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(54) **PULSE OXIMETER**

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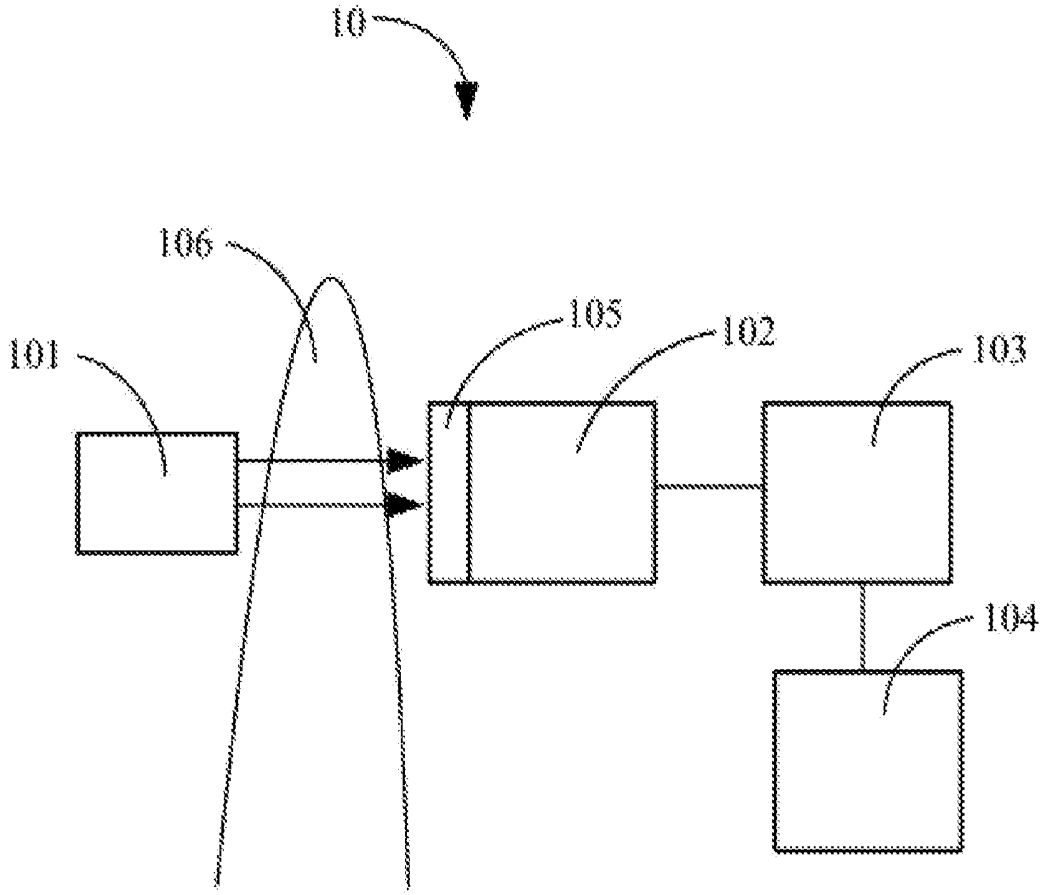
(57) **ABSTRACT**

This disclosure relates to a pulse oximeter. The pulse oximeter includes a light source; a light acquirer spaced apart from the light source; a processor connected to the light acquirer; a filter in the light path from the light source to the light acquirer; and a first mechanical device. The filter includes a first single band filter having center wavelength of 660 nm and a second single band filter having center wavelength of 940 nm. The first mechanical device moves the filter so that the first single band filter and the second single band filter are alternately in the light path from the light source to the light acquirer. The double band filter can filter the unnecessary light and improve the accuracy of the pulse oximeter.



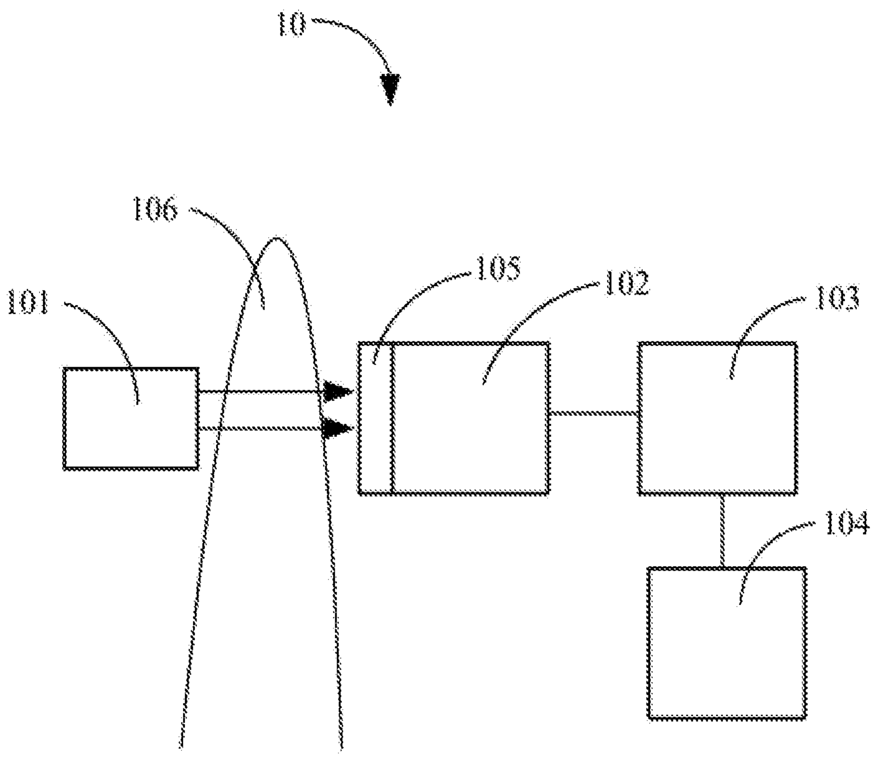


FIG. 1

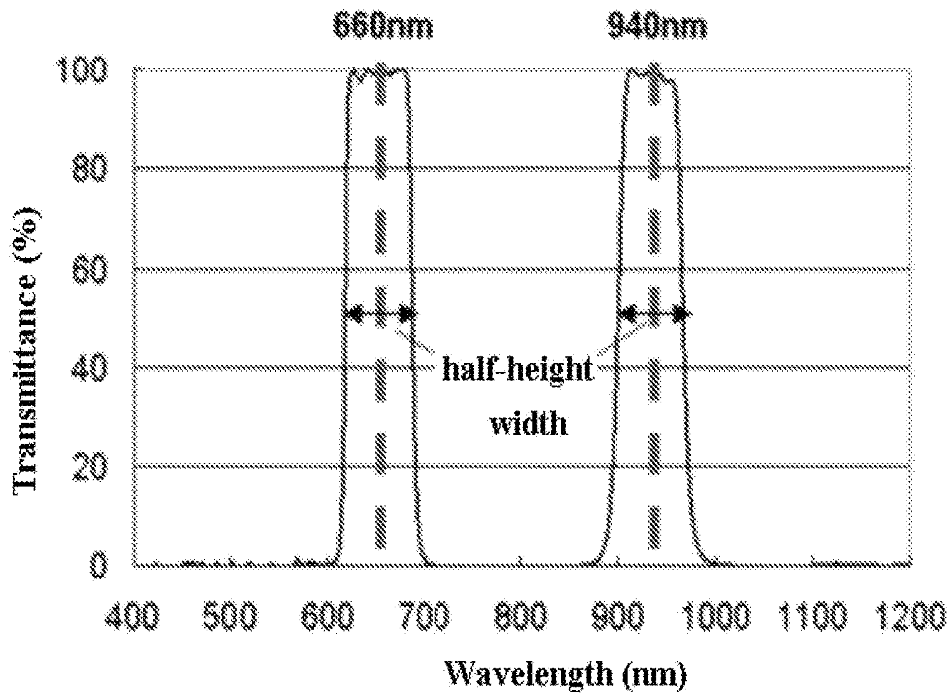

660nm
940nm
100
80
60
40
20
0
Transmittance (%)
half-height
width
400
500
600
700
800
900
1000
1100
1200
Wavelength (nm)

