiments, the transmission module 12 is a wireless transmission module. An example of the wireless transmission module includes but is not limited to a Wi-Fi transmission module, a Bluetooth transmission module, a radio frequency identification (RFID) transmission module or a near field communication (NFC) transmission module. In some other embodiments, the transmission module 12 may include a wired transmission module and a wireless transmission module. The type of the data to be transmitted may be varied according to practical requirements. Any implementation that transmits the physiological information (e.g., the blood pressure information) of the user stored in the driving-and-control module 1 to the external device is included in the claimed scope of the present disclosure, and not redundantly described hereinafter. In this embodiment, the external device may be for example but not limited to a cloud system, a portable electronic device or a computer system. After the external device receives the physiological information of the user from the wearable blood pressure measuring device 100, the health condition of the user may be clarified in more detail by running an application program that analyzes and compares the physiological information.

**[0015]** Please refer to FIG. 2 again. The wristband 2 has a mounting zone 21. The mounting zone 21 has a first accommodation recess 211, a second accommodation recess 212, a gas-collecting hole 213 and a pressure-releasing hole 214. The gas-collecting hole 213 is located between the first accommodation recess 211 and the second accommodation recess 212. The first accommodation recess 211 and the second accommodation recess 212 are in fluid communication with each other through the gas-collecting hole 213. The first accommo-

