

(19) Japan Patent Office (JP)

(12) **Japanese Unexamined Patent Application Publication (A)**

(11) Japanese Unexamined Patent Application Publication Number

2006-296564
(P2006-296564A)

(43) Publication date **November 2, 2006 (11.2.2006)**

| | | | | | |
|---------------|---------------|------------------|------|-------------------------|-------|
| (51) Int. Cl. | FI | | | Theme codes (reference) | |
| A61B | 5/0245 | (01.2006) | A61B | 5/02 | 31OF |
| | | | | | 4CO17 |

Request for examination Not yet requested Number of claims 53 OL (Total of 23 pages)

| | | | |
|--------------------------|--|----------------|---|
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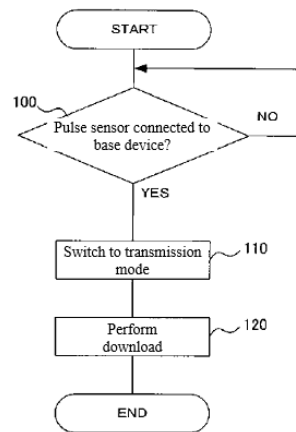
(54) (TITLE OF THE INVENTION) OPTICAL VITAL SENSOR, BASE DEVICE, VITAL SIGN INFORMATION GATHERING SYSTEM, AND SENSOR COMMUNICATION METHOD

(57) (ABSTRACT)

(PROBLEM) Provide an optical vital sensor, base device, vital sign information gathering system, and sensor communication method that are able to transmit and receive information with few malfunctions and with a simple structure.

(MEANS FOR SOLVING) In S100, determine whether or not a pulse sensor 1 and base device 17 are connected. In short, determine whether or not an S-side contact-detecting terminal 19 and a B-side contact-detecting terminal 39 are in contact, and consequently a "contact detected" signal has been input to the S-side contact-detecting terminal 19 from the B-side contact-detecting terminal 39. In S110, switch the control mode of the CPU 16 from measurement mode to transmission mode. In the ensuing S120, transmit data stored in memory, such as pulse, to a base device 17 in transmission mode. In short, download data. In other words, information, such as pulse, is automatically transmitted to the base device 17 from the pulse sensor 1 when the pulse sensor 1 is mounted onto the base device 17.

(SELECTED DRAWING) FIG. 8



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(SCOPE OF PATENT CLAIMS)

(CLAIM 1)

Optical vital sensor furnished with a sensor-side optical device component having:

A sensor-side light-emitting means that emits light onto the body;

A sensor-side light-receiving means that receives reflected light, which consists of light that has been emitted by the aforesaid sensor-side light-emitting means and reflected by the aforesaid body; and

A vital sign sensing means that senses the vital signs of the aforesaid body based on the reflected light that was received by the aforesaid sensor-side light-receiving means;

characterized in that the information about the aforesaid vital signs sensed by the aforesaid vital sign sensing means is transmitted, using the aforesaid sensor-side light-emitting means, to a base device that is the recipient of transmissions from the aforesaid optical vital sensor.

(CLAIM 2)

Optical vital sensor set forth in Claim 1, characterized in that the aforesaid optical vital sensor has a measurement mode in which vital signs are sensed by the aforesaid vital sign sensing means, and a transmission mode in which the aforesaid vital sign information is transmitted to the aforesaid base device.

(CLAIM 3)

Optical vital sensor set forth in Claim 1 or 2, characterized in that it is furnished with a sensor-side contact-detecting component that detects when [the optical vital sensor] has been mounted onto the aforesaid base device.

(CLAIM 4)

Optical vital sensor set forth in Claim 3, characterized in that [the optical vital sensor] is set to the aforesaid transmission mode upon detecting that [the optical vital sensor] has been mounted onto the aforesaid base device.