FIG. 2

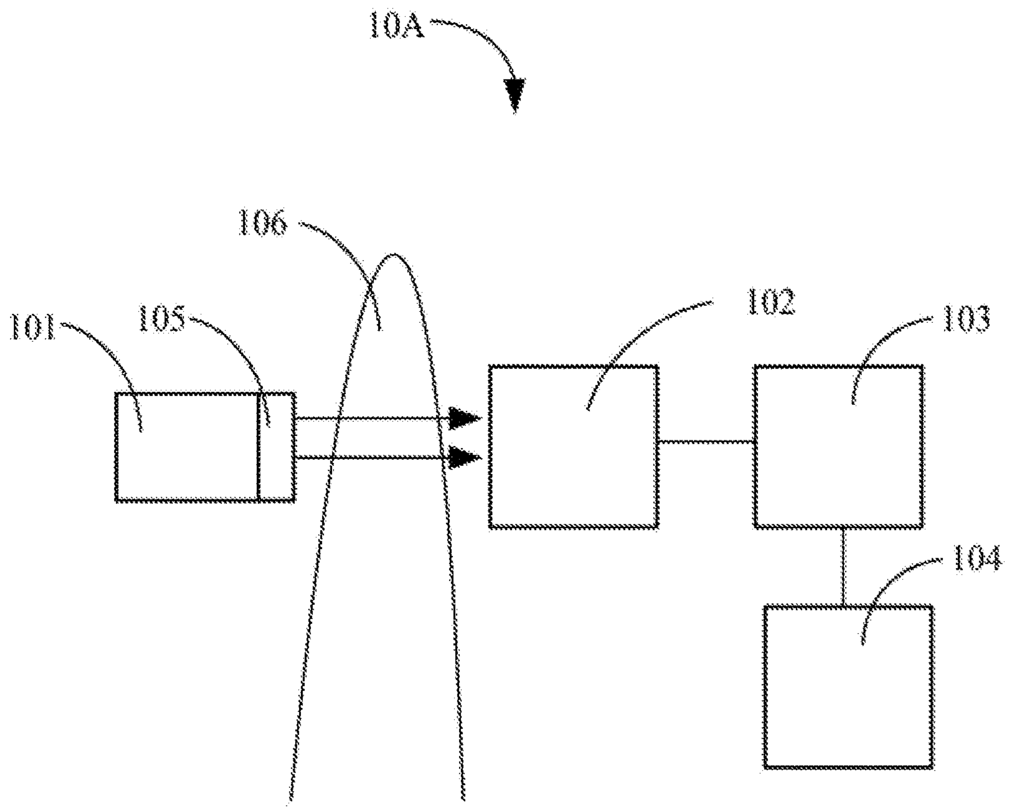


FIG. 3

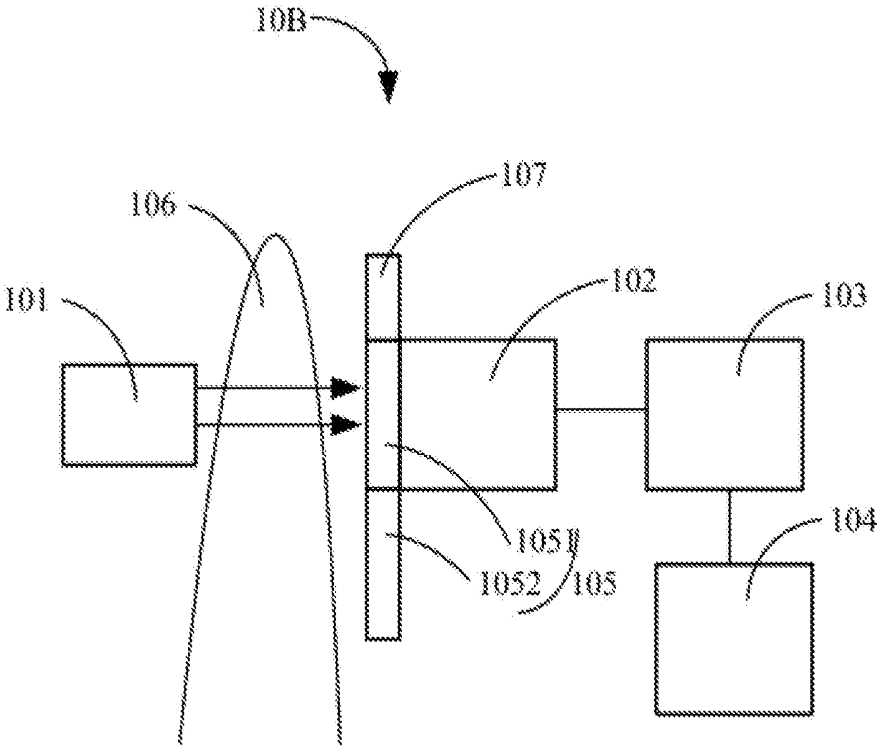


FIG. 4

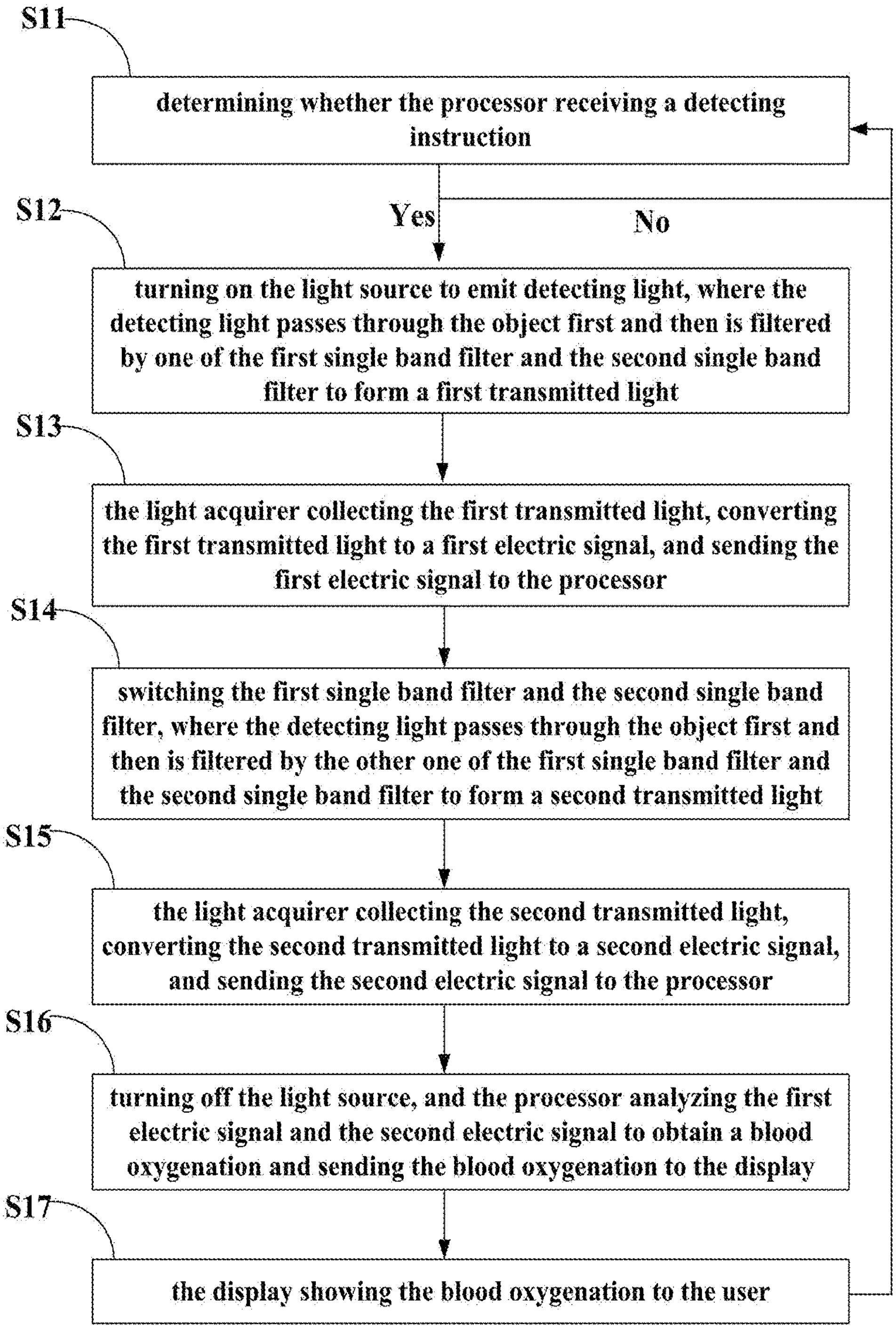

S11
determining whether the processor receiving a detecting instruction
Yes
No
S12
turning on the light source to emit detecting light, where the detecting light passes through the object first and then is filtered by one of the first single band filter and the second single band filter to form a first transmitted light
S13
the light acquirer collecting the first transmitted light, converting the first transmitted light to a first electric signal, and sending the first electric signal to the processor
S14
switching the first single band filter and the second single band filter, where the detecting light passes through the object first and then is filtered by the other one of the first single band filter and the second single band filter to form a second transmitted light
S15
the light acquirer collecting the second transmitted light, converting the second transmitted light to a second electric signal, and sending the second electric signal to the processor
S16
turning off the light source, and the processor analyzing the first electric signal and the second electric signal to obtain a blood oxygenation and sending the blood oxygenation to the display
S17
the display showing the blood oxygenation to the user