5  
10  
15  
20  
25  
30  
35  
40  
45  
50  
55  
60  
65  
70  
75  
80  
85  
90  
95  
100  
105  
110  
115  
120  
125  
130  
135  
140  
145  
150  
155  
160  
165  
170  
175  
180  
185  
190  
195  
200  
205  
210  
215  
220  
225  
230  
235  
240  
245  
250  
255  
260  
265  
270  
275  
280  
285  
290  
295  
300  
305  
310  
315  
320  
325  
330  
335  
340  
345  
350  
355  
360  
365  
370  
375  
380  
385  
390  
395  
400  
405  
410  
415  
420  
425  
430  
435  
440  
445  
450  
455  
460  
465  
470  
475  
480  
485  
490  
495  
500  
505  
510  
515  
520  
525  
530  
535  
540  
545  
550  
555  
560  
565  
570  
575  
580  
585  
590  
595  
600  
605  
610  
615  
620  
625  
630  
635  
640  
645  
650  
655  
660  
665  
670  
675  
680  
685  
690  
695  
700  
705  
710  
715  
720  
725  
730  
735  
740  
745  
750  
755  
760  
765  
770  
775  
780  
785  
790  
795  
800  
805  
810  
815  
820  
825  
830  
835  
840  
845  
850  
855  
860  
865  
870  
875  
880  
885  
890  
895  
900  
905  
910  
915  
920  
925  
930  
935  
940  
945  
950  
955  
960  
965  
970  
975  
980  
985  
990  
995  
1000  
1005  
1010  
1015  
1020  
1025  
1030  
1035  
1040  
1045  
1050  
1055  
1060  
1065  
1070  
1075  
1080  
1085  
1090  
1095  
1100  
1105  
1110  
1115  
1120  
1125  
1130  
1135  
1140  
1145  
1150  
1155  
1160  
1165  
1170  
1175  
1180  
1185  
1190  
1195  
1200  
1205  
1210  
1215  
1220  
1225  
1230  
1235  
1240  
1245  
1250  
1255  
1260  
1265  
1270  
1275  
1280  
1285  
1290  
1295  
1300  
1305  
1310  
1315  
1320  
1325  
1330  
1335  
1340  
1345  
1350  
1355  
1360  
1365  
1370  
1375  
1380  
1385  
1390  
1395  
1400  
1405  
1410  
1415  
1420  
1425  
1430  
1435  
1440  
1445  
1450  
1455  
1460  
1465  
1470  
1475  
1480  
1485  
1490  
1495  
1500  
1505  
1510  
1515  
1520  
1525  
1530  
1535  
1540  
1545  
1550  
1555  
1560  
1565  
1570  
1575  
1580  
1585  
1590  
1595  
1600  
1605  
1610  
1615  
1620  
1625  
1630  
1635  
1640  
1645  
1650  
1655  
1660  
1665  
1670  
1675  
1680  
1685  
1690  
1695  
1700  
1705  
1710  
1715  
1720  
1725  
1730  
1735  
1740  
1745  
1750  
1755  
1760  
1765  
1770  
1775  
1780  
1785  
1790  
1795  
1800  
1805  
1810  
1815  
1820  
1825  
1830  
1835  
1840  
1845  
1850  
1855  
1860  
1865  
1870  
1875  
1880  
1885  
1890  
1895  
1900  
1905  
1910  
1915  
1920  
1925  
1930  
1935  
1940  
1945  
1950  
1955  
1960  
1965  
1970  
1975  
1980  
1985  
1990  
1995  
2000  
2005  
2010  
2015  
2020  
2025  
2030  
2035  
2040  
2045  
2050  
2055  
2060  
2065  
2070  
2075  
2080  
2085  
2090  
2095  
2100  
2105  
2110  
2115  
2120  
2125  
2130  
2135  
2140  
2145  
2150  
2155  
2160  
2165  
2170  
2175  
2180  
2185  
2190  
2195  
2200  
2205  
2210  
2215  
2220  
2225  
2230  
2235  
2240  
2245  
2250  
2255  
2260  
2265  
2270  
2275  
2280  
2285  
2290  
2295  
2300  
2305  
2310  
2315  
2320  
2325  
2330  
2335  
2340  
2345  
2350  
2355  
2360  
2365  
2370  
2375  
2380  
2385  
2390  
2395  
2400  
2405  
2410  
2415  
2420  
2425  
2430  
2435  
2440  
2445  
2450  
2455  
2460  
2465  
2470  
2475  
2480  
2485  
2490  
2495  
2500  
2505  
2510  
2515  
2520  
2525  
2530  
2535  
2540  
2545  
2550  
2555  
2560  
2565  
2570  
2575  
2580  
2585  
2590  
2595  
2600  
2605  
2610  
2615  
2620  
2625  
2630  
2635  
2640  
2645  
2650  
2655  
2660  
2665  
2670  
2675  
2680  
2685  
2690  
2695  
2700  
2705  
2710  
2715  
2720  
2725  
2730  
2735  
2740  
2745  
2750  
2755  
2760  
2765  
2770  
2775  
2780  
2785  
2790  
2795  
2800  
2805  
2810  
2815  
2820  
2825  
2830  
2835  
2840  
2845  
2850  
2855  
2860  
2865  
2870  
2875  
2880  
2885  
2890  
2895  
2900  
2905  
2910  
2915  
2920  
2925  
2930  
2935  
2940  
2945  
2950  
2955  
2960  
2965  
2970  
2975  
2980  
2985  
2990  
2995  
3000  
3005  
3010  
3015  
3020  
3025  
3030  
3035  
3040  
3045  
3050  
3055  
3060  
3065  
3070  
3075  
3080  
3085  
3090  
3095  
3100  
3105  
3110  
3115  
3120  
3125  
3130  
3135  
3140  
3145  
3150  
3155  
3160  
3165  
3170  
3175  
3180  
3185  
3190  
3195  
3200  
3205  
3210  
3215  
3220  
3225  
3230  
3235  
3240  
3245  
3250  
3255  
3260  
3265  
3270  
3275  
3280  
3285  
3290  
3295  
3300  
3305  
3310  
3315  
3320  
3325  
3330  
3335  
3340  
3345  
3350  
3355  
3360  
3365  
3370  
3375  
3380  
3385  
3390  
3395  
3400  
3405  
3410  
3415  
3420  
3425  
3430  
3435  
3440  
3445  
3450  
3455  
3460  
3465  
3470  
3475  
3480  
3485  
3490  
3495  
3500  
3505  
3510  
3515  
3520  
3525  
3530  
3535  
3540  
3545  
3550  
3555  
3560  
3565  
3570  
3575  
3580  
3585  
3590  
3595  
3600  
3605  
3610  
3615  
3620  
3625  
3630  
3635  
3640  
3645  
3650  
3655  
3660  
3665  
3670  
3675  
3680  
3685  
3690  
3695  
3700  
3705  
3710  
3715  
3720  
3725  
3730  
3735  
3740  
3745  
3750  
3755  
3760  
3765  
3770  
3775  
3780  
3785  
3790  
3795  
3800  
3805  
3810  
3815  
3820  
3825  
3830  
3835  
3840  
3845  
3850  
3855  
3860  
3865  
3870  
3875  
3880  
3885  
3890  
3895  
3900  
3905  
3910  
3915  
3920  
3925  
3930  
3935  
3940  
3945  
3950  
3955  
3960  
3965  
3970  
3975  
3980  
3985  
3990  
3995  
4000  
4005  
4010  
4015  
4020  
4025  
4030  
4035  
4040  
4045  
4050  
4055  
4060  
4065  
4070  
4075  
4080  
4085  
4090  
4095  
4100  
4105  
4110  
4115  
4120  
4125  
4130  
4135  
4140  
4145  
4150  
4155  
4160  
4165  
4170  
4175  
4180  
4185  
4190  
4195  
4200  
4205  
4210  
4215  
4220  
4225  
4230  
4235  
4240  
4245  
4250  
4255  
4260  
4265  
4270  
4275  
4280  
4285  
4290  
4295  
4300  
4305  
4310  
4315  
4320  
4325  
4330  
4335  
4340  
4345  
4350  
4355  
4360  
4365  
4370  
4375  
4380  
4385  
4390  
4395  
4400  
4405  
4410  
4415  
4420  
4425  
4430  
4435  
4440  
4445  
4450  
4455  
4460  
4465  
4470  
4475  
4480  
4485  
4490  
4495  
4500  
4505  
4510  
4515  
4520  
4525  
4530  
4535  
4540  
4545  
4550  
4555  
4560  
4565  
4570  
4575  
4580  
4585  
4590  
4595  
4600  
4605  
4610  
4615  
4620  
4625  
4630  
4635  
4640  
4645  
4650  
4655  
4660  
4665  
4670  
4675  
4680  
4685  
4690  
4695  
4700  
4705  
4710  
4715  
4720  
4725  
4730  
4735  
4740  
4745  
4750  
4755  
4760  
4765  
4770  
4775  
4780  
4785  
4790  
4795  
4800  
4805  
4810  
4815  
4820  
4825  
4830  
4835  
4840  
4845  
4850  
4855  
4860  
4865  
4870  
4875  
4880  
4885  
4890  
4895  
4900  
4905  
4910  
4915  
4920  
4925  
4930  
4935  
4940  
4945  
4950  
4955  
4960  
4965  
4970  
4975  
4980  
4985  
4990  
4995  
5000  
5005  
5010  
5015  
5020  
5025  
5030  
5035  
5040  
5045  
5050  
5055  
5060  
5065  
5070  
5075  
5080  
5085  
5090  
5095  
5100  
5105  
5110  
5115  
5120  
5125  
5130  
5135  
5140  
5145  
5150  
5155  
5160  
5165  
5170  
5175  
5180  
5185  
5190  
5195  
5200  
5205  
5210  
5215  
5220  
5225  
5230  
5235  
5240  
5245  
5250  
5255  
5260  
5265  
5270  
5275  
5280  
5285  
5290  
5295  
5300  
5305  
5310  
5315  
5320  
5325  
5330  
5335  
5340  
5345  
5350  
5355  
5360  
5365  
5370  
5375  
5380  
5385  
5390  
5395  
5400  
5405  
5410  
5415  
5420  
5425  
5430  
5435  
5440  
5445  
5450  
5455  
5460  
5465  
5470  
5475  
5480  
5485  
5490  
5495  
5500  
5505  
5510  
5515  
5520  
5525  
5530  
5535  
5540  
5545  
5550  
5555  
5560  
5565  
5570  
5575  
5580  
5585  
5590  
5595  
5600  
5605  
5610  
5615  
5620  
5625  
5630  
5635  
5640  
5645  
5650  
5655  
5660  
5665  
5670  
5675  
5680  
5685  
5690  
5695  
5700  
5705  
5710  
5715  
5720  
5725  
5730  
5735  
5740  
5745  
5750  
5755  
5760  
5765  
5770  
5775  
5780  
5785  
5790  
5795  
5800  
5805  
5810  
5815  
5820  
5825  
5830  
5835  
5840  
5845  
5850  
5855  
5860  
5865  
5870  
5875  
5880  
5885  
5890  
5895  
5900  
5905  
5910  
5915  
5920  
5925  
5930  
5935  
5940  
5945  
5950  
5955  
5960  
5965  
5970  
5975  
5980  
5985  
5990  
5995  
6000  
6005  
6010  
6015  
6020  
6025  
6030  
6035  
6040  
6045  
6050  
6055  
6060  
6065  
6070  
6075  
6080  
6085  
6090  
6095  
6100  
6105  
6110  
6115  
6120  
6125  
6130  
6135  
6140  
6145  
6150  
6155  
6160  
6165  
6170  
6175  
6180  
6185  
6190  
6195  
6200  
6205  
6210  
6215  
6220  
6225  
6230  
6235  
6240  
6245  
6250  
6255  
6260  
6265  
6270  
6275  
6280  
6285  
6290  
6295  
6300  
6305  
6310  
6315  
6320  
6325  
6330  
6335  
6340  
6345  
6350  
6355  
6360  
6365  
6370  
6375  
6380  
6385  
6390  
6395  
6400  
6405  
6410  
6415  
6420  
6425  
6430  
6435  
6440  
6445  
6450  
6455  
6460  
6465  
6470  
6475  
6480  
6485  
6490  
6495  
6500  
6505  
6510  
6515  
6520  
6525  
6530  
6535  
6540  
6545  
6550  
6555  
6560  
6565  
6570  
6575  
6580  
6585  
6590  
6595  
6600  
6605  
6610  
6615  
6620  
6625  
6630  
6635  
6640  
6645  
6650  
6655  
6660  
6665  
6670  
6675  
6680  
6685  
6690  
6695  
6700  
6705  
6710  
6715  
6720  
6725  
6730  
6735  
6740  
6745  
6750  
6755  
6760  
6765  
6770  
6775  
6780  
6785  
6790  
6795  
6800  
6805  
6810  
6815  
6820  
6825  
6830  
6835  
6840  
6845  
6850  
6855  
6860  
6865  
6870  
6875  
6880  
6885  
6890  
6895  
6900  
6905  
6910  
6915  
6920  
6925  
6930  
6935  
6940  
6945  
6950  
6955  
6960  
6965  
6970  
6975  
6980  
6985  
6990  
6995  
7000  
7005  
7010  
7015  
7020  
7025  
7030  
7035  
7040  
7045  
7050  
7055  
7060  
7065  
7070  
7075  
7080  
7085  
7090  
7095  
7100  
7105  
7110  
7115  
7120  
7125  
7130  
7135  
7140  
7145  
7150  
7155  
7160  
7165  
7170  
7175  
7180  
7185  
7190  
7195  
7200  
7205  
7210  
7215  
7220  
7225  
7230  
7235  
7240  
7245  
7250  
7255  
7260  
7265  
7270  
7275  
7280  
7285  
7290  
7295  
7300  
7305  
7310  
7315  
7320  
7325  
7330  
7335  
7340  
7345  
7350  
7355  
7360  
7365  
7370  
7375  
7380  
7385  
7390  
7395  
7400  
7405  
7410  
7415  
7420  
7425  
7430  
7435  
7440  
7445  
7450  
7455  
7460  
7465  
7470  
7475  
7480  
7485  
7490  
7495  
7500  
7505  
7510  
7515  
7520  
7525  
7530  
7535  
7540  
7545  
7550  
7555  
7560  
7565  
7570  
7575  
7580  
7585  
7590  
7595  
7600  
7605  
7610  
7615  
7620  
7625  
7630  
7635  
7640  
7645  
7650  
7655  
7660  
7665  
7670  
7675  
7680  
7685  
7690  
7695  
7700  
7705  
7710  
7715  
7720  
7725  
7730  
7735  
7740  
7745  
7750  
7755  
7760  
7765  
7770  
7775  
7780  
7785  
7790  
7795  
7800  
7805  
7810  
7815  
7820  
7825  
7830  
7835  
7840  
7845  
7850  
7855  
7860  
7865  
7870  
7875  
7880  
7885  
7890  
7895  
7900  
7905  
7910  
7915  
7920  
7925  
7930  
7935  
7940  
7945  
7950  
7955  
7960  
7965  
7970  
7975  
7980  
7985  
7990  
7995  
8000  
8005  
8010  
8015  
8020  
8025  
8030  
8035  
8040  
8045  
8050  
8055  
8060  
8065  
8070  
8075  
8080  
8085  
8090  
8095  
8100  
8105  
8110  
8115  
8120  
8125  
8130  
8135  
8140  
8145  
8150  
8155  
8160  
8165  
8170  
8175  
8180  
8185  
8190  
8195  
8200  
8205  
8210  
8215  
8220  
8225  
8230  
8235  
8240  
8245  
8250  
8255  
8260  
8265  
8270  
8275  
8280  
8285  
8290  
8295  
8300  
8305  
8310  
8315  
8320  
8325  
8330  
8335  
8340  
8345  
8350  
8355  
8360  
8365  
8370  
8375  
8380  
8385  
8390  
8395  
8400  
8405  
8410  
8415  
8420  
8425  
8430  
8435  
8440  
8445  
8450  
8455  
8460  
8465  
8470  
8475  
8480  
8485  
8490  
8495  
8500  
8505  
8510  
8515  
8520  
8525  
8530  
8535  
8540  
8545  
8550  
8555  
8560  
8565  
8570  
8575  
8580  
8585  
8590  
8595  
8600  
8605  
8610  
8615  
8620  
8625  
8630  
8635  
8640  
8645  
8650  
8655  
8660  
8665  
8670  
8675  
8680  
8685  
8690  
8695  
8700  
8705  
8710  
8715  
8720  
8725  
8730  
8735  
8740  
8745  
8750  
8755  
8760  
8765  
8770  
8775  
8780  
8785  
8790  
8795  
8800  
8805  
8810  
8815  
8820  
8825  
8830  
8835  
8840  
8845  
8850  
8855  
8860  
8865  
8870  
8875  
8880  
8885  
8890  
8895  
8900  
8905  
8910  
8915  
8920  
8925  
8930  
8935  
8940  
8945  
8950  
8955  
8960  
8965  
8970  
8975  
8980  
8985  
8990  
8995  
9000  
9005  
9010  
9015  
9020  
9025  
9030  
9035  
9040  
9045  
9050  
9055  
9060  
9065  
9070  
9075  
9080  
9085  
9090  
9095  
9100  
9105  
9110  
9115  
9120  
9125  
9130  
9135  
9140  
9145  
9150  
9155  
9160  
9165  
9170  
9175  
9180  
9185  
9190  
9195  
9200  
9205  
9210  
9215  
9220  
9225  
9230  
9235  
9240  
9245  
9250  
9255  
9260  
9265  
9270  
9275  
9280  
9285  
9290  
9295  
9300  
9305  
9310  
9315  
9320  
9325  
9330  
9335  
9340  
9345  
9350  
9355  
9360  
9365  
9370  
9375  
9380  
9385  
9390  
9395  
9400  
9405  
9410  
9415  
9420  
9425  
9430  
9435  
9440  
9445  
9450  
9455  
9460  
9465  
9470  
9475  
9480  
9485  
9490  
9495  
9500  
9505  
9510  
9515  
9520  
9525  
9530  
9535  
9540  
9545  
9550  
9555  
9560  
9565  
9570  
9575  
9580  
9585  
9590  
9595  
9600  
9605  
9610  
9615  
9620  
9625  
9630  
9635  
9640  
9645  
9650  
9655  
9660  
9665  
9670  
9675  
9680  
9685  
9690  
9695  
9700  
9705  
9710  
9715  
9720  
9725  
9730  
9735  
9740  
9745  
9750  
9755  
9760  
9765  
9770

