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(54) APPARATUS AND METHOD FOR SECURING AN OXIMETER PROBE TO A PATIENT

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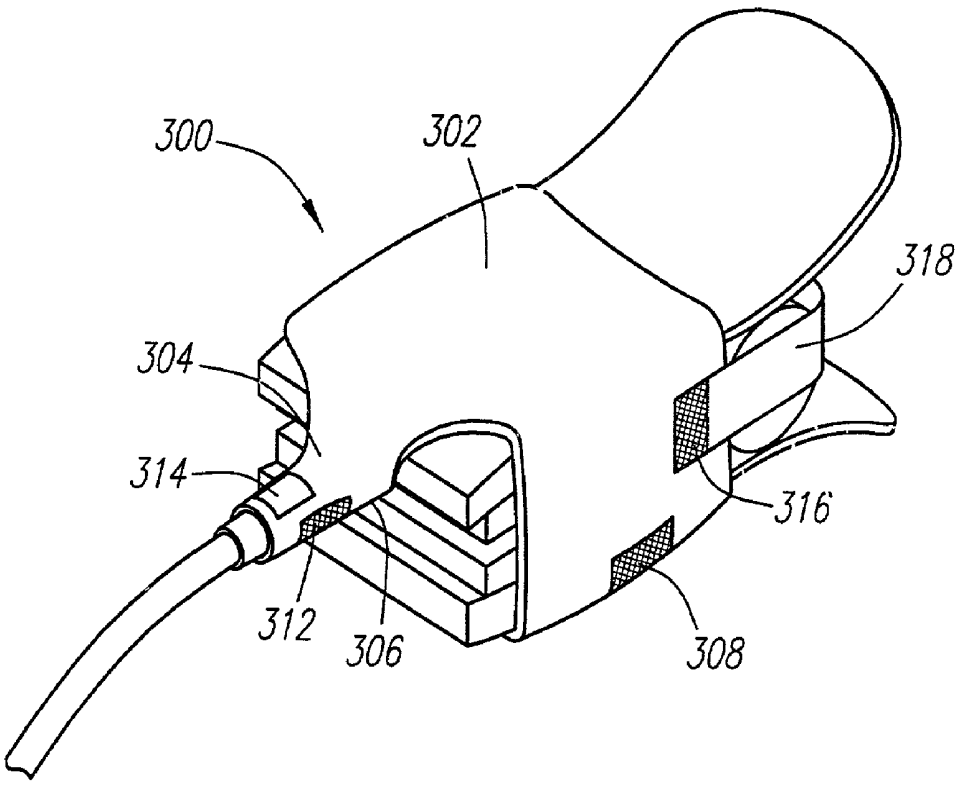
(52) **U.S. Cl.** **24/306**

(57) **ABSTRACT**

A strap or fastener for removably securing an oximeter probe to the appendage of a patient. The strap is made of an elastic material that wraps around the outside of the oximeter probe and is secured to the oximeter probe by attachment mechanisms such as Velcro that can be readjusted after initial application without producing excessive stress on the spring hinge of the oximeter probe.