FIG. 5

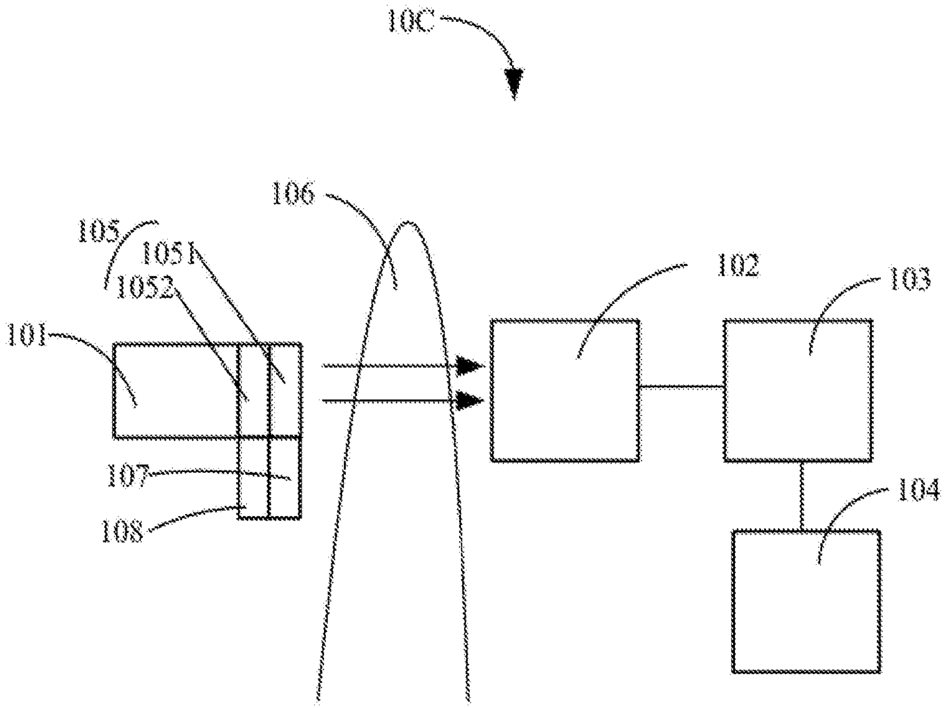


FIG. 6

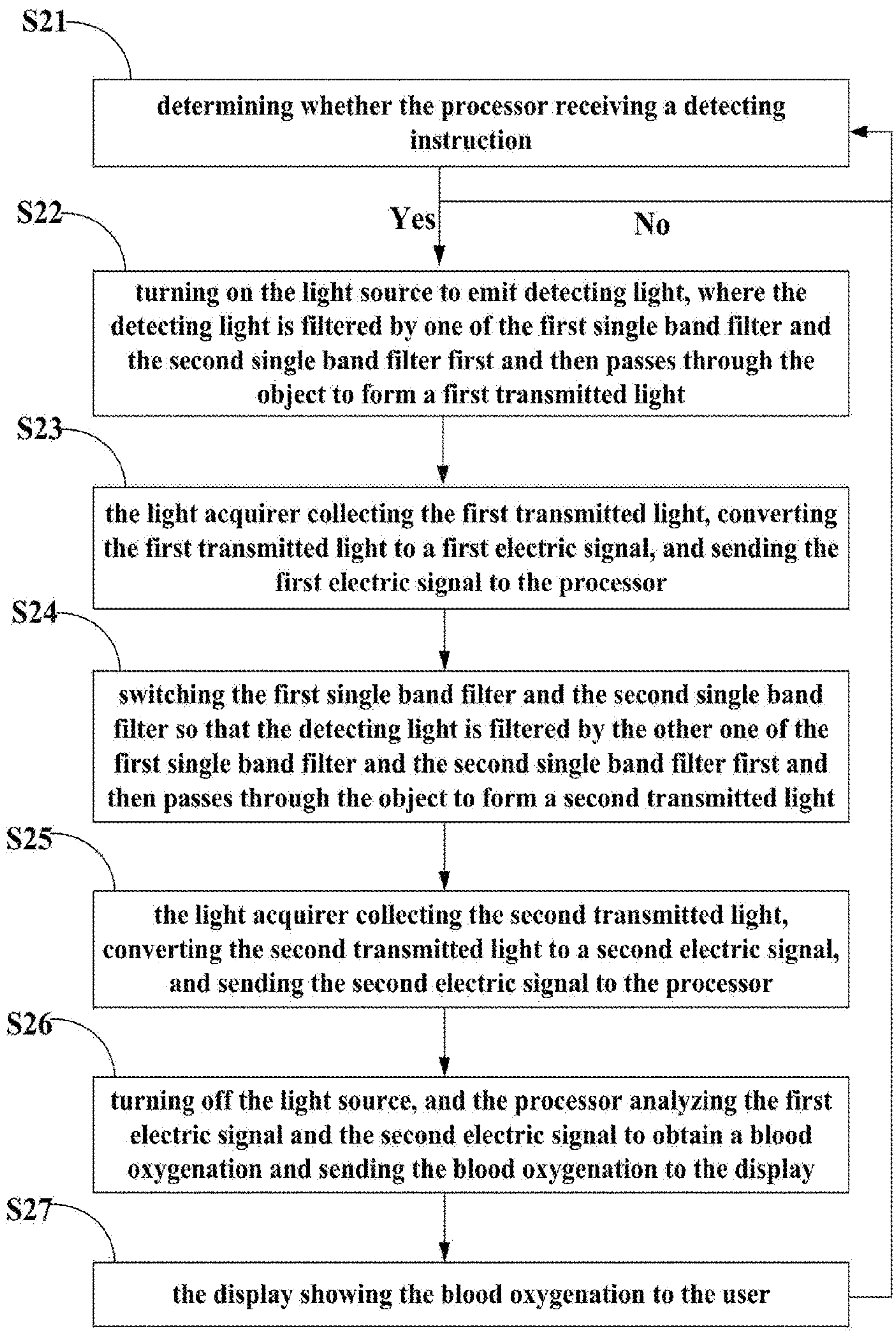

S21
determining whether the processor receiving a detecting instruction
Yes
No
S22
turning on the light source to emit detecting light, where the detecting light is filtered by one of the first single band filter and the second single band filter first and then passes through the object to form a first transmitted light
S23
the light acquirer collecting the first transmitted light, converting the first transmitted light to a first electric signal, and sending the first electric signal to the processor
S24
switching the first single band filter and the second single band filter so that the detecting light is filtered by the other one of the first single band filter and the second single band filter first and then passes through the object to form a second transmitted light
S25
the light acquirer collecting the second transmitted light, converting the second transmitted light to a second electric signal, and sending the second electric signal to the processor
S26
turning off the light source, and the processor analyzing the first electric signal and the second electric signal to obtain a blood oxygenation and sending the blood oxygenation to the display
S27
the display showing the blood oxygenation to the user