be in close contact with the user's skin. By pressing the pressure sensor 26 against the user's skin, the pressure sensor 26 can perform a scanning operation to measure a blood pressure value of a target artery of the user. In this embodiment, the pressure sensor 26 may be an array-type pressure sensor.

**[0018]** Please refer to FIG. 2. The gas-collecting seat 23 includes the second gas-collecting chamber 231, the second pressure-releasing chamber 232, the first perforation 233, the second perforation 234, the second convex structure 235 and a communication slot 236. The second gas-collecting chamber 231 is concavely formed in the gas-collecting seat 23 and corresponding in position with the first gas-collecting chamber 215. Consequently, the first gas-collecting chamber 215 and the second gas-collecting chamber 231 are collaboratively formed as an integrated gas-collecting chamber. The first gas-collecting chamber 215 and the second gas-collecting chamber 231 are separated from each other by the valve plate 22. When the valve opening 221 of the valve plate 22 moves away from the second convex structure 235, the valve opening 221 is in an open state. The open state allows the first gas-collecting chamber 215 and the second gas-collecting chamber 231 to be in fluid communication with each other through the valve opening 221. The second pressure-releasing chamber 232 is also concavely formed in the gas-collecting seat 23 and corresponding in position with the first pressure-releasing chamber 216. The first pressure-releasing chamber 216 and the second pressure-releasing chamber 232 are collaboratively formed as an integrated pressure-releasing chamber. The first pressure-releasing chamber 216 and the second pressure-releasing chamber 232 are separated from each other by the valve plate 22. The communication slot 236 is in fluid communication with the second gas-collecting chamber 231 through the first perforation 233. The first perforation 233 and the gas-collecting hole 213 are misaligned. The communication slot 236 is in fluid communication with the second pressure-releasing chamber 232 through the second perforation 234. The second perforation 234 and the pressure-releasing hole 214 are aligned with each other along the vertical direction. The second convex structure 235 is disposed adjacent to the first perforation 233. Moreover, the second convex structure 235 and the valve opening 221 of the valve plate 22 are aligned with each other along the vertical direction, but not limited thereto. Before the gas is introduced into the gas-collecting seat 23, the valve plate 22 is in close contact with the second convex structure 235. Under this circumstance, the valve opening 221 of the valve plate 22 is closed by the second convex structure 235.

**[0019]** When the gas is transported through the first perforation 233 and the second perforation 234 of the gas-collecting seat 23 to push the valve plate 22 to move, the valve opening 221 of the valve plate 22 is separated away from the second convex structure 235. Consequently, the valve opening 221 is in fluid communication

with the gas-collecting hole 213, so that the gas is transported to the elastic medium 25 in the second accommodation recess 212 through the valve opening 221 and the gas-collecting hole 213. While the valve plate 22 is pushed by the gas introduced through the second perforation 234, the valve plate 22 is in close contact with the first convex structure 218 to close the pressure-releasing hole 214, so that the pressure-releasing hole 214 is sealed, which prevents the gas from leaking out of the pressure-releasing hole 214. In such way, the gas transported by the gas transportation device 24 is collected in and transported to the elastic medium 25.

**[0020]** Please refer to FIGS. 2, 3A, 3B and 3C. In this embodiment, the gas transportation device 24 includes a gas inlet plate 241, a resonance plate 242, a piezoelectric actuator 243, a first insulation plate 244, a conducting plate 245 and a second insulation plate 246, which are stacked on each other sequentially. The gas inlet plate 241 has at least one inlet aperture 241a, at least one convergence channel 241b and a convergence chamber 241c. The number of the at least one inlet aperture 241a and the number of the at least one convergence channel 241b are equal. For example, the gas inlet plate 241 has four inlet apertures 241a and four convergence channels 241b. A first end of the inlet aperture 241a is in fluid communication with the environment outside the gas transportation device 24. A second end of the inlet aperture 241a is in fluid communication with a first end of the corresponding convergence channel 241b. A second end of the convergence channel 241b is communication with the convergence chamber 241c. As the gas is introduced into the gas transportation device 24 through the at least one inlet aperture 241a, the gas is transported to flow along the at least one convergence channel 241b and converged to the convergence chamber 241c.

**[0021]** The resonance plate 242 has a central aperture 242a aligned with the convergence chamber 241c of the gas inlet plate 241 along the vertical direction. The resonance plate 242 has a movable part 242b around the central aperture 242a. The piezoelectric actuator 243 is corresponding in position with the resonance plate 242. The piezoelectric actuator 243 includes a suspension plate 243a and a piezoelectric plate 243b. The piezoelectric plate 243b is attached on a surface of the suspension plate 243a. Moreover, the profile of the piezoelectric plate 243b matches the profile of the suspension plate 243a. The length of a side of the piezoelectric plate 243b is smaller than or equal to the length of a side of the suspension plate 243a. When a voltage is applied to the piezoelectric plate 243b, the piezoelectric plate 243b is subjected to deformation according to a piezoelectric effect. Consequently, the suspension plate 243a vibrates upwardly and downwardly. At the same time, the resonance plate 242 vibrates in resonance with the suspension plate 243a.

**[0022]** Please refer to FIGS. 4A and 4B. After the gas transportation device 24 is enabled, the piezoelectric

plate 243b of the piezoelectric actuator 243 is driven by the applied voltage. Because of the piezoelectric effect, the piezoelectric plate 243b is subjected to the deformation and drives the suspension plate 243a to vibrate. After the piezoelectric actuator 243 is actuated, the movable part 242b of the resonance plate 242 vibrates in resonance with the suspension plate 243a. As the piezoelectric plate 243b drives the suspension plate 243a to move, the volume between the suspension plate 243a and the resonance plate 242 is changed. Consequently, the ambient gas is inhaled into the at least one convergence channel 241b through the at least one inlet aperture 241a, and the gas is guided by the at least one convergence channel 241b and converged to the convergence chamber 241c. Then, the gas is transported to an interior of the gas transportation device 24 through the central aperture 242a of the resonance plate 242. After the gas is transported to the communication slot 236, the gas is transported to the second gas-collecting chamber 231 and the second pressure-releasing chamber 232 through the first perforation 233 and the second perforation 234, respectively. Please refer to FIG. 4B. After the gas is introduced into the gas-collecting seat 23, the pressure of the gas pushes and moves the valve plate 22. The valve opening 221 of the valve plate 22 is separated from the second convex structure 235 and a pre-force that brings the valve opening 221 into close contact with the second convex structure 235 is eliminated. Consequently, the gas is transported to the gas-collecting hole 213 through the valve opening 221. At the same time, the valve plate 22 is in close contact with the first convex structure 218 to close the pressure-releasing hole 214. In this way, the gas is transported to the elastic medium 25 through the gas-collecting hole 213 and collected in the elastic medium 25. As the elastic medium 25 is inflated with the gas and expanded, the pressure sensor 26 is pushed by the expanded elastic medium 25. As the piezoelectric actuator 243 vibrates upwardly and downwardly, the gas continuously flows through the valve opening 221 and the gas-collecting hole 213 into the elastic medium 25 for collection of the gas. The elastic medium 25 is continuously expanded to lift the pressure sensor 26 up to a position that makes the pressure sensor 26 press against a measurement part of the user's body.