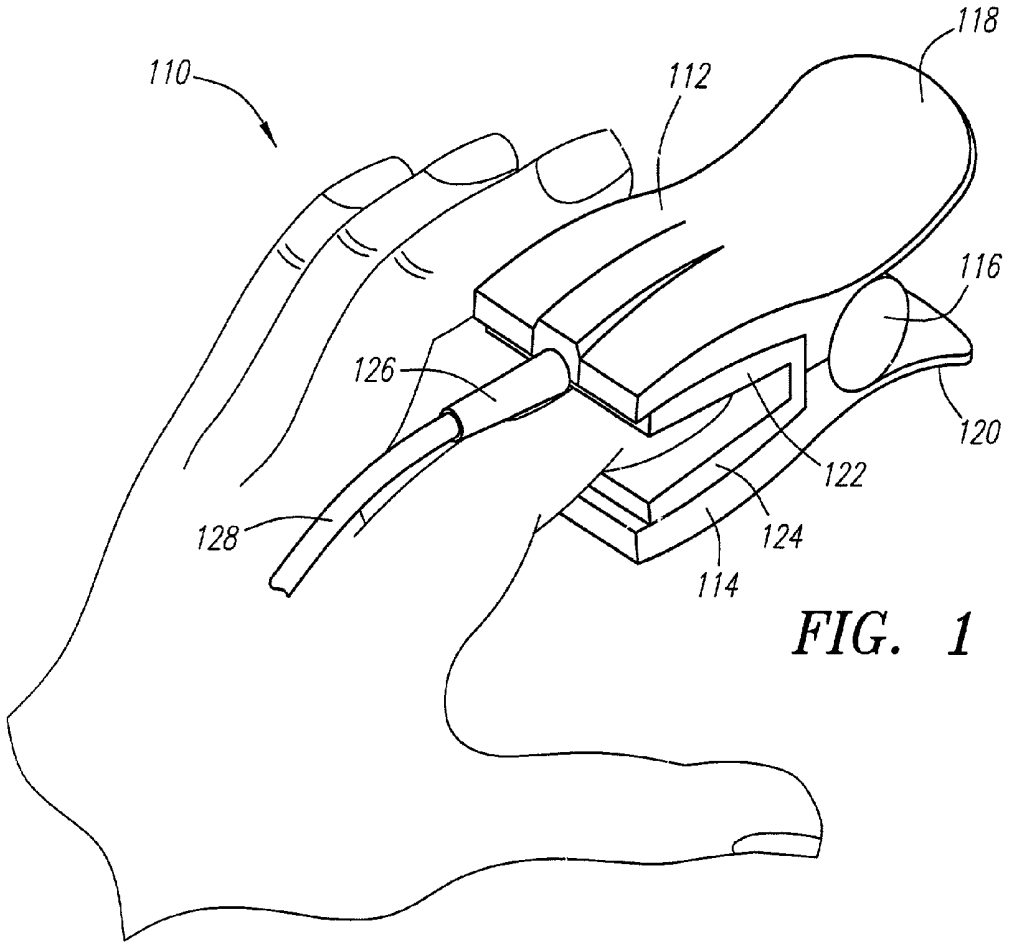

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FIG. 1

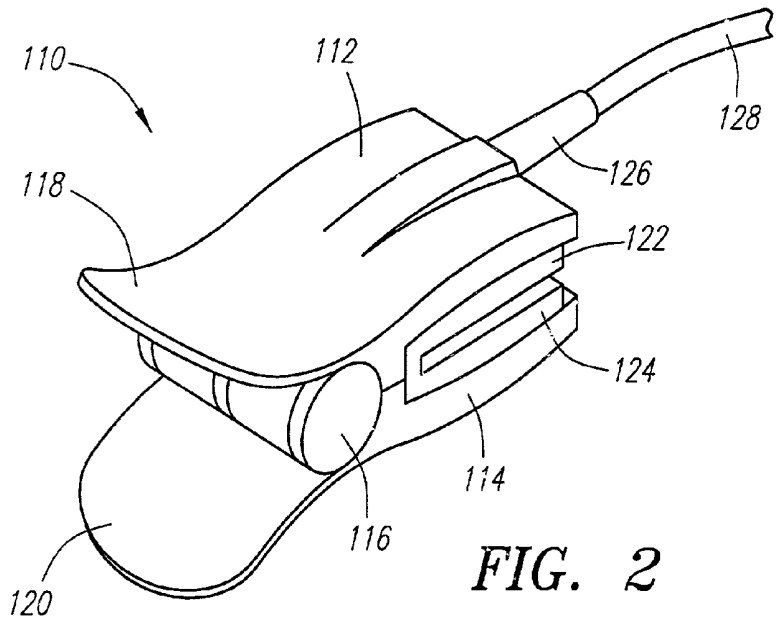
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FIG. 2

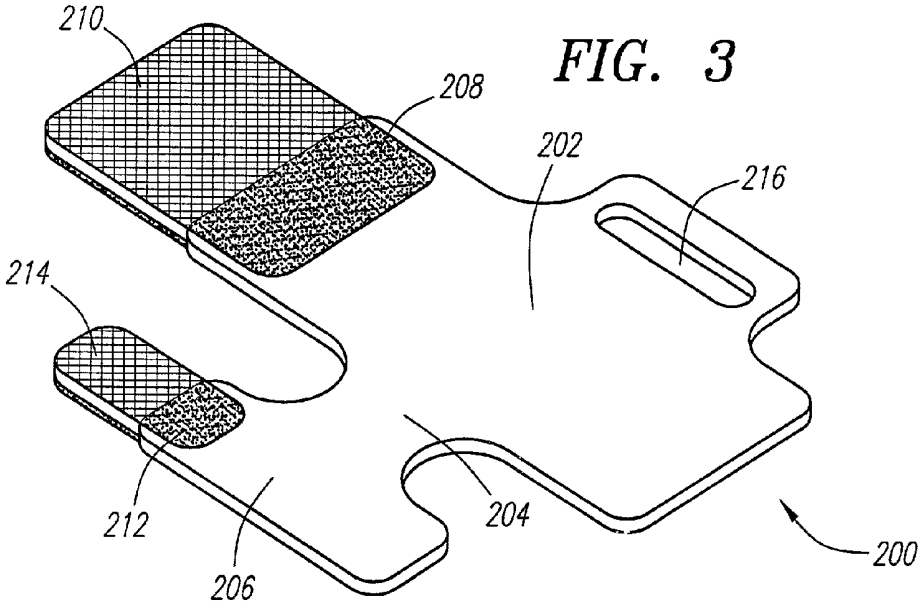
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FIG. 3