FIG. 7

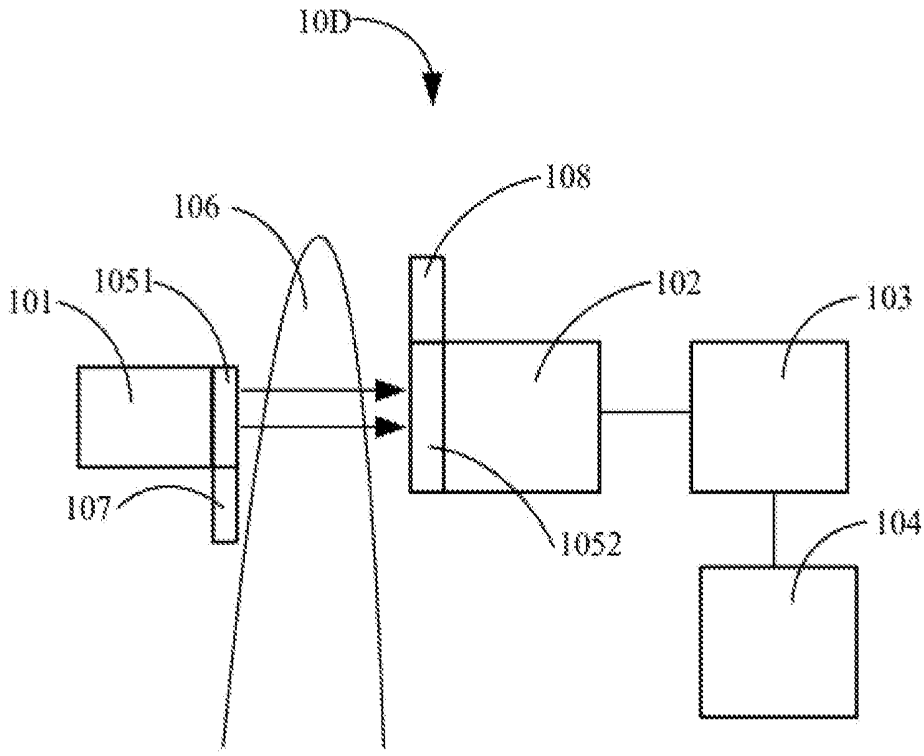


FIG. 8

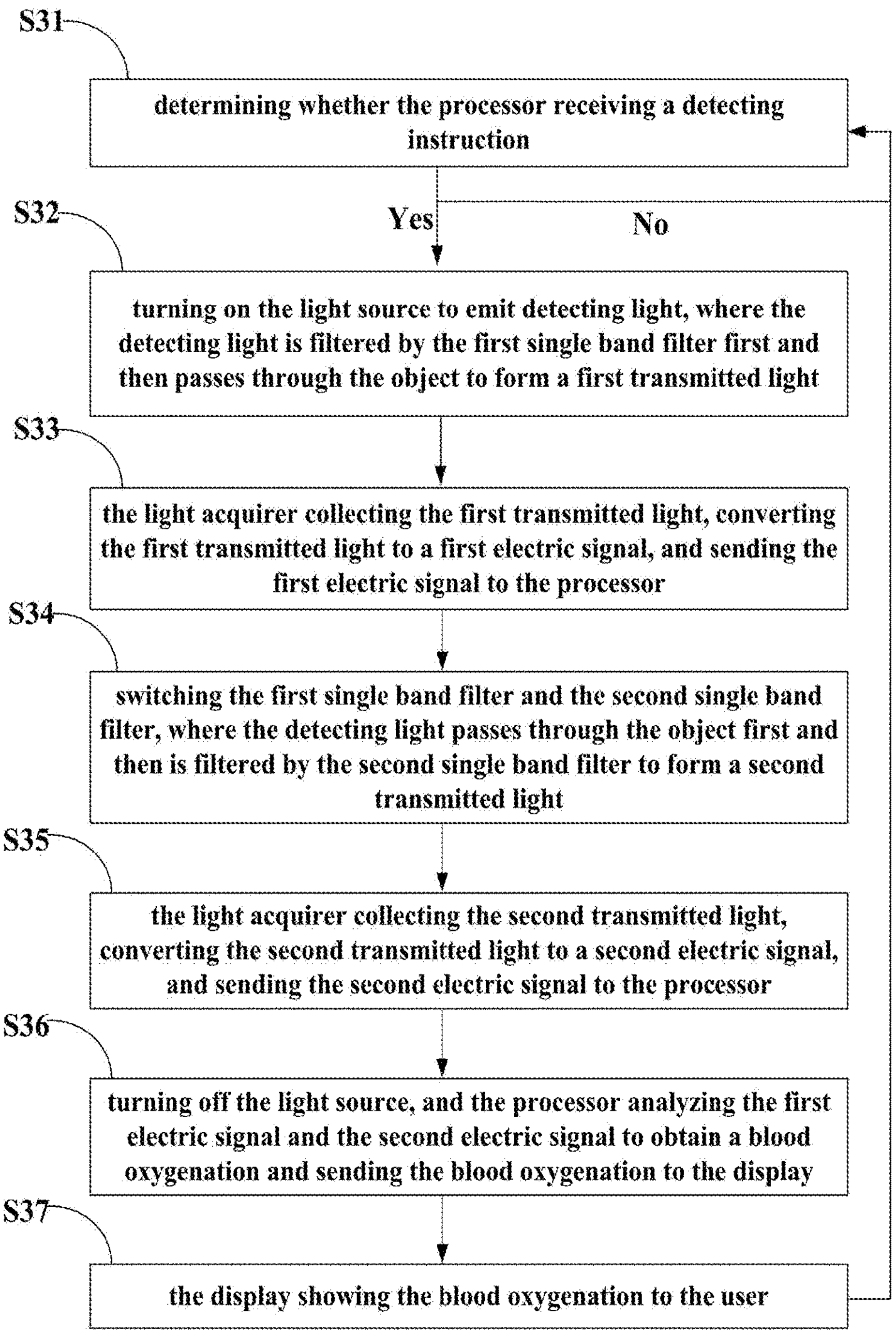

S31
determining whether the processor receiving a detecting instruction
Yes
No
S32
turning on the light source to emit detecting light, where the detecting light is filtered by the first single band filter first and then passes through the object to form a first transmitted light
S33
the light acquirer collecting the first transmitted light, converting the first transmitted light to a first electric signal, and sending the first electric signal to the processor
S34
switching the first single band filter and the second single band filter, where the detecting light passes through the object first and then is filtered by the second single band filter to form a second transmitted light
S35
the light acquirer collecting the second transmitted light, converting the second transmitted light to a second electric signal, and sending the second electric signal to the processor
S36
turning off the light source, and the processor analyzing the first electric signal and the second electric signal to obtain a blood oxygenation and sending the blood oxygenation to the display
S37
the display showing the blood oxygenation to the user

FIG. 9

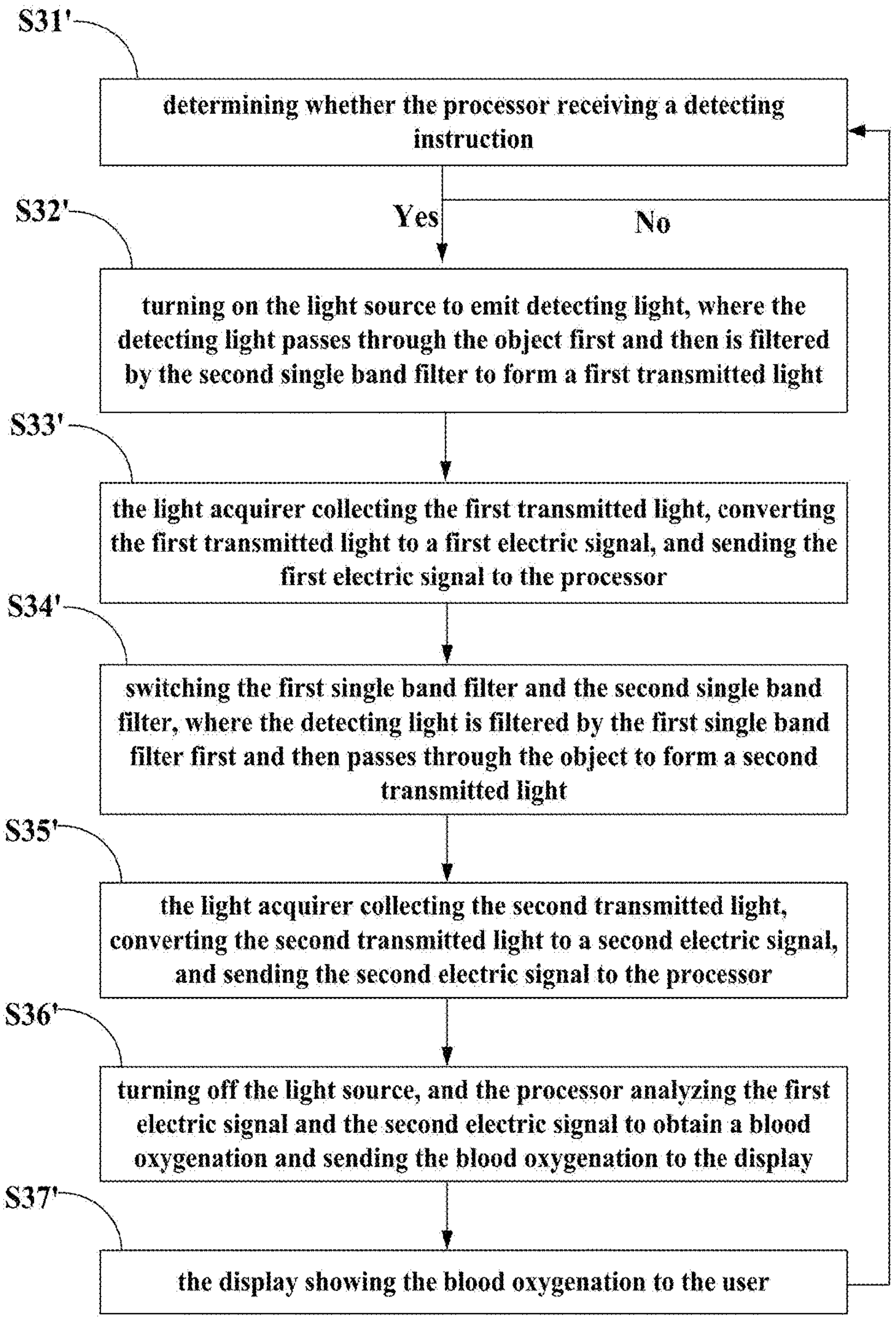

S31'
determining whether the processor receiving a detecting instruction
Yes
No
S32'
turning on the light source to emit detecting light, where the detecting light passes through the object first and then is filtered by the second single band filter to form a first transmitted light
S33'