(CLAIM 5)

Optical vital sensor set forth in any of Claims 2 through 4, characterized in that it is furnished with a mode-switching switch that switches between the aforesaid measurement mode and the aforesaid transmission mode.

(CLAIM 6)

Optical vital sensor set forth in any of Claims 1 through 5, characterized in that it is furnished with a charging component that is charged by means of a power supply structure on the aforesaid base device.

(CLAIM 7)

Optical vital sensor set forth in any of Claims 1 through 6, characterized in that it is furnished with two or more of the aforesaid sensor-side light-emitting means.

(CLAIM 8)

Light-emitting vital sensor set forth in any of Claims 1 through 7, characterized in that a lens is placed on the surface of the aforesaid sensor-side light-emitting means.

(CLAIM 9)

Light-emitting vital sensor set forth in any of Claims 1 through 7, characterized in that a translucent cover is placed on the surface of the aforesaid sensor-side light-emitting means.

(CLAIM 10)

Light-emitting vital sensor set forth in Claim 9, characterized in that the aforesaid cover serves the function of blocking visible light.

(CLAIM 11)

Base device to which the aforesaid vital sign information is transmitted from the optical vital sensor set forth in any of the aforesaid Claims 1 through 10,

Characterized in that it is furnished with a base-side optical device component that has a base-side light-receiving means for receiving the aforesaid vital sign information transmitted by the aforesaid sensor-side light-emitting means.

(CLAIM 12)

Base device set forth in Claim 11, characterized in that the aforesaid base-side optical device component is further furnished with a base-side light-emitting means that transmits a signal to the aforesaid sensor-side optical device component.

(CLAIM 13)

Base device set forth in Claim 12, characterized in that a command signal instructing the aforesaid vital sign information to be transmitted from the aforesaid sensor-side light-receiving means is transmitted to the aforesaid sensor-side light-receiving means

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using the aforesaid base-side light-emitting means.

(CLAIM 14)

Base device set forth in any of Claims 11 through 13, characterized in that the aforesaid base device is furnished with a mounting structure onto which the aforesaid optical vital sensor is mounted in physical contact therewith.

(CLAIM 15)

Base device set forth in Claim 14, characterized in that the aforesaid optical vital sensor is disposed so as to be mounted at an angle when the aforesaid optical vital sensor is mounted onto the aforesaid base device.

(CLAIM 16)

Base device set forth in Claim 14, characterized in that the aforesaid optical vital sensor is disposed so as to be mounted level onto the aforesaid base device.

(CLAIM 17)

Base device set forth in any of Claims 11 through 16, characterized in that it is furnished with a base-side contact-detecting component that transmits a detection signal to the aforesaid optical vital sensor when the aforesaid optical vital sensor is mounted onto [the base device].

(CLAIM 18)

Base device set forth in any of Claims 11 through 17, characterized in that it has a power supply structure for charging the charging component of the aforesaid optical vital sensor.

(CLAIM 19)

Base device set forth in any of Claims 11 through 18, characterized in that it is furnished with two or more of the aforesaid base-side light-receiving elements.

(CLAIM 20)

Base device set forth in any of Claims 11 through 19, characterized in that the aforesaid base device is furnished with a recess into which the aforesaid optical vital sensor is fitted.

(CLAIM 21)

Base device set forth in Claim 20, characterized in that the aforesaid recess is a basal recess matching the base of the aforesaid optical vital sensor and/or a flank recess matching the sensor-side optical device component.

(CLAIM 22)

Base device set forth in Claim 20 or 21, characterized in that the aforesaid recess is a groove running the length of the direction in which the aforesaid optical vital sensor is mounted.

(CLAIM 23)

Vital sign information gathering system [*sic*: base device] set forth in Claim 21 or 22, characterized in that the central part of the groove in the aforesaid flank recess is itself further recessed.

(CLAIM 24)

Base device set forth in Claim 21 or 22, characterized in that the depth of the aforesaid basal recess is set such that, when the aforesaid optical vital sensor is fitted [into the recess] with a band attached thereto, the aforesaid band does not cause any impediment.