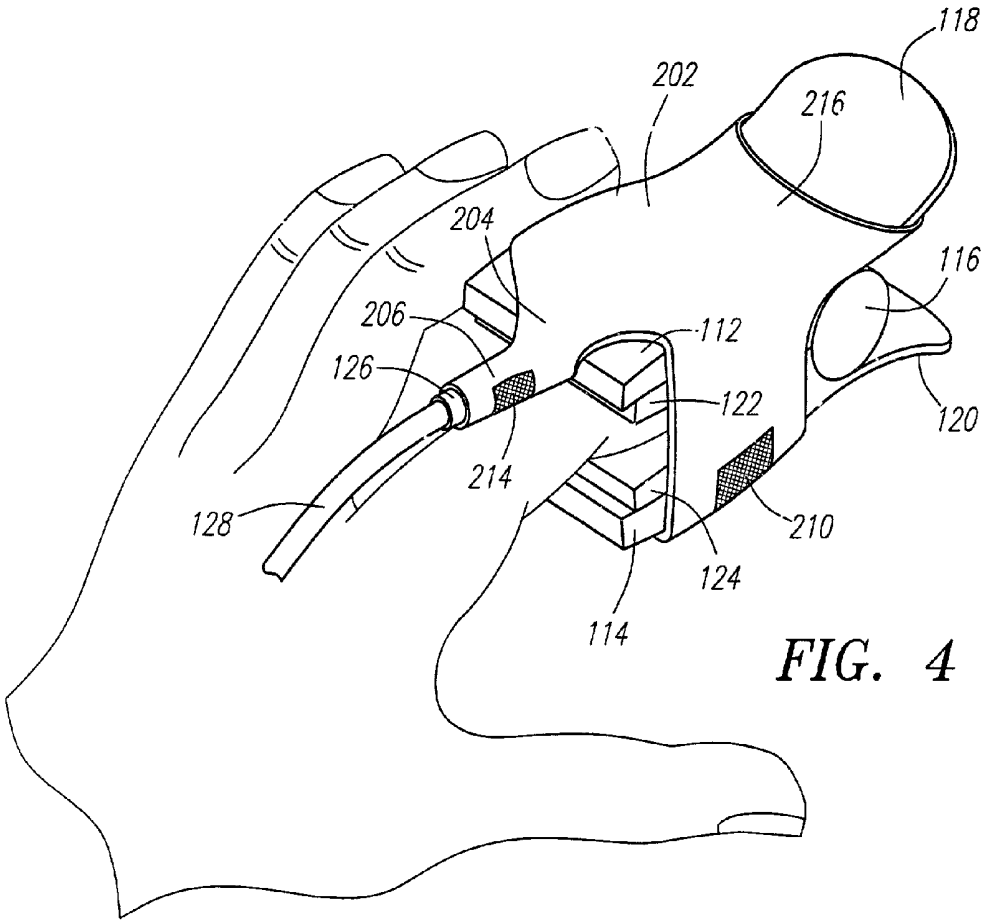
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FIG. 4