the light acquirer collecting the first transmitted light, converting the first transmitted light to a first electric signal, and sending the first electric signal to the processor
S34'
switching the first single band filter and the second single band filter, where the detecting light is filtered by the first single band filter first and then passes through the object to form a second transmitted light
S35'
the light acquirer collecting the second transmitted light, converting the second transmitted light to a second electric signal, and sending the second electric signal to the processor
S36'
turning off the light source, and the processor analyzing the first electric signal and the second electric signal to obtain a blood oxygenation and sending the blood oxygenation to the display
S37'
the display showing the blood oxygenation to the user

FIG. 10

PULSE OXIMETER

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application claims all benefits accruing under 35 U.S.C. § 119 from Taiwan Patent Application No. 105141483, filed on Dec. 14, 2016, in the Taiwan Intellectual Property Office, the contents of which are hereby incorporated by reference.

BACKGROUND

1. Technical Field

[0002] The present disclosure relates to pulse oximeter.

2. Description of Related Art

[0003] Pulse oximetry is a noninvasive method for monitoring a person's oxygen saturation. Two light beams are used to radiate the patient's body, usually a fingertip or earlobe, and would be respectively absorbed by the HbO_2 and Hb of the blood. The blood oxygenation can be obtained by processing the intensity change of the two light beams. The light beams with wavelength of 660 nm and 940 nm are preferable for monitoring the oxygen saturation.