**[0023]** Please refer to FIGS. 1, 5 and 6. When the user operates the driving-and-control module 1 through the display screen 11, the gas transportation device 24 is enabled under control of the driving-and-control module 1. The ambient gas is inhaled into the elastic medium 25 by the gas transportation device 24 and collected in the elastic medium 25, so that the volume of the elastic medium 25 is expanded. As the volume of the elastic medium 25 is expanded, the pressure sensor 26 disposed on the elastic medium 25 is raised up for allowing the pressure sensor 26 to be in close contact with the user's skin 3 to measure the blood pressure value of the user. Please refer to FIG. 6. As the gas transportation device 24 is enabled to continuously push the gas to the elastic me-

dium 25, the pressure sensor 26 is in close contact with the user's skin 3 to press against the artery 5 between the bone 4 and the skin 3. By pressing the pressure sensor 26 against the artery 5 of the user, the pressure sensor 26 measures the blood pressure value of the target artery through a scanning operation and transmits the measured blood pressure information to the driving-and-control module 1.

**[0024]** Please refer to FIG. 7. After the blood pressure value is measured, the gas transportation device 24 is disabled. At this stage, the inner pressure of the elastic medium 25 is higher than the pressure of any part inside the gas transportation device 24. Consequently, the gas in the elastic medium 25 is transported to the first gas-collecting chamber 215 through the gas-collecting hole 213. The gas in the first gas-collecting chamber 215 pushes the valve plate 22, so that the valve plate 22 is moved downwardly to be in contact with the gas-collecting seat 23. Under this circumstance, the valve opening 221 of the valve plate 22 is in close contact with the second convex structure 235 to close the valve opening 221 and thus the first perforation 233 is not in fluid communication with the first gas-collecting chamber 215. The second perforation 234 is also closed by the valve plate 22. Both the valve opening 221 and the second perforation 234 are closed so as to prevent the gas from returning back to the gas transportation device 24 through the first perforation 233 and the second perforation 234. At the same time, the portion of the valve plate 22 around the pressure-releasing hole 214 is separated from the first convex structure 218, and a pre-force that brings the valve plate 22 into close contact with the first convex structure 218 is eliminated. Therefore, the gas is transported from the gas-collecting chamber 215 to the first pressure-releasing chamber 216 through the communication channel 217, and then discharged through the pressure-releasing hole 214 into the environment outside the gas transportation device 24. Consequently, the pressure-releasing action is completed and the pressure sensor 26 is shrunken to the second accommodation recess 212.

**[0025]** From the above descriptions, the present disclosure provides the wearable blood pressure measuring device. The gas transportation device is embedded in the wristband. After the gas transportation device is enabled, the gas is transported to the elastic medium to raise the pressure sensor so that the pressure sensor is in close contact with the user to measure the blood pressure information of the user and transmit the measured blood pressure information to the driving-and-control module. The blood pressure information is transmitted to the external device through the transmission module, or the blood pressure information is directly shown on the display screen. Consequently, the blood pressure information can be measured everywhere and at any time. In addition, the wearable blood pressure measuring device has the benefits of small size, light weightiness and easy portability, and the wearable blood pressure meas-

uring device is power-saving. In other words, the wearable blood pressure measuring device with the gas transportation device is industrially valuable.

[0026] While the disclosure has been described in terms of what is presently considered to be the most practical and preferred embodiments, it is to be understood that the disclosure needs not be limited to the disclosed embodiment. On the contrary, it is intended to cover various modifications and similar arrangements included within the spirit and scope of the appended claims which are to be accorded with the broadest interpretation so as to encompass all such modifications and similar structures.

### Claims

1. A wearable blood pressure measuring device (100), comprising:

a wristband (2) having a mounting zone (21), wherein the mounting zone (21) has a first accommodation recess (211), a second accommodation recess (212), a gas-collecting hole (213) and a pressure-releasing hole (214), wherein the first accommodation recess (211) and the second accommodation recess (212) are in fluid communication with each other through the gas-collecting hole (213), and the first accommodation recess (211) is in fluid communication with an environment outside the wristband (2) through the pressure-releasing hole (214);

a valve plate (22) stacked on an inner surface of the first accommodation recess (211), and having a valve opening (221) aligned with the gas-collecting hole (213);

a gas-collecting seat (23) disposed within the first accommodation recess (211) and stacked on the valve plate (22), wherein the gas-collecting seat (23) has plural perforations;

a gas transportation device (24) covering and sealing the gas-collecting seat (23), wherein the gas transportation device (24) introduces gas through the plural perforations of the gas-collecting seat (23) into the wearable blood pressure measuring device (100) so as to push the valve plate (22) and cause the valve opening (221) of the valve plate (22) to be in fluid communication with the gas-collecting hole (213), and the gas is further guided into and collected in the second accommodation recess (212);

an elastic medium (25) covering and sealing the second accommodation recess (212) and configured to be inflated with the gas for displacement; and

a pressure sensor (26) stacked on the elastic medium (25),

wherein when the gas transportation device (24) is enabled to transport the gas to the elastic medium (25), the elastic medium (25) is inflated with the gas and expanded so as to push the pressure sensor (26) to be in close contact with a measurement part of a user's body, thereby measuring a blood pressure value of a target artery through a scanning operation by pressing the pressure sensor (26) against the measurement part.

2. The wearable blood pressure measuring device (100) according to claim 1, wherein the pressure sensor (26) is an array-type pressure sensor.

3. The wearable blood pressure measuring device (100) according to claim 1, wherein the wearable blood pressure measuring device (100) further comprises a driving-and-control module (1) disposed on the wristband (2) to control the gas transportation device (24).

4. The wearable blood pressure measuring device (100) according to claim 3, wherein the driving-and-control module (1) further comprises a display screen (11) for displaying information of the blood pressure value measured by the pressure sensor (26).

5. The wearable blood pressure measuring device (100) according to claim 3, further comprising a transmission module (12), wherein the transmission module (12) is disposed on the driving-and-control module (1) to transmit information of the blood pressure value of the user wearing the wearable blood pressure measuring device (100) to an external device.

6. The wearable blood pressure measuring device (100) according to claim 5, wherein the transmission module (12) is a wired transmission module, wherein the wired transmission module is at least one selected from the group consisting of a USB transmission module, a mini-USB transmission module and a micro-USB transmission module.

7. The wearable blood pressure measuring device (100) according to claim 5, wherein the transmission module (12) is a wireless transmission module, wherein the wireless transmission module is at least one selected from the group consisting of a Wi-Fi transmission module, a Bluetooth transmission module, a radio frequency identification (RFID) transmission module and a near field communication (NFC) transmission module.

8. The wearable blood pressure measuring device (100) according to claim 5, wherein the external de-

vice is at least one selected from the group consisting of a cloud system, a portable electronic device and a computer system.

9. The wearable blood pressure measuring device (100) according to claim 1, wherein a first gas-collecting chamber (215) and a first pressure-releasing chamber (216) are concavely formed in the first accommodation recess (211), the first gas-collecting chamber (215) and the first pressure-releasing chamber (216) are in fluid communication with each other through a communication channel (217), the gas-collecting hole (213) is in fluid communication with the first gas-collecting chamber (215), the pressure-releasing hole (214) is in fluid communication with the first pressure-releasing chamber (216), a first convex structure (218) is received within the first pressure-releasing chamber (216), and the first convex structure (218) is disposed around the pressure-releasing hole (214).
10. The wearable blood pressure measuring device (100) according to claim 9, wherein the gas-collecting seat (23) further comprises a second gas-collecting chamber (231), a second pressure-releasing chamber (232) and a second convex structure (235), wherein the second gas-collecting chamber (231) is corresponding in position with the first gas-collecting chamber (215), the second pressure-releasing chamber (231) is corresponding in position with the first pressure-releasing chamber (216), a first perforation (233) of the plural perforations is in fluid communication with the second gas-collecting chamber (231), a second perforation (234) of the plural perforations is in fluid communication with the second pressure-releasing chamber (231), and the second convex structure (235) is disposed within the second gas-collecting chamber (231), wherein when the second convex structure (235) is in contact with the valve opening (221) of the valve plate (22) to generate a pre-force, the valve opening (221) is closed, wherein when the gas transportation device (24) is enabled, the gas is introduced through the first perforation (233) and the second perforation (234) into the wearable blood pressure measuring device (100) to push the valve plate (22), so that the valve plate (22) is in close contact with the first convex structure (218) to close the pressure-releasing hole (214) and the valve opening (221) moves away from the second convex structure (235), wherein the gas is transported through the valve opening (221) and then collected in the second accommodation recess (212) through the gas-collecting hole (213), so that the elastic medium (25) is inflated with the gas and expanded to press the pressure sensor (26) against the user's skin for measuring the blood pressure value.