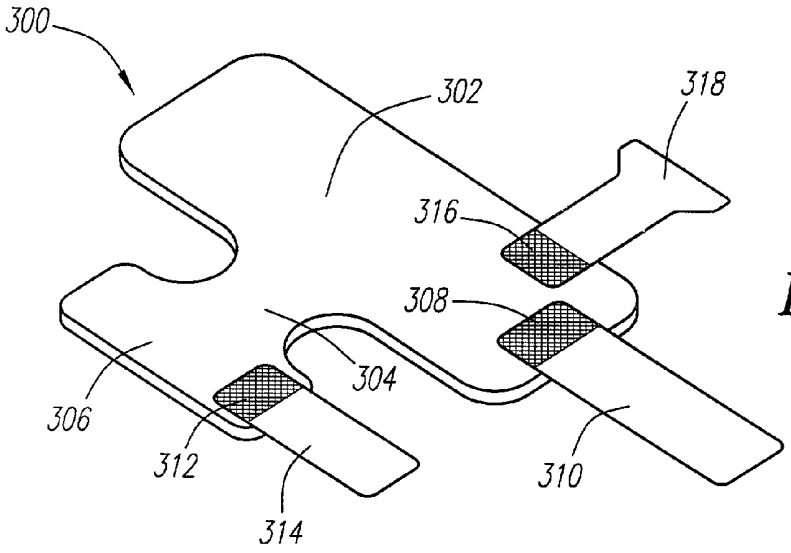

FIG. 5

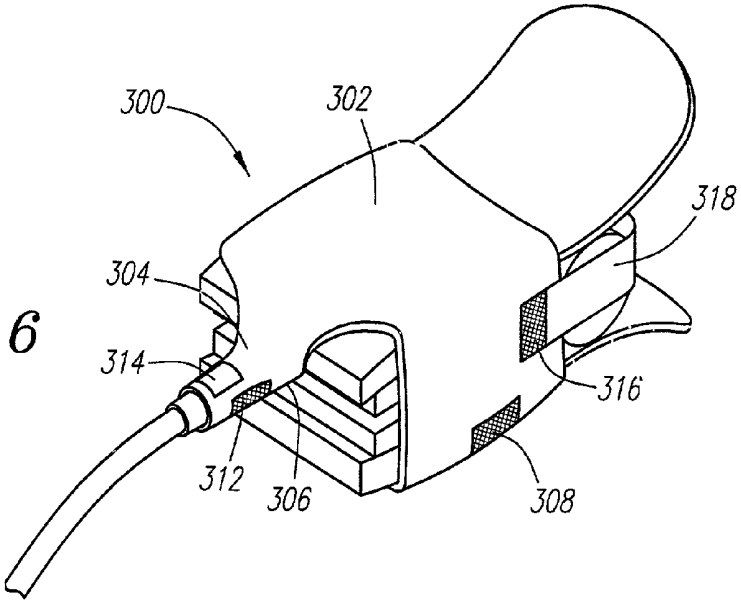

FIG. 6

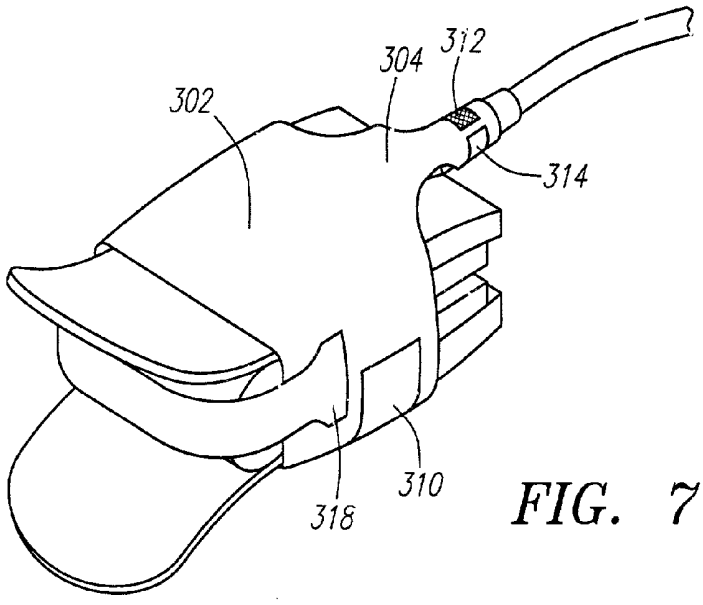

FIG. 7

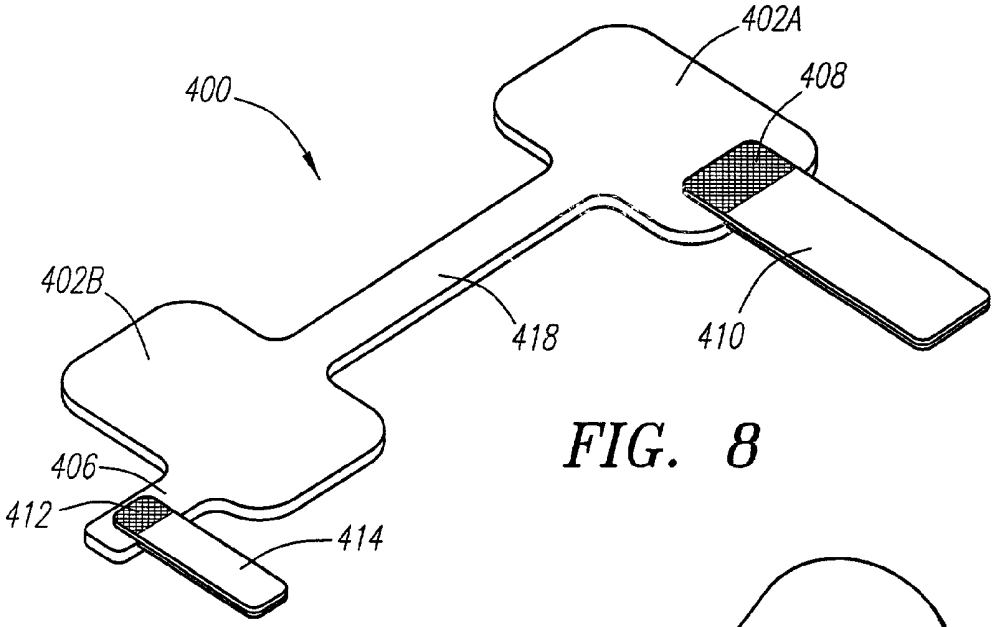

FIG. 8

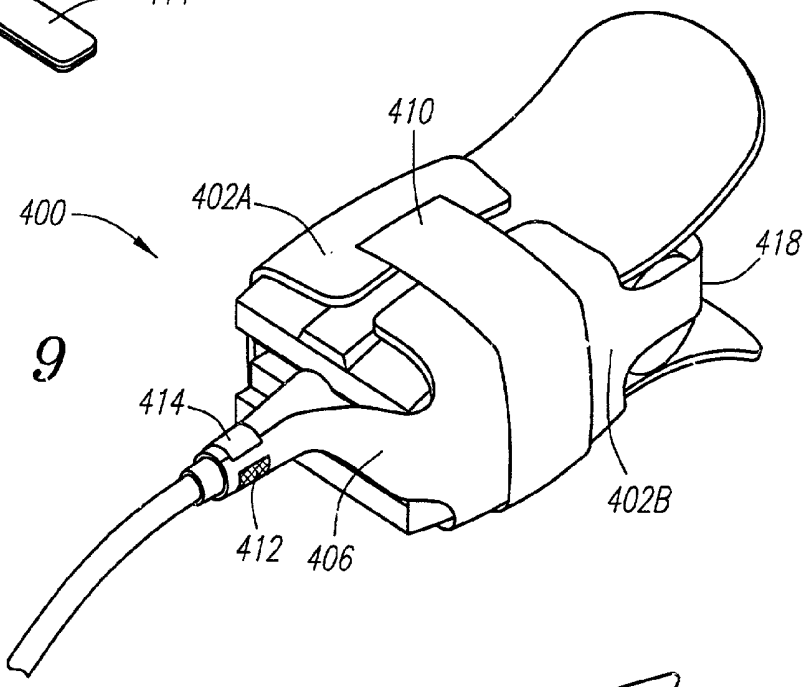

FIG. 9

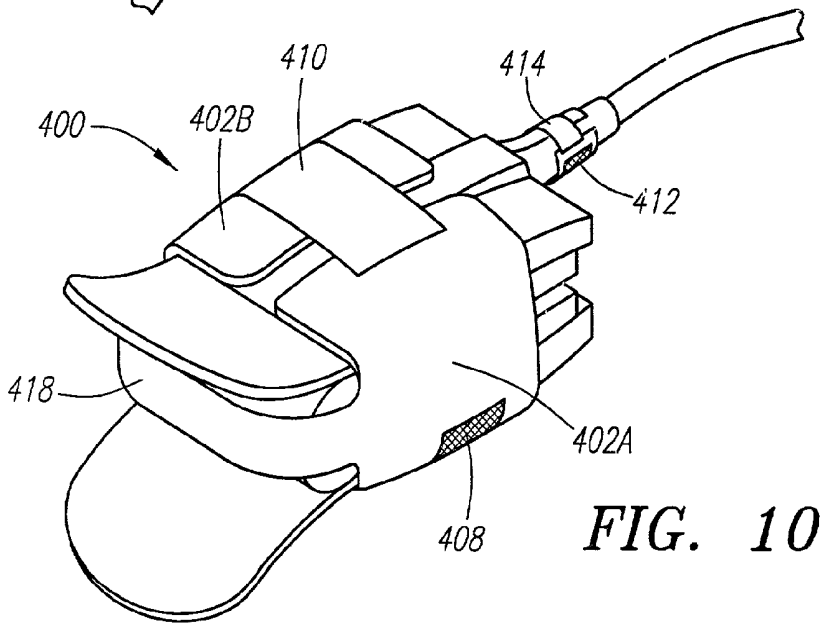

FIG. 10

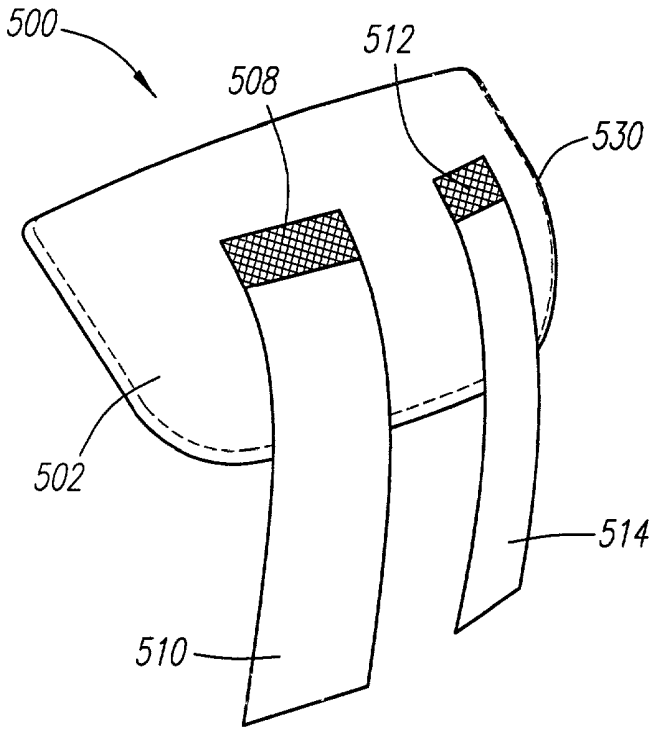

FIG. 11

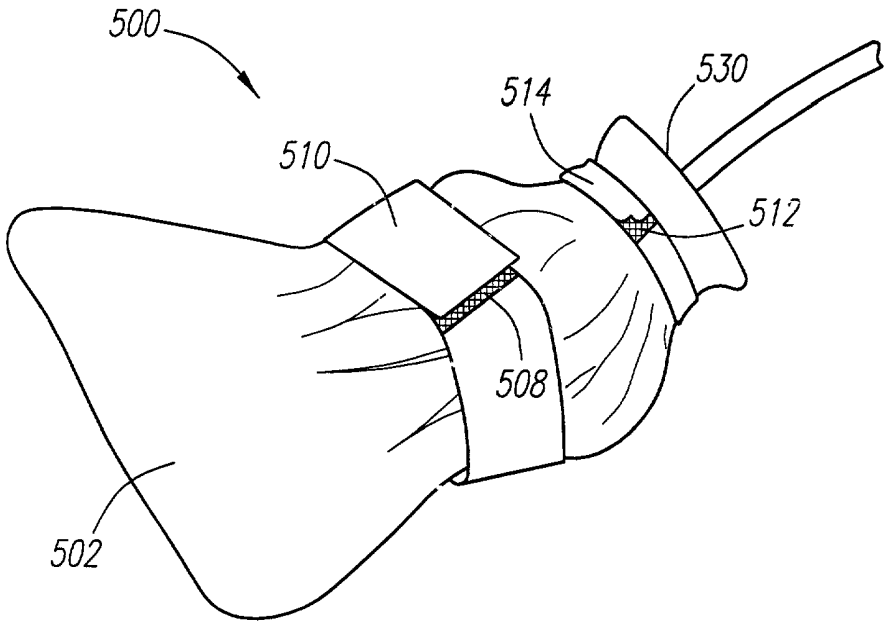

FIG. 12

APPARATUS AND METHOD FOR SECURING AN OXIMETER PROBE TO A PATIENT

[0001] This application is a continuation of U.S. patent application Ser. No. 09/506,467, filed Feb. 17, 2000, which is herein incorporated by reference.

BACKGROUND OF THE INVENTION

[0002] The present invention relates to medical sensors for detecting physiological functions and, in particular, to an apparatus for securing an oximeter probe to an appendage of a patient.

[0003] Pulse oximetry is a non-invasive medical technique useful for measuring certain vascular conditions. A pulse oximetry system comprises a sensor appliance containing a light source, such as an L.E.D., and a light sensor, such as a photodetector, and is mounted to the finger, toe or earlobe of a patient. The oximetry sensor emits light, which is scattered through a portion of the patient's tissue where blood perfuses the tissue and the light sensor photoelectrically senses the absorption of light in such tissue. The measurement of light absorbed is used to evaluate various characteristics of a patient such as oxygen saturation of hemoglobin in arterial blood, the volume of individual blood pulsations supplying the tissue, and the rate of blood pulsations corresponding to each heartbeat of a patient.