[0004] However, the light source usually emits a light with continuous wavelength that causes a lots of noise light signal and affects the accuracy of the pulse oximeter. Thus, the light beam is split by a light splitter to two incident light beams with each having continuous wavelength respectively by two filters. Then the two incident light beams with each having continuous wavelength are simultaneously filtered by two filter to form two incident light with wavelength of 660 nm and 940 nm. The two incident light with wavelength of 660 nm and 940 nm are respectively collected by two light acquirers. Thus, the pulse oximeter is complicated and has a lower accuracy.

[0005] What is needed, therefore, is to provide a pulse oximeter that can overcome the problems as discussed above.

BRIEF DESCRIPTION OF THE DRAWINGS

[0006] Many aspects of the exemplary embodiments can be better understood with reference to the following drawings. The components in the drawings are not necessarily drawn to scale, the emphasis instead being placed upon clearly illustrating the principles of the exemplary embodiments. Moreover, in the drawings, like reference numerals designate corresponding parts throughout the several views.

[0007] FIG. **1** is a schematic section view of a first exemplary embodiment of a pulse oximeter.

[0008] FIG. **2** shows a test result of a double band filter of the first exemplary embodiment of the pulse oximeter.

[0009] FIG. **3** is a schematic section view of a second exemplary embodiment of a pulse oximeter.

[0010] FIG. **4** is a schematic section view of a third exemplary embodiment of a pulse oximeter.

[0011] FIG. **5** is a flow chart of the third exemplary embodiment of a method of the pulse oximeter of FIG. **4**.

[0012] FIG. **6** is a schematic section view of a fourth exemplary embodiment of a pulse oximeter.

[0013] FIG. **7** is a flow chart of the fourth exemplary embodiment of a method of the pulse oximeter of FIG. **6**.

[0014] FIG. **8** is a schematic section view of a fifth exemplary embodiment of a pulse oximeter.

[0015] FIG. **9** is a flow chart of the fourth exemplary embodiment of a method of the pulse oximeter of FIG. **8**.

[0016] FIG. **10** is a flow chart of the fourth exemplary embodiment of another method of the pulse oximeter of FIG. **8**.

DETAILED DESCRIPTION

[0017] It will be appreciated that for simplicity and clarity of illustration, where appropriate, reference numerals have been repeated among the different figures to indicate corresponding or analogous elements. In addition, numerous specific details are set forth in order to provide a thorough understanding of the exemplary embodiments described herein. However, it will be understood by those of ordinary skill in the art that the exemplary embodiments described herein can be practiced without these specific details. In other instances, methods, procedures, and components have not been described in detail so as not to obscure the related relevant feature being described. The drawings are not necessarily to scale, and the proportions of certain parts may be exaggerated better illustrate details and features. The description is not to considered as limiting the scope of the exemplary embodiments described herein.

[0018] Several definitions that apply throughout this disclosure will now be presented. The term "coupled" is defined as connected, whether directly or indirectly through intervening components, and is not necessarily limited to physical connections. The connection can be such that the objects are permanently connected or releasably connected. The term "outside" refers to a region that is beyond the outermost confines of a physical object. The term "inside" indicates that at least a portion of a region is partially contained within a boundary formed by the object. The term "substantially" is defined to essentially conforming to the particular dimension, shape or other word that substantially modifies, such that the component need not be exact. For example, substantially cylindrical means that the object resembles a cylinder, but can have one or more deviations from a true cylinder. The term "comprising" means "including, but not necessarily limited to"; it specifically indicates open-ended inclusion or membership in a so-described combination, group, series and the like. It should be noted that references to "an" or "one" exemplary embodiment in this disclosure are not necessarily to the same exemplary embodiment, and such references mean at least one.

[0019] References will now be made to the drawings to describe, in detail, various exemplary embodiments of the present pulse oximeters.

[0020] Referring to FIG. **1**, a pulse oximeter **10** of a first exemplary embodiment includes a light source **101**, a light acquirer **102**, a processor **103**, a display **104**, and a filter **105**. In use of the pulse oximeter **10**, an object **106**, such as a finger, can be located between the light source **101** and the light acquirer **102**.

[0021] The light source **101** emits detecting light. The light acquirer **102** is spaced apart from the light source **101** so that the detecting light can reach the light acquirer **102** after passing through the object **106**. The processor **103** is electrically connected to the light acquirer **102** and the display **104**. The acquirer **102** collects and converts the detecting light signal to electric signal, and send the electric signal to the processor **103**. The processor **103** obtains a blood oxygenation by processing the electric signal and send the blood oxygenation to the display **104**. The display **104** shows the blood oxygenation to the user. The filter **105** is in the light path from the light source **101** to the light acquirer **102** and filters the unnecessary noise light signal and improve the accuracy of the pulse oximeter **10**.

[0022] In one exemplary embodiment, the filter **105** is located between the light source **101** to the light acquirer **102**. As shown in FIG. **2**, the filter **105** includes a double band filter having center wavelength of 660 nm and 940 nm, and a half-height width of 10 nm~100 nm. The double band filter is a single sheet of light filter that only allows the light with a wavelength of 610 nm~710 nm and 890 nm~990 nm to pass through. In one exemplary embodiment, the double band filter only allows the light with a wavelength of 650 nm~670 nm and 930 nm~950 nm to pass through. The size and structure of the double band filter is not limited and can be designed according to need.

[0023] The filter **105** is adjacent to the light acquirer **102** so that the object **106** can be located between the light source **101** and the filter **105**. The filter **105** can be in direct contact with a light receiving surface of the light acquirer **102** or spaced apart from the light acquirer **102**.

[0024] The structure of the light source **101** is not limited and can be selected according to need. The light source **101** can at least emit light with wavelength of 660 nm and 940 nm. In one exemplary embodiment, the light source **101** is a light emitting diode (LED) and can emit light with wavelength of 400 nm~1200 nm. The light emitted from the light source **101** is focused on and pass through the object **106**. The transmitted light pass through the filter **105** and are substantially and completely collected by the light acquirer **102**.

[0025] The structure of the light acquirer **102**, the processor **103**, and the display **104** is not limited and can be selected according to need. The processor **103** can also be connected to a communication unit (not shown) that is used to send the blood oxygenation to other device such as a cell phone, a tablet computer, or a note book. The display **104** is optional.

[0026] Referring to FIG. **3**, a pulse oximeter **10**A of a second exemplary embodiment includes a light source **101**, a light acquirer **102**, a processor **103**, a display **104**, and a filter **105**.

[0027] The pulse oximeter **10**A of the second exemplary embodiment is similar with the pulse oximeter **10** of the first exemplary embodiment except that the filter **105** is adjacent to the light source **101** so that the object **106** can be located between the filter **105** and the acquirer **102**. The light emitted from the light source **101** are filtered by the filter **105** first and then pass through the object **106**. Only the light with wavelength of 660 nm and 940 nm can be focused on and pass through the object **106**. The transmitted light passed through the object **106** are substantially and completely collected by the light acquirer **102**. The filter **105** can be spaced apart from or in direct contact with the light source **101**. In one exemplary embodiment, the filter **105** is in direct contact with and fixed on a light exiting surface of the light source **101**.

[0028] The pulse oximeter **10**, **10**A has following advantages. First, the filter **105** can filter the unnecessary noise light signal and improve the accuracy of the pulse oximeter **10**. Second, because the filter **105** is a double band filter, the pulse oximeter **10** can have only one light source **101** and only one light acquirer **102**, and does not need any light splitter. Thus, the pulse oximeter **10** can be more compact and have a lower cost. Third, because the filter **105** is a double band filter, the transmitted light passed through the filter **105** can be substantially completely collected by a single light acquirer **102**. Thus, the detected signal has a higher intensity and the pulse oximeter **10** has a higher accuracy.