11. The wearable blood pressure measuring device (100) according to claim 9, wherein when the gas transportation device (24) is disabled and a pressure of the collected gas in the second accommodation recess (212) is higher than a pressure of the gas at the first perforation (233) and the second perforation (234), the gas pushes the valve plate (22) away from the first perforation (233) to close the second perforation (234) and open the pressure-releasing hole (214), and the second convex structure (235) is in contact with the valve opening (221) of the valve plate (22) to restore the pre-force to close the first perforation (233), so that the gas is discharged through the communication channel (217) and the pressure-releasing hole (214) into the environment outside the wristband (2), wherein after the gas is discharged into the environment outside the wristband (2), the gas is released from the elastic medium (25) and the pressure sensor (26) returns to the second accommodation recess (212).

12. The wearable blood pressure measuring device (100) according to claim 1, wherein the gas transportation device (24) comprises:

a gas inlet plate (241) having at least one inlet aperture (241a), at least one convergence channel (241b) and a convergence chamber (241c), wherein the at least one inlet aperture (241a) allows the gas to flow in, and the convergence channel (241b) is disposed correspondingly to the inlet aperture (241a) and guides the gas from the inlet aperture (241a) toward the convergence chamber (241c);

a resonance plate (242) having a central aperture (242a) and a movable part (242b), wherein the central aperture (242a) is aligned with the convergence chamber (241c), and the movable part (242b) surrounds the central aperture (242a); and

a piezoelectric actuator (243) aligned with the resonance plate (242),

wherein a gap is formed between the resonance plate (242) and the piezoelectric actuator (243), so that the gas from the at least one inlet aperture (241a) of the gas inlet plate (241) is converged to the convergence chamber (241c) along the at least one convergence channel (241b) and flows into the gap through the central aperture (242a) of the resonance plate (242) when the piezoelectric actuator (243) is driven, whereby the gas is further transported through a resonance between the piezoelectric actuator (243) and the movable part (242b) of the resonance plate (242).

13. The wearable blood pressure measuring device (100) according to claim 12, wherein the gas trans-

portation device (24) further comprises a conducting plate (245), a first insulation plate (244) and a second insulation plate (246), wherein the gas inlet plate (241), the resonance plate (242), the piezoelectric actuator (243), the first insulation plate (244), the conducting plate (245) and the second insulation plate (246) are stacked sequentially.

the pressure sensor (26) against the measurement part.

14. A wearable blood pressure measuring device (100), comprising:

at least one wristband (2) having at least one mounting zone (21), wherein the mounting zone (21) has at least one first accommodation recess (211), at least one second accommodation recess (212), at least one gas-collecting hole (213) and at least one pressure-releasing hole (214), wherein the first accommodation recess (211) and the second accommodation recess (212) are in fluid communication with each other through the gas-collecting hole (213), and the first accommodation recess (211) is in fluid communication with an environment outside the wristband (2) through the pressure-releasing hole (214);

at least one valve plate (22) stacked on an inner surface of the first accommodation recess (211), and having at least one valve opening (221) aligned with the gas-collecting hole (213);

at least one gas-collecting seat (23) disposed within the first accommodation recess (211) and stacked on the valve plate (22), wherein the gas-collecting seat (23) has plural perforations;

at least one gas transportation device (24) covering and sealing the gas-collecting seat (23), wherein the gas transportation device (24) introduces gas through the plural perforations of the gas-collecting seat (23) into the wearable blood pressure measuring device (100) so as to push the valve plate (22) and cause the valve opening (221) of the valve plate (22) to be in fluid communication with the gas-collecting hole (213), and the gas is further guided into and collected in the second accommodation recess (212);

at least one elastic medium (25) covering and sealing the second accommodation recess (212) and configured to be inflated with the gas for displacement; and

at least one pressure sensor (26) stacked on the elastic medium (25),

wherein when the gas transportation device (24) is enabled to transport the gas to the elastic medium (25), the elastic medium (25) is inflated with the gas and expanded so as to push the pressure sensor (26) to be in close contact with a measurement part of a user's body, thereby measuring a blood pressure value of a target artery through a scanning operation by pressing