[0004] One kind of commonly used oximetry probe **110** is illustrated in **FIGS. 1 and 2**. The probe **110** comprises first and second outer shells **112**, **114**, a spring hinge **116** at the distal end of the probe **110**, first and second extending tabs **118**, **120**, first and second inner pads **122**, **124**, and a cord **128** connected to the proximal end of the probe. **FIG. 1** depicts the oximeter probe **110** in use. The first and second outer shells **112**, **114** are separated by forcing the first and second extending tabs **118**, **120** toward one another. The patient's finger or other appendage is then slipped between the first and second inner pads **122**, **124**. On the exposed faces of the first and second inner pads **122**, **124** are the photoemitter and photodetector used to measure various vascular conditions of the patient. The data from the photodetector is then transmitted to an attached console electrical cord **128**.

[0005] The spring hinge **116** is soft because excessive pressure on the finger can distort pulsations in the finger's blood supply. As a result, oximetry sensors frequently fall off the patient's finger when the patient is allowed to move unrestrained.

[0006] To prevent excessive movement of a finger to which the probe **110** is attached, medical personnel may secure the hand or arm to the patient's bed or a stationary object located nearby. A patient would be allowed to move the arm and hand more freely so that discomfort to the patient is avoided. To allow for the patient to move freely while not compromising the security of the oximeter probe **110** upon the finger, an additional means of securing the probe **110** to the patient is necessary.

[0007] Further, even small movements by the patient can cause differential motion between the oximeter probe **110** and the patient because the physical construction of the sensors renders them bulky and difficult to securely fasten to a patient's appendage. Such differential motion causes the signal received by the light sensor to be distorted, resulting in inaccurate measurements of the amount of blood constituent being evaluated.