[0029] Referring to FIG. **4**, a pulse oximeter **10**B of a third exemplary embodiment includes a light source **101**, a light acquirer **102**, a processor **103**, a display **104**, a filter **105**, and a first mechanical device **107**.

[0030] The pulse oximeter **10**B of the third exemplary embodiment is similar with the pulse oximeter **10** of the first exemplary embodiment except that the filter **105** includes a first single band filter **1051** and a second single band filter **1052**, and the first mechanical device **107** is provided and connected to the filter **105**.

[0031] The first single band filter **1051** and the second single band filter **1052** can be arranged side-by-side or stacked with respect to each other. The first single band filter **1051** has a center wavelength of 660 nm and the second single band filter **1052** has a center wavelength of 940 nm. The first mechanical device **107** is used to move the filter **105** so that the first single band filter **1051** and the second single band filter **1052** can be alternately in the light path from the light source **101** to the light acquirer **102**.

[0032] In one exemplary embodiment, the first single band filter **1051** and the second single band filter **1052** are coplanar and connected to the first mechanical device **107**. The first mechanical device **107** can pull or push the filter **105**. For example, when the first single band filter **1051** is located on the light acquirer **102**, the first mechanical device **107** can make the second single band filter **1052** to be on the light acquirer **102** by pulling; and when the second single band filter **1052** is located on the light acquirer **102**, the first mechanical device **107** can make the first single band filter **1051** to be on the light acquirer **102** by pushing.

[0033] The processor **103** can also control the operation of the pulse oximeter **10**B. Referring to FIG. **5**, the method of the pulse oximeter **10**B includes following steps:

[0034] step (S**11**), determining whether the processor **103** receiving a detecting instruction, if yes, go to step (S**12**), if no, repeats step (S**11**);

[0035] step (S**12**), turning on the light source **101** to emit detecting light, where the detecting light passes through the object **106** first and then is filtered by one of the first single band filter **1051** and the second single band filter **1052** to form a first transmitted light, and go to step (S**13**);

[0036] step (S**13**), the light acquirer **102** collecting the first transmitted light, converting the first transmitted light to a first electric signal, and sending the first electric signal to the processor **103**, and go to step (S**14**);

[0037] step (S**14**), switching the first single band filter **1051** and the second single band filter **1052**, where the detecting light passes through the object **106** first and then is filtered by the other one of the first single band filter **1051** and the second single band filter **1052** to form a second transmitted light, and go to step (S**15**);

[0038] step (S**15**), the light acquirer **102** collecting the second transmitted light, converting the second transmitted light to a second electric signal, and sending the second electric signal to the processor **103**, and go to step (S**16**);

[0039] step (S16), turning off the light source **101**, and the processor **103** analyzing the first electric signal and the second electric signal to obtain a blood oxygenation and sending the blood oxygenation to the display **104**, and go to step (S17); and

[0040] step (S17), the display **104** showing the blood oxygenation to the user, and return to step (S11).

[0041] In step (S12), the detecting light emitted from the light source **101** pass through the first single band filter **1051** or the second single band filter **1052** since one of the first single band filter **1051** and the second single band filter **1052** is located on the light acquirer **102**.

[0042] In step (S14), switching the first single band filter **1051** and the second single band filter **1052** is performed by pushing or pulling. Thus, the first single band filter **1051** and the second single band filter **1052** are alternately on the light acquirer **102**.

[0043] Referring to FIG. **6**, a pulse oximeter **10**C of a fourth exemplary embodiment includes a light source **101**, a light acquirer **102**, a processor **103**, a display **104**, a filter **105**, a first mechanical device **107**, and a second mechanical device **108**.

[0044] The pulse oximeter **10**C of the fourth exemplary embodiment is similar with the pulse oximeter **10**B of the third exemplary embodiment except that the filter **105** in direct contact with a light exiting surface of the light source **101**, and the first single band filter **1051** and the second single band filter **1052** are stacked with respect to each other and respectively moved by the first mechanical device **107** and the second mechanical device **108**.

[0045] In one exemplary embodiment, the first single band filter **1051** is connected to and moved by the first mechanical device **107**, and the second single band filter **1052** is connected to and moved by the second mechanical device **108**. The first mechanical device **107** can rotate the first single band filter **1051** so that the first single band filter **1051** can be in or moved away from the light path from the light source **101** to the light acquirer **102**. The second mechanical device **108** can rotate the second single band filter **1052** so that the second single band filter **1052** can be in or moved away from the light path from the light source **101** to the light acquirer **102**. The first single band filter **1051** and the second single band filter **1052** can be located on the light source **101** alternately.

[0046] The processor **103** can also control the operation of the pulse oximeter **10**C. Referring to FIG. **7**, the method of the pulse oximeter **10**C includes following steps:

[0047] step (S**21**), determining whether the processor **103** receiving a detecting instruction, if yes, go to step (S22), if no, repeats step (S21);

[0048] step (S22), turning on the light source **101** to emit detecting light, where the detecting light is filtered by one of the first single band filter **1051** and the second single band filter **1052** first and then passes through the object **106** to form a first transmitted light, and go to step (S23);

[0049] step (S23), the light acquirer **102** collecting the first transmitted light, converting the first transmitted light to a first electric signal, and sending the first electric signal to the processor **103**, and go to step (S**24**);

[0050] step (S24), switching the first single band filter **1051** and the second single band filter **1052** so that the detecting light is filtered by the other one of the first single band filter **1051** and the second single band filter **1052** first and then passes through the object **106** to form a second transmitted light, and go to step (S**25**);

[0051] step (S25), the light acquirer **102** collecting the second transmitted light, converting the second transmitted light to a second electric signal, and sending the second electric signal to the processor **103**, and go to step (S26);

[0052] step (S**26**), turning off the light source **101**, and the processor **103** analyzing the first electric signal and the second electric signal to obtain a blood oxygenation and sending the blood oxygenation to the display **104**, and go to step (S27); and

[0053] step (S27), the display **104** showing the blood oxygenation to the user, and return to step (S**21**).

[0054] Referring to FIG. **8**, a pulse oximeter **10**D of a fifth exemplary embodiment includes a light source **101**, a light acquirer **102**, a processor **103**, a display **104**, a filter **105**, a first mechanical device **107**, and a second mechanical device **108**.

[0055] The pulse oximeter **10**D of the fifth exemplary embodiment is similar with the pulse oximeter **10**C of the fourth exemplary embodiment except that the first single band filter **1051** in direct contact with a light exiting surface of the light source **101** and moved by the first mechanical device **107**, and the second single band filter **1052** in direct contact with the light acquirer **102** and moved by the second mechanical device **108**.