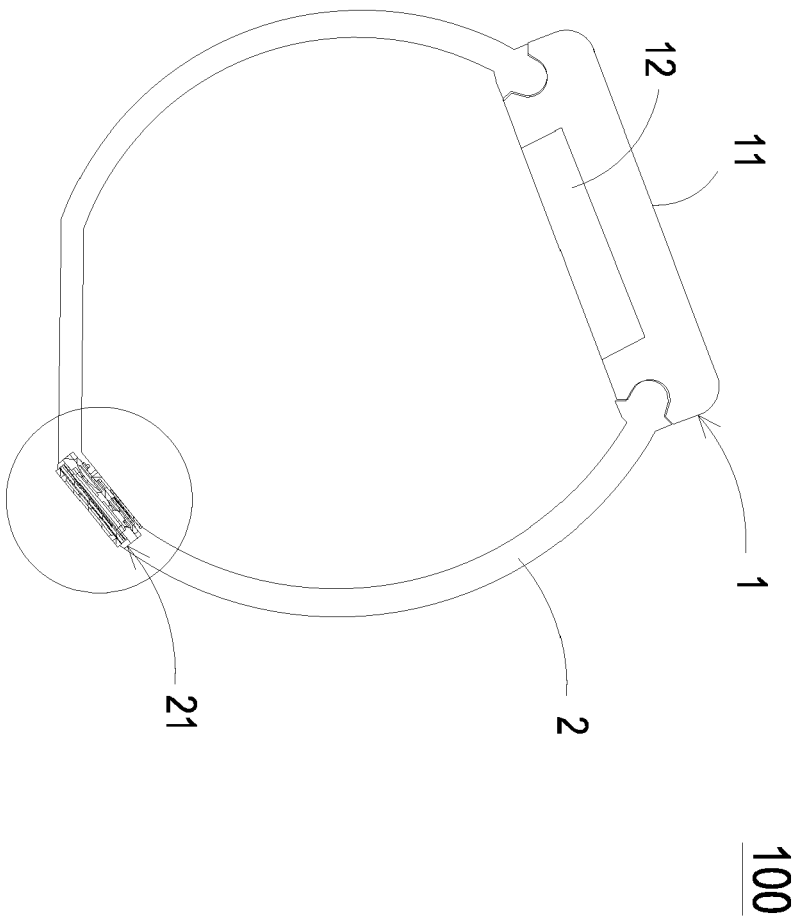


FIG. 1

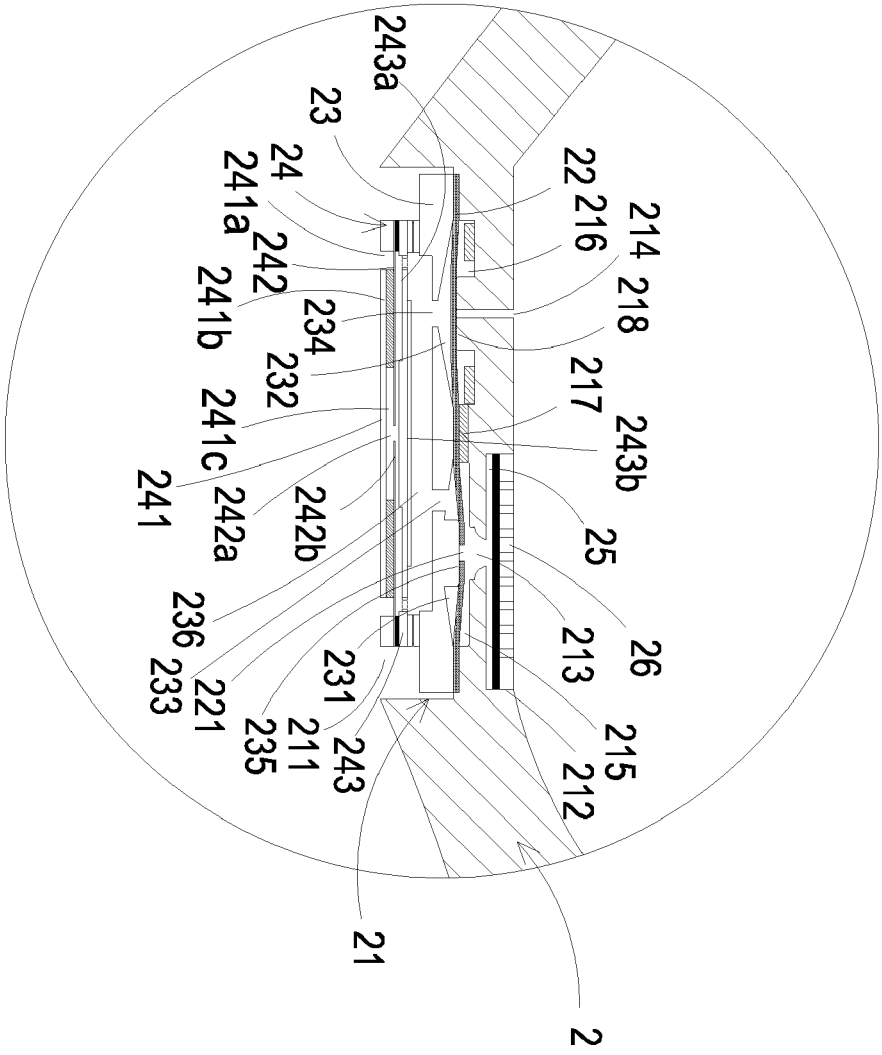
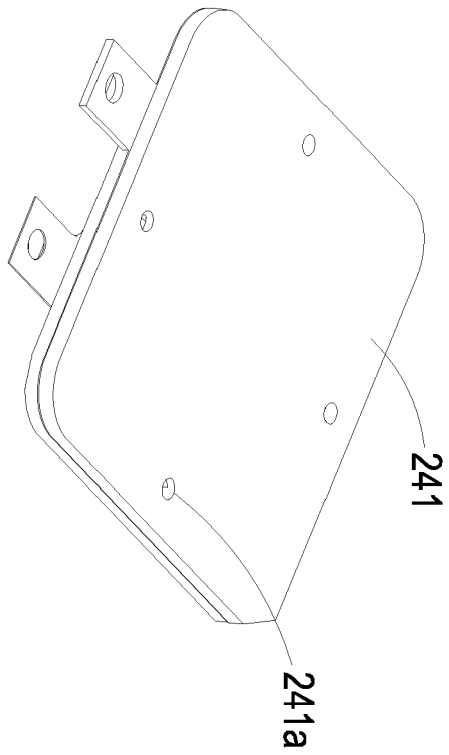