(CLAIM 25)

Base device set forth in any of Claims 11 through 24, characterized in that the aforesaid base device is furnished with a basal component onto which the aforesaid optical vital sensor is placed and an upright component extending upwards from said basal component.

(CLAIM 26)

Base device set forth in Claim 25, characterized in that there is a difference in level between the aforesaid basal component and the aforesaid upright component.

(CLAIM 27)

Base device set forth in Claim 25 or 26, characterized in that it is designed so that, when a band is attached to the aforesaid optical vital sensor, this band fits around the outside of the aforesaid upright component.

(CLAIM 28)

Base device set forth in any of Claims 25 through 27, characterized in that the flank of the aforesaid upright component is curved.

(CLAIM 29)

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Base device set forth in any of Claims 11 through 28, characterized in that a lens is placed on the surface of the aforesaid base-side light-emitting means.

(CLAIM 30)

Base device set forth in any of Claims 11 through 28, characterized in that a translucent cover is placed on the surface of the aforesaid base-side light-emitting means.

(CLAIM 31)

Base device set forth in Claim 30, characterized in that the aforesaid cover serves the function of blocking visible light.

(CLAIM 32)

Vital sign information gathering system characterized in that it is furnished with the optical vital sensor set forth in any of the aforesaid Claims 1 through 10 and the base device set forth in any of the aforesaid Claims 11 through 31.

(CLAIM 33)

Vital sign information gathering system set forth in Claim 32, characterized in that the aforesaid vital sign information transmitted using the aforesaid sensor-side light-emitting means is received by the aforesaid base-side light-receiving means.

(CLAIM 34)

Vital sign information gathering system set forth in Claim 32 or 33, characterized in that a designated command signal transmitted using the aforesaid base-side light-emitting means is received by the aforesaid sensor-side light-receiving means.

(CLAIM 35)

Vital sign information gathering system set forth in Claim 34, characterized in that, when the aforesaid command signal is transmitted by the aforesaid base-side light-emitting means, the aforesaid optical vital sensor is set to the aforesaid transmission mode based on the aforesaid command signal.

(CLAIM 36)

Vital sign information gathering system set forth in any of Claims 32 through 35, characterized in that the aforesaid sensor-side optical device component and the aforesaid base-side optical device component are positioned in such a way as to be situated opposite one another when the aforesaid optical vital sensor is mounted onto the aforesaid base device.

(CLAIM 37)

Vital sign information gathering system set forth in any of Claims 32 through 36, characterized in that, when the aforesaid optical vital sensor is mounted onto the aforesaid base device, the aforesaid optical vital sensor fits into the aforesaid base device in such a way as to maintain a uniform distance and position between the light-emitting means and the light-receiving means.

(CLAIM 38)

Vital sign information gathering system set forth in any of Claims 32 through 37, characterized in that, when an infrared LED is used as the aforesaid sensor-side light-emitting means, a member to block visible light is placed on the surface of the aforesaid base-side light-receiving means.

(CLAIM 39)

Vital sign information gathering system set forth in any of Claims 32 through 38, characterized in that it has a configuration whereby, if a lens has been placed on the aforesaid base-side optical device component and on the aforesaid sensor-side optical device component, the convexity of one lens fits into the concavity of the other.

(CLAIM 40)

Vital sign information gathering system set forth in any of Claims 32 through 38, characterized in that, if a translucent cover has been placed on the aforesaid base-side optical device component and on the aforesaid sensor-side optical device component, the convexity of one cover fits into the concavity of the other.

(CLAIM 41)

Vital sign information gathering system set forth in any of Claims 32 through 40, characterized in that it has a configuration whereby the terminals of the aforesaid base device and the terminals of the aforesaid optical vital sensor mechanically contact one another.