[0008] In practice, reusable oximeter probes are frequently secured to the patient's appendage using adhesive tape. This method requires that the adhesive tape be applied such that sufficient pressure is applied to the patient's finger to securely fasten the oximeter probe **110**, but not so much that vasoconstriction occurs. If the practitioner creates too much or too little pressure during the initial application of the adhesive tape, it becomes necessary to remove the adhesive tape from the body of the oximeter probe **110** and replace it in a different position. Such readjustment is made difficult by the bond between the tape and the shell of the oximeter probe **110**. In addition, the residual adhesive remaining on the shell increases risk of contamination. Further, if the tape is in contact with both the patient's skin and the oximeter probe **110**, removal of the adhesive tape from the patient's skin can cause irritation, especially when the patient's skin is particularly sensitive due to trauma or age.

[0009] Often, when adhesive tape is used to secure an oximeter probe to the appendage of the patient, the adhesive tape stresses the structure of the oximeter probe. Such distortion occurs if the adhesive tape is not applied with substantially equal pressure on both side openings of the oximeter probe. The undue stress on the spring mechanism that results from such distortion shortens the useful life span of the oximeter probe. Additionally, use of adhesive tape to secure the oximeter probe to the patient also decreases the useful life span of the oximeter probe by making sterilization of the oximeter probe after each use difficult because of adhesive build up. When adhesive tape is removed from the oximeter probe, residue of the adhesive remains on the shell of the probe. Removing the residue may require vigorous scrubbing and/or use of abrasive cleaning agents.