FIG. 2



24

FIG. 3A

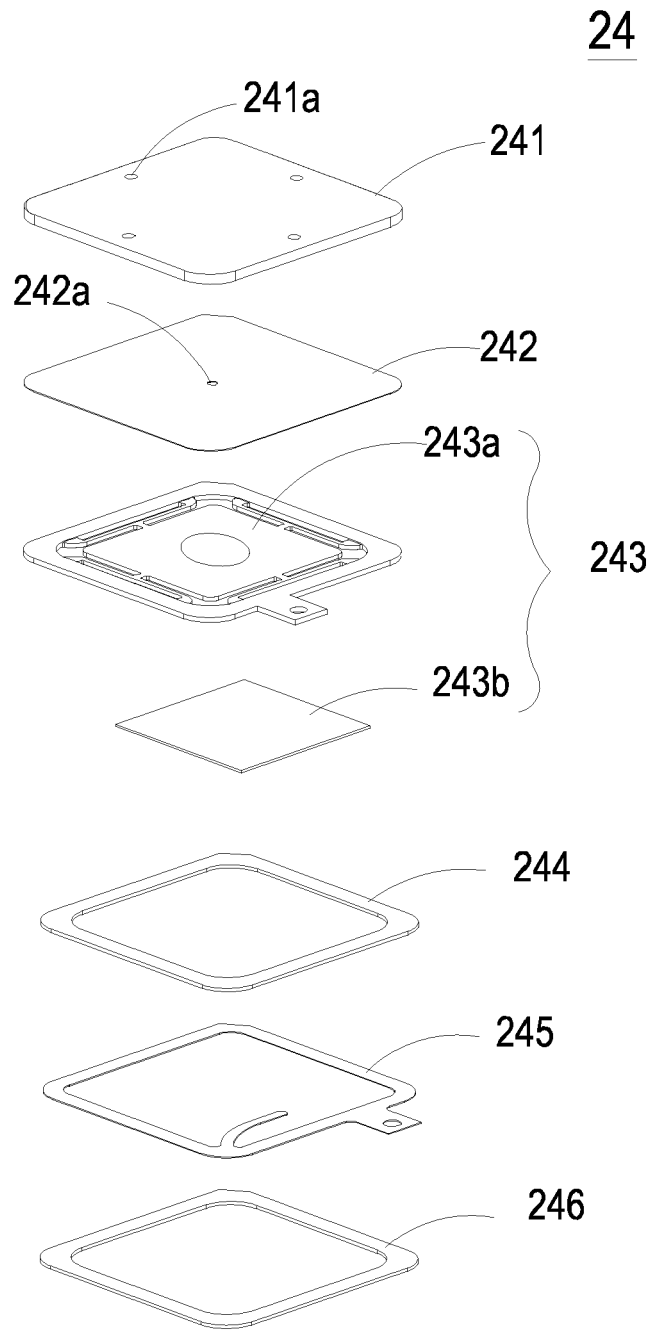


FIG. 3B

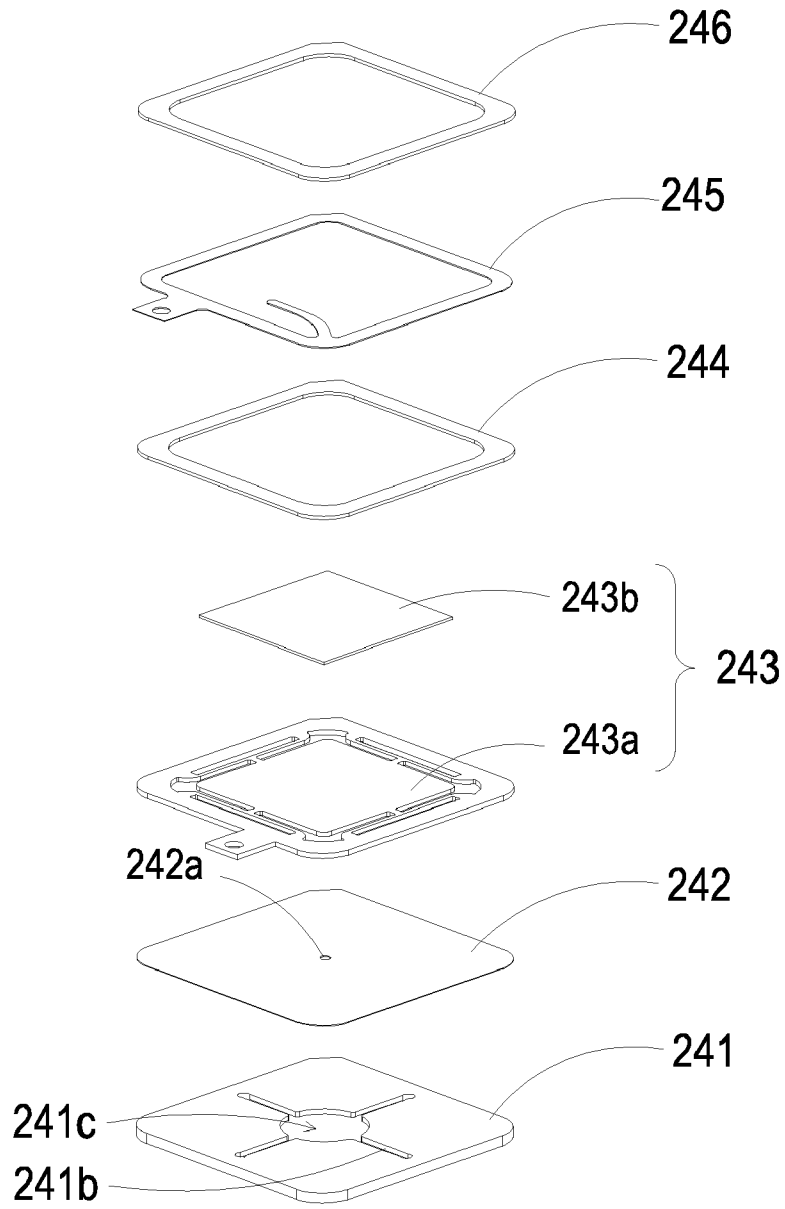


FIG. 3C

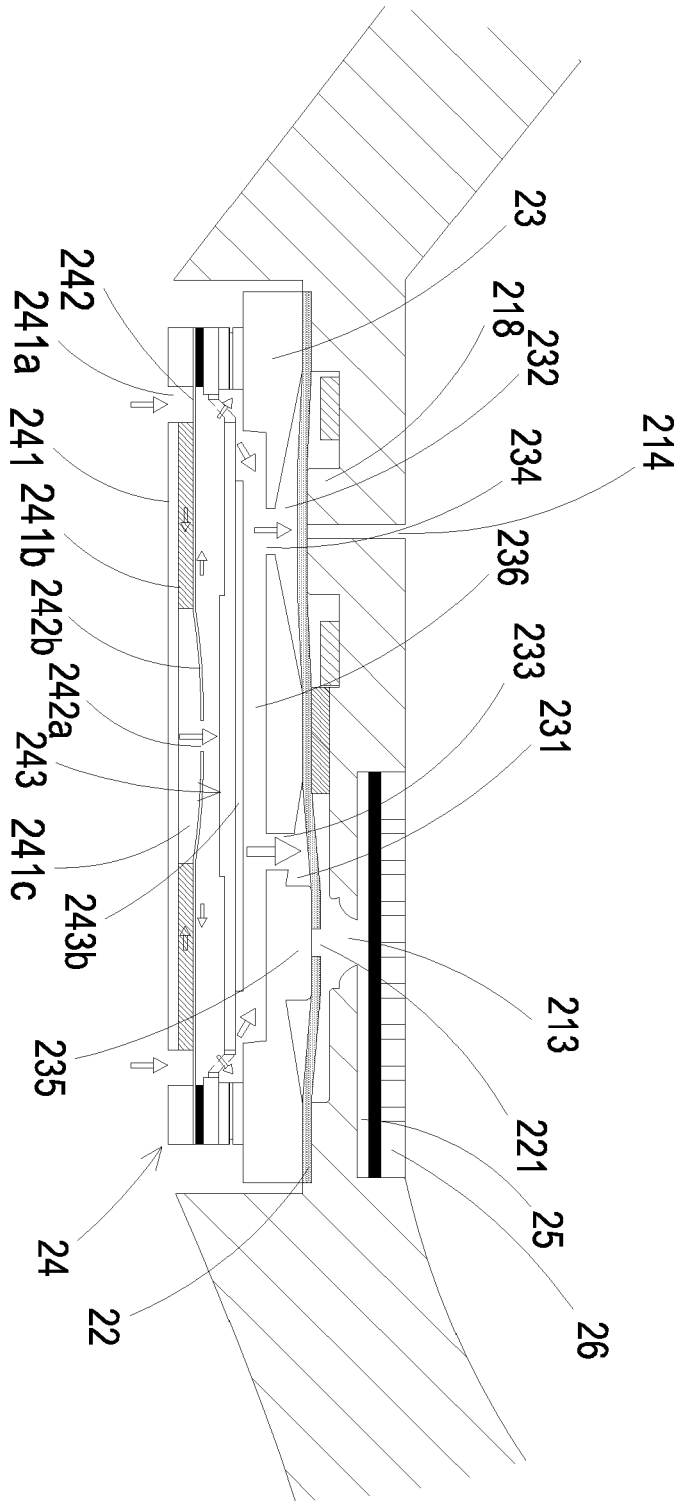


FIG. 4A

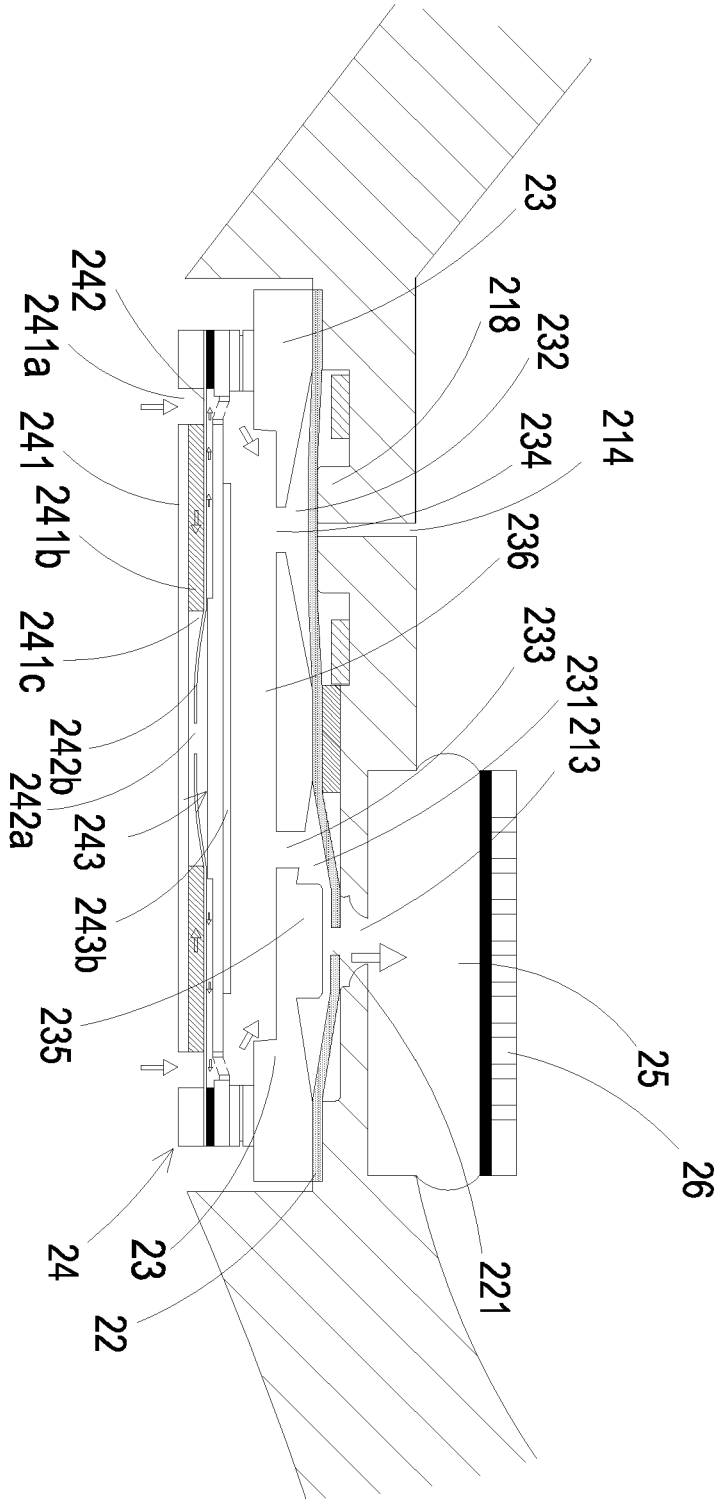


FIG. 4B

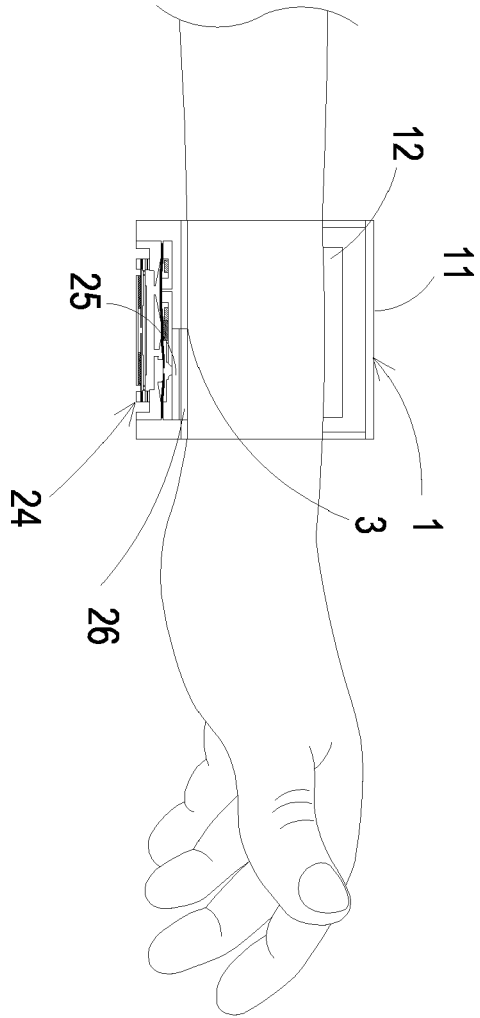


FIG. 5

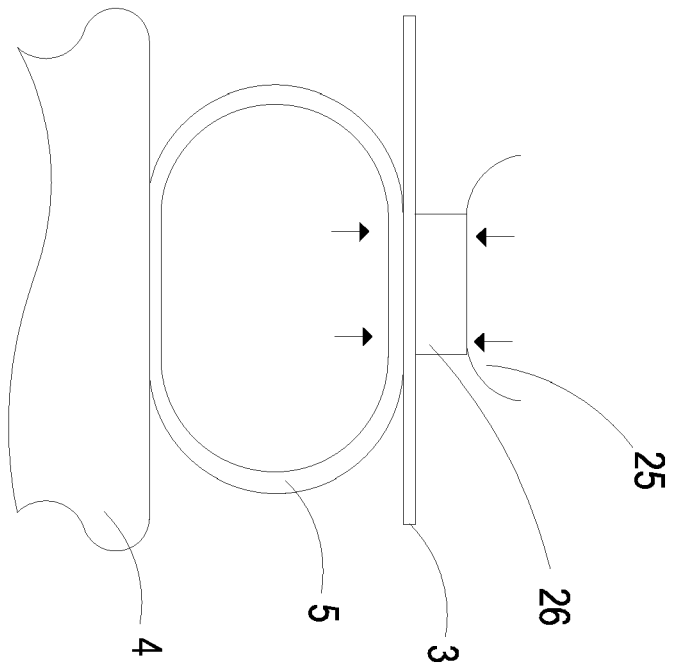


FIG. 6

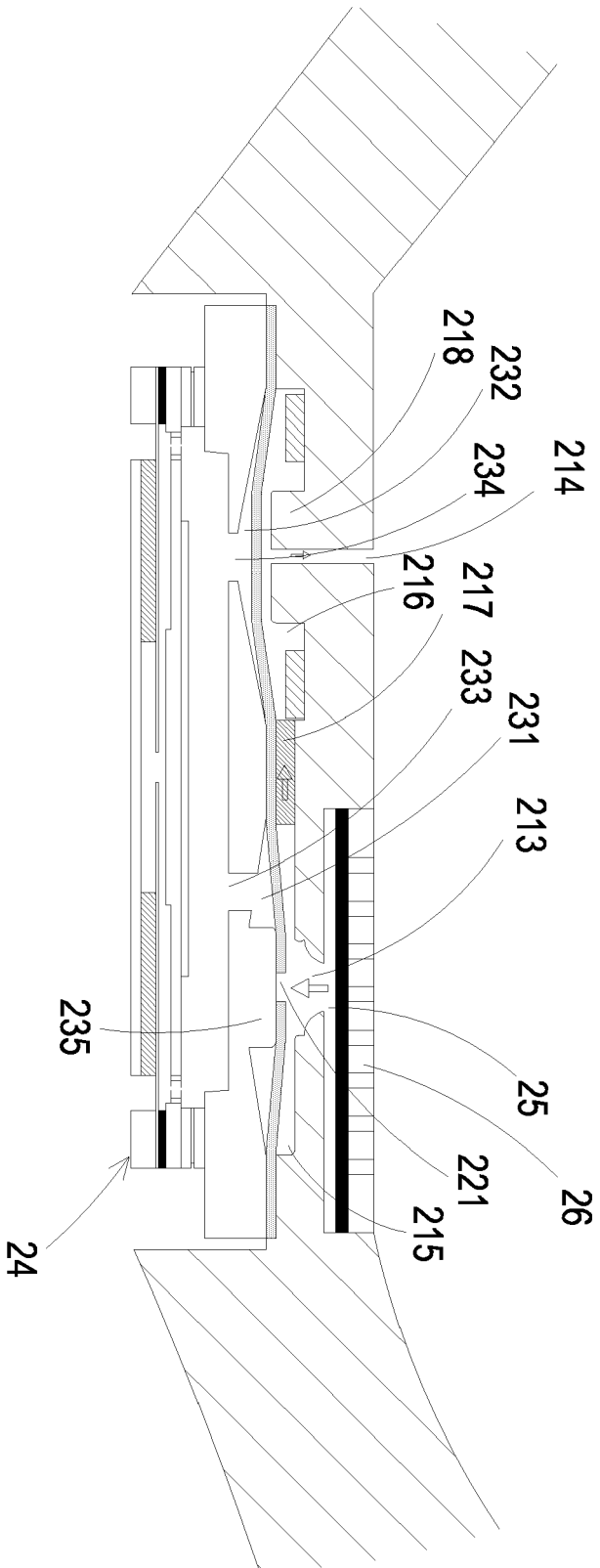


FIG. 7



EUROPEAN SEARCH REPORT

Application Number  
EP 18 20 1155

5

10

15

20

25

30

35

40

45

50

55

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	TW M 523 432 U (MICROJET TECHNOLOGY CO LTD [TW]) 11 June 2016 (2016-06-11) * the whole document *	1-14	INV. A61B5/021 A61B5/00
A	US 2017/218942 A1 (CHEN SHIH-CHANG [TW] ET AL) 3 August 2017 (2017-08-03) * figures 7A-8 *	1-14	
A	US 2010/121206 A1 (BAE SANG-KON [KR] ET AL) 13 May 2010 (2010-05-13) * paragraphs [0009], [0011], [0039], [0040]; claim 9; figure 1 *	1-14	
A	US 2016/034696 A1 (JOOSTE SAREL KOBUS [US] ET AL) 4 February 2016 (2016-02-04) * paragraphs [0029], [0031], [0039], [0054], [0069], [0074], [0075]; figures 1,7A,7B *	1-14	
A	WO 2016/040256 A1 (BRAINTREE ANALYTICS LLC [US]) 17 March 2016 (2016-03-17) * paragraphs [0114], [0115] *	2	
The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (IPC)
			A61B
Place of search		Date of completion of the search	Examiner
The Hague		12 March 2019	Lommel, André
CATEGORY OF CITED DOCUMENTS			
X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	

EPO FORM 1503 03.02 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT  
ON EUROPEAN PATENT APPLICATION NO.

EP 18 20 1155

5 This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.  
The members are as contained in the European Patent Office EDP file on  