(CLAIM 42)

Vital sign information gathering system set forth in Claim 41, characterized in that it has a configuration whereby the shape of the mutually contacting aforesaid terminals determines the direction in which the aforesaid optical vital sensor is mounted.

(CLAIM 43)

Vital sign information gathering system set forth in any of Claims 32 through 42, characterized in that it has a configuration

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whereby the reception and transmission of signals between the aforesaid base device and the aforesaid optical vital sensor is performed using electromagnetism.

(CLAIM 44)

Vital sign information gathering system set forth in any of Claims 32 through 43, characterized in that it has a configuration whereby power is supplied from the aforesaid base device to the aforesaid optical vital sensor using electromagnetism.

(CLAIM 45)

Vital sign information gathering system set forth in any of Claims 32 through 44, characterized in that, if two or more sensor-side light-emitting means are provided on the aforesaid sensor-side optical device component, the aforesaid base-side optical device component is furnished with as many base-side light-receiving means as there are aforesaid sensor-side light-emitting means.

(CLAIM 46)

Vital sign information gathering system set forth in Claim 45, characterized in that a plurality of pairs of the aforesaid light-emitting means and light-receiving means are provided on the aforesaid sensor-side optical device component and the aforesaid base-side optical device component, and transmission of the aforesaid vital sign information is performed using the aforesaid plurality of pairs of light-emitting means and light-receiving means.

(CLAIM 47)

Vital sign information gathering system set forth in Claim 45, characterized in that a plurality of pairs of the aforesaid light-emitting means and light-receiving means are provided on the aforesaid sensor-side optical device component and the aforesaid base-side optical device component, and transmission of the aforesaid vital sign information is performed using one of the aforesaid pairs of light-emitting means and light-receiving means, whereas transmission of check information for checking the aforesaid transmitted vital sign information is performed using the other of the aforesaid pairs of light-emitting means and light-receiving means.

(CLAIM 48)

Sensor communication method for communication between the optical vital sensor set forth in any of the aforesaid Claims 1 through 10 and the base device set forth in any of the aforesaid Claims 11 through 31,

characterized in that the aforesaid vital sign information is transmitted to the aforesaid base-side light-receiving means using the aforesaid sensor-side light-emitting means.

(CLAIM 49)

Sensor communication method set forth in Claim 48, characterized in that the aforesaid vital sign information is transmitted from the aforesaid optical vital sensor to the aforesaid base device when the aforesaid optical vital sensor is mounted onto the aforesaid base device.

(CLAIM 50)

Sensor communication method set forth in Claim 48 or 49, characterized in that the aforesaid vital sign information is transmitted from the aforesaid optical vital sensor to the aforesaid base device when a designated command signal is transmitted from the aforesaid base device to the aforesaid optical vital sensor.

(CLAIM 51)

Sensor communication method set forth in Claim 50, characterized in that the aforesaid optical vital sensor is placed in standby mode when the aforesaid optical vital sensor is mounted onto the aforesaid base device, and the aforesaid vital sign information is transmitted from the aforesaid optical vital sensor to the aforesaid base device when a command signal is received from the aforesaid base device.

(CLAIM 52)

Sensor communication method set forth in Claim 51, characterized in that, in the event that the aforesaid optical vital sensor has been placed in standby mode by means of the mode-switching switch, the aforesaid vital sign information is transmitted from the aforesaid optical vital sensor to the aforesaid base device when a signal requesting the aforesaid command signal is transmitted from the aforesaid optical vital sensor to the aforesaid base device and a command signal is then received from the aforesaid base device.

(CLAIM 53)

Sensor communication method set forth in Claim 50, characterized in that, in the event that the aforesaid optical vital sensor has been placed in standby mode by means of the mode-switching switch, the aforesaid vital sign information is transmitted from the aforesaid optical vital sensor to the aforesaid base device when a command signal is received from the aforesaid base device.

(DETAILED DESCRIPTION OF THE INVENTION)

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