[0010] Another concern when securing an oximeter probe to a patient is ensuring that ambient light does not interfere with the signal being received by the photodetector. Outside light is easily scattered and transmitted within the tissue toward the photodetector because skin tissue is translucent. This ambient light causes interference with the signal detected at the photodetector.

[0011] Further, vasoconstriction may also be caused by exposure of the appendage to the often cool outside air. Low temperature induced vasoconstriction and the resultant decrease in blood supply may significantly affect the performance of the oximeter probe. Conventional attempts to alleviate the problem of low temperature vasoconstriction include using an integral heater with the sensor and periodic massaging. Heaters, however, must be well regulated to avoid overheating. Furthermore, they increase the complexity of the sensor and can be costly. Periodic massaging can be effective, but usually requires removal of the probe while the appendage is massaged. After some massaging of the appendage to stimulate blood flow to it, the probe is reapplied and measurement resumed. It would be desirable to employ a less complex, passive means for retaining body heat that does not interrupt the measurement process.

SUMMARY OF THE INVENTION

[0012] The present invention is preferably a strap for securing an oximeter probe to an appendage of a patient. The strap is preferably made of elastic material and may be removably secured to the outside of an oximeter probe to allow for readjustment of the strap after initial application without producing excessive stress on the spring hinge of the oximeter probe.

[0013] In one embodiment, the strap is preferably a patch of material comprising a body, a tab located at a proximal end of the body and connected to the body of the strap by a narrow neck, an attachment mechanism for securing the body of the strap about an oximeter probe, and another attachment mechanism for securing the tab about the cord of an oximeter probe. Preferably, at a distal end of the body of the strap is a flap that has a slit through which the extending flap of the top shell of the oximeter probe may be placed to prevent excessive longitudinal movement of the strap.

[0014] In another embodiment of the present invention, the strap is preferably a patch of material comprising a body, a tab located at a proximal end of the body and connected to the body of the strap by a narrow neck, one attachment mechanism for securing the body of the strap, a second attachment mechanism for securing the tab and a third attachment mechanism preferably substantially perpendicular to the first and second attachment mechanisms for preventing excessive longitudinal movement of the strap.

[0015] In yet another embodiment of the strap, the strap preferably comprises two flaps connected by a neck, one of the flaps having a tab. The strap is secured to the oximeter probe by placing the flaps on opposing sides of the oximeter probe and placing the neck along the spring hinge at the distal end of the oximeter probe. An attachment mechanism is wrapped around the strap enclosing the body of the oximeter probe to secure the probe to an appendage of a patient while a second attachment mechanism is wrapped around the tab of the strap enclosing the cord neck of the oximeter probe to prevent excessive longitudinal movement of the strap.

[0016] In yet another embodiment of the present invention the strap is preferably conformed as a sock which, in use, is slipped over the oximeter probe. The strap further comprises two attachment mechanisms. One attachment mechanism is wrapped around the strap about the body of the oximeter probe so that the spring hinge is appropriately compressed on the appendage of the patient. The other is wrapped around the strap enclosing the cord neck of the oximeter probe.

[0017] For a fuller understanding of the nature of the present invention, reference should be made to the ensuing detailed description taken in conjunction with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0018] In the drawings:

[0019] **FIG. 1** is a perspective view from the proximal end of an oximeter probe.

[0020] **FIG. 2** is a perspective view from the distal end of an oximeter probe.

[0021] **FIG. 3** is a perspective view of a preferred embodiment of the oximeter probe strap according to the present invention.

[0022] **FIG. 4** is a perspective view, from the proximal end of the oximeter probe, of the strap depicted in **FIG. 3** in use.

[0023] **FIG. 5** is a perspective view of a second preferred embodiment of the oximeter probe strap according to the present invention.

[0024] **FIG. 6** is a perspective view, from the proximal end of the oximeter probe, of the strap depicted in **FIG. 5** in use.

[0025] **FIG. 7** is a perspective view, from the distal end of the oximeter probe, of the strap depicted in **FIG. 5** in use.

[0026] **FIG. 8** is a perspective view of a third preferred embodiment of the oximeter probe strap according to the present invention.

[0027] **FIG. 9** is a perspective view, from the proximal end of the oximeter probe, of the strap depicted in **FIG. 8** in use.

[0028] **FIG. 10** is a perspective view, from the distal end of the oximeter probe, of the strap depicted in **FIG. 8** in use.

[0029] **FIG. 11** is a perspective view of a fourth preferred embodiment of the oximeter probe strap according to the present invention.

[0030] **FIG. 12** is a perspective view, from the distal end of the oximeter probe, of the strap depicted in **FIG. 11** in use.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0031] **FIGS. 1 and 2** illustrate a reusable oximeter probe **110** commonly used in the medical industry. **FIG. 1** is a perspective view taken from the proximal end of the oximeter probe **110** while attached to a patient. **FIG. 2** depicts the oximeter probe **110** from the distal end in its neutral position.