[0056] The processor **103** can also control the operation of the pulse oximeter **10**D. Referring to FIG. **9**, the method of the pulse oximeter **10**D includes following steps:

[0057] step (S**31**), determining whether the processor **103** receiving a detecting instruction, if yes, go to step (S32), if no, repeats step (S**31**);

[0058] step (S32), turning on the light source **101** to emit detecting light, where the detecting light is filtered by the first single band filter **1051** first and then passes through the object **106** to form a first transmitted light, and go to step (S**33**);

[0059] step (S33), the light acquirer **102** collecting the first transmitted light, converting the first transmitted light to a first electric signal, and sending the first electric signal to the processor **103**, and go to step (S34);

[0060] step (S34), switching the first single band filter **1051** and the second single band filter **1052**, where the detecting light passes through the object **106** first and then is filtered by the second single band filter **1052** to form a second transmitted light, and go to step (S35);

[0061] step (S35), the light acquirer **102** collecting the second transmitted light, converting the second transmitted light to a second electric signal, and sending the second electric signal to the processor **103**, and go to step (S36);

[0062] step (S**36**), turning off the light source **101**, and the processor **103** analyzing the first electric signal and the second electric signal to obtain a blood oxygenation and sending the blood oxygenation to the display **104**, and go to step (S37); and

[0063] step (S37), the display **104** showing the blood oxygenation to the user, and return to step (S31).

[0064] Referring to FIG. **10**, the method of the pulse oximeter **10**D can also include following steps:

[0065] step (S31'), determining whether the processor **103** receiving a detecting instruction, if yes, go to step (S**32'**), if no, repeats step (S**31'**);

[0066] step (S32'), turning on the light source **101** to emit detecting light, where the detecting light passes through the object **106** first and then is filtered by the second single band filter **1052** to form a first transmitted light, and go to step (S33');

[0067] step (S33'), the light acquirer **102** collecting the first transmitted light, converting the first transmitted light to a first electric signal, and sending the first electric signal to the processor **103**, and go to step (S34');

[0068] step (S34'), switching the first single band filter **1051** and the second single band filter **1052**, where the detecting light is filtered by the first single band filter **1051** first and then passes through the object **106** to form a second transmitted light, and go to step (S35');

[0069] step (S35'), the light acquirer **102** collecting the second transmitted light, converting the second transmitted light to a second electric signal, and sending the second electric signal to the processor **103**, and go to step (S36');

[0070] step (S36'), turning off the light source **101**, and the processor **103** analyzing the first electric signal and the second electric signal to obtain a blood oxygenation and sending the blood oxygenation to the display **104**, and go to step (S37'); and

[0071] step (S37'), the display **104** showing the blood oxygenation to the user, and return to step (S31).

[0072] The pulse oximeter **10**B, **10**C, **10**D has following advantages. First, the first single band filter **1051** and the second single band filter **1052** can alternately operate and filter the unnecessary noise light signal and improve the accuracy of the pulse oximeter **10**. Second, because the first single band filter **1051** and the second single band filter **1052** can alternately operate, the pulse oximeter **10** can have only one light acquirer **102** and only one light source **101**, and does not need any light splitter. Thus, the pulse oximeter **10** can be more compact and have a lower cost. Third, because the first single band filter **1051** and the second single band filter **1052** can alternately operate, the transmitted light passed through the filter **105** can be substantially and completely collected by a single light acquirer **102**. Thus, the detected signal has a higher intensity and the pulse oximeter **10** has a higher accuracy.

[0073] It is to be understood that the above-described exemplary embodiments are intended to illustrate rather than limit the disclosure. Any elements described in accordance with any exemplary embodiments is understood that they can be used in addition or substituted in other exemplary embodiments. Exemplary embodiments can also be used together. Variations may be made to the exemplary embodiments without departing from the spirit of the disclosure. The above-described exemplary embodiments illustrate the scope of the disclosure but do not restrict the scope of the disclosure.

[0074] Depending on the exemplary embodiment, certain of the steps of methods described may be removed, others may be added, and the sequence of steps may be altered. It is also to be understood that the description and the claims drawn to a method may include some indication in reference to certain steps. However, the indication used is only to be viewed for identification purposes and not as a suggestion as to an order for the steps.

What is claimed is:

1. A pulse oximeter, comprising:

a light source emitting detecting light;

a light acquirer spaced apart from the light source and collecting the detecting light;

a processor connected to the light acquirer;

a filter in a light path from the light source to the light acquirer, wherein the filter comprises a first single band filter having a first center wavelength of 660 nm and a second single band filter having a second center wavelength of 940 nm; and

a first mechanical device moving the filter so that the first single band filter and the second single band filter are alternately in the light path from the light source to the light acquirer.

2. The pulse oximeter of claim **1**, wherein the first single band filter and the second single band filter are arranged side-by-side.

3. The pulse oximeter of claim **2**, wherein the first mechanical device moves the filter by pushing and pulling.

4. The pulse oximeter of claim **1**, further comprising a second mechanical device, and the first single band filter and the second single band filter are respectively removed by the first mechanical device and the second mechanical device.

5. The pulse oximeter of claim **4**, wherein the first single band filter and the second single band filter are stacked with respect to each other and respectively rotated by the first mechanical device and the second mechanical device.

6. The pulse oximeter of claim **4**, wherein the first single band filter is on the light source and moves by the first mechanical device, and the second single band filter is on the light acquirer and moves by the second mechanical device.

7. The pulse oximeter of claim **1**, wherein the filter is on the light acquirer so that an object can be between the light source and the filter.

8. The pulse oximeter of claim **7**, wherein the filter is in direct contact with the light acquirer.

9. The pulse oximeter of claim **1**, wherein the filter is on the light source so that an object can be between the light acquirer and the filter.

10. The pulse oximeter of claim **9**, wherein the filter is in direct contact with the light source.

11. The pulse oximeter of claim **1**, further comprising a display electrically connected to the processor.

12. The pulse oximeter of claim **1**, further comprising a communication unit electrically connected to the processor.

13. The pulse oximeter of claim **1**, wherein the light source comprises a light emitting diode and emits the detecting light with wavelength of 400 nm~1200 nm.

14. The pulse oximeter of claim **1**, wherein the pulse oximeter comprises only one light acquirer.

15. A method of a pulse oximeter, wherein the pulse oximeter comprises a light source, a light acquirer, a processor, a first single band filter, a second single band filter, a mechanical device, and a display; and the method comprises:

step (S**1**), determining whether the processor receives a detecting instruction, if yes, go to step (S**2**), if no, repeats step (S**1**);

step (S**2**), turning on the light source to emit detecting light, wherein the detecting light is filtered by one of the first single band filter and the second single band filter to form a first transmitted light, and go to step (S**3**);

step (S**3**), the light acquirer collecting the first transmitted light, converting the first transmitted light to a first electric signal, and sending the first electric signal to the processor, and go to step (S**4**);

step (S**4**), the mechanical device switches the first single band filter and the second single band filter, wherein the detecting light is filtered by the other one of the first single band filter and the second single band filter to form a second transmitted light, and go to step (S**5**);

step (S**5**), the light acquirer collecting the second transmitted light, converting the second transmitted light to a second electric signal, and sending the second electric signal to the processor, and go to step (S**6**);

step (S**6**), turning off the light source, and the processor analyzing the first electric signal and the second electric signal to obtain a blood oxygenation and sending the blood oxygenation to the display, and go to step (S**7**); and

step (S**7**), the display showing the blood oxygenation to the user, and return to step (S**1**).

* * * * *

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摘要(译)

本公开涉及脉搏血氧计。脉搏血氧计包括光源;与光源间隔开的光收集器;连接到光收单机的处理器;从光源到光采集器的光路中的滤光器;和第一个机械装置。该滤波器包括中心波长为660nm的第一单波段滤波器和中心波长为940nm的第二单波段滤波器。第一机械装置移动滤光器，使得第一单带滤光器和第二单带滤光器交替地处于从光源到光获取器的光路中。双频带滤波器可以过滤不必要的光线，提高脉搏血氧仪的精度。