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

12-03-2019

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
TW M523432 U	11-06-2016	NONE	
US 2017218942 A1	03-08-2017	EP 3203076 A1 JP 2017133514 A KR 20170091021 A US 2017218942 A1	09-08-2017 03-08-2017 08-08-2017 03-08-2017
US 2010121206 A1	13-05-2010	KR 20100053204 A US 2010121206 A1	20-05-2010 13-05-2010
US 2016034696 A1	04-02-2016	CA 2955625 A1 EP 3160333 A1 JP 6423021 B2 JP 2017529883 A KR 20170036049 A US 2016034696 A1 WO 2016018818 A1	04-02-2016 03-05-2017 14-11-2018 12-10-2017 31-03-2017 04-02-2016 04-02-2016
WO 2016040256 A1	17-03-2016	US 2017360306 A1 WO 2016040256 A1	21-12-2017 17-03-2016

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

专利名称(译)	可穿戴式血压测量装置		
公开(公告)号	<a href="#">EP3479760A1</a>	公开(公告)日	2019-05-08
申请号	EP2018201155	申请日	2018-10-18
[标]申请(专利权)人(译)	研能科技股份有限公司		
申请(专利权)人(译)	MicroJet技术有限公司		
当前申请(专利权)人(译)	MicroJet技术有限公司		
[标]发明人	MOU HAO JAN CHEN SHIH CHANG LIAO JIA YU HAN YUNG LUNG HUANG CHI FENG LEE WEI MING		
发明人	MOU, HAO-JAN CHEN, SHIH-CHANG LIAO, JIA-YU HAN, YUNG-LUNG HUANG, CHI-FENG LEE, WEI-MING		
IPC分类号	A61B5/021 A61B5/00		
CPC分类号	A61B5/02141 A61B5/681 A61B5/6824 A61B5/022 A61B5/02438 A61B5/6831 A61B2562/0247		
代理机构(译)	UEXKÜLL & STOLBERG		
优先权	106138512 2017-11-07 TW		
其他公开文献	EP3479760A8		
外部链接	<a href="#">Espacenet</a>		

摘要(译)

可穿戴式血压测量装置 (100) 包括腕带 (2)，阀板 (22)，气体收集座 (23)，气体输送装置 (24)，弹性介质 (25) 和压力传感器 (26)。腕带 (2) 具有安装区域 (21)。安装区域 (21) 具有第一容纳凹槽 (211)，第二容纳凹槽 (212)，气体收集孔 (213) 和压力释放孔 (214)。第一容纳凹槽 (211) 和第二容纳凹槽 (212) 通过气体收集孔 (213) 彼此流体连通。当气体输送装置 (24) 能够将气体输送到弹性介质 (25) 时，弹性介质 (25) 被气体充气并膨胀以推动压力传感器 (26) 与气体紧密接触。测量用户身体的一部分，从而通过扫描操作测量目标动脉的血压值。

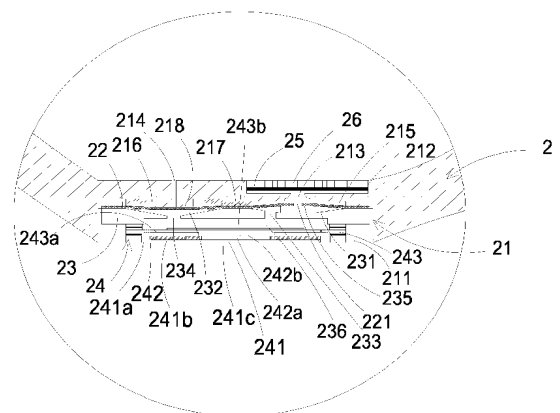


FIG. 2