[0032] The oximeter probe **110** comprises a first and second outer shell **112, 114**, a spring hinge **116** at the distal end of the probe, first and second extending tabs **118, 120**, first and second inner pads **122, 124**, a cord sleeve **126**, and a cord **128**. **FIG. 1** depicts the oximeter probe in use. The first and second outer shells **112, 114** are separated by pressing the first and second extending tabs **118, 120** toward one another. The patient's finger or other appendage is then slipped between the first and second inner pads **122, 124**. On the inside faces of the first and second inner pads **122, 124** are a photoemitter and a photodetector (not shown) used to measure various vascular conditions of the patient. The data from the photodetector is then transmitted to an attached console via the cord **128**.

[0033] **FIG. 3** is a perspective view of a preferred embodiment of an oximeter probe strap comprising a body **202**, a tab **206** located at the proximal end of the body **202**, a first attachment mechanism **210** for securing the body **202** of the strap **200**, and a second attachment mechanism **214** for securing the tab **206**. The tab **206** is preferably connected to the body **202** of the strap **200** by a preferably narrow strip **204**, the body **202**, tab **206**, and strip **204** preferably constituting a single patch of elastic material.

[0034] The strap may also include a flap **218** at the end opposing the strip **204**, the flap **218** having a slit **216** through which the extending tab **118** of the top shell **112** of the oximeter probe **110** may be placed, as shown in **FIG. 4**. It

is preferrable that the strap **200** include the flap **218** with the slit **216** so that longitudinal movement of the strap **200** along the hard outer shells **112, 114** of the oximeter probe **110** may be minimized.

[**0035**] The strap **200** preferably has a total length (from proximal to distal end) of approximately 3.0 inches. The width of the body **202** preferably is approximately 3.5 inches and the width of the tab **206** preferably is approximately 1.25 inches. The body **202** and the tab **206** constitute one patch of elastic material that is preferably composed of a foam laminate with brushed nylon that is hook engagable.

[**0036**] As illustrated in **FIG. 4**, on a surface of the body **202** of the strap **200** is the first attachment mechanism **210** for securing the strap **200** about the oximeter probe **110** such that the spring hinge **116** of the oximeter probe **110** is appropriately compressed to maintain secure contact between the inner surfaces **122, 124** of the oximeter probe **110** and the appendage of the patient. The first attachment mechanism **210** preferably is comprised of a patch of hook material, such as Velcro, which may be adhesively laminated **210** to the material of the strap **200** as shown in **FIG. 3**. Alternatively, the first attachment mechanism **210** may be comprised of adhesive strip or a patch of hook material separate from the strap **200**.

[**0037**] On a surface of the tab **206** is a second attachment mechanism **214** for holding the strap **200** about the cord sleeve **126** of the oximeter probe **110**. Like the first attachment mechanism **210**, the second attachment mechanism **214** preferably comprises a patch of hook material, such as Velcro, which may be adhesively laminated **212** to the tab **206** as shown in **FIG. 3**. Alternatively, the second attachment mechanism **214** may constitute an adhesive strip or a patch of hook material separate from the strap **200**.

[**0038**] In use, after the patient's appendage is secured in the probe **110**, the body **202** of the strap **200** may be placed over the top portion of the hard shell **112** of the oximeter probe **110** with the extending tab **118** of the top portion of the hard shell placed through the slit **216** in the flap **218** of the strap **200**. The first attachment mechanism **210** may be wrapped around the outer surface of the body **202** of the strap **200** enclosing the upper and lower hard shells **112, 114** of the oximeter probe **110**. The second attachment mechanism **214** may be wrapped around the tab **206**, enclosing the cord sleeve **126** of the oximeter probe **110**.

[**0039**] When hook material is used for the first and second attachment mechanisms **210, 212**, the attachment mechanisms can be secured directly to the elastic material that constitutes the strap **200**. When adhesive strips are used for the attachment mechanisms **210, 212** the strips may be placed around the entire circumference so that the opposing ends of the adhesive strips overlap to allow for a secure bond. Using hook material as the attachment mechanism may be preferred over an adhesive strip because it may facilitate to a greater degree readjustment of the first attachment mechanism **210** about the strap **200** and the oximeter probe **110**.

[**0040**] The combination of the slit **216** in the body **202** of the strap **200** and the second attachment mechanism **214** wrapped around the tab **206** enclosing the cord sleeve **126** prevents excessive longitudinal movement of the strap **200** along the hard shells **112, 114** of the oximeter probe **110**. Likewise, the attachment mechanism **210** of the body **202** of the strap **200** holds the oximeter probe **110** securely to the appendage of the patient by reinforcing the spring action of the spring hinge **116**.

[**0041**] FIGS. **5-7** illustrate an alternative preferred embodiment of an oximeter probe strap. **FIG. 5** is a perspective view of a strap **300** alone. **FIG. 6** depicts the strap **300** in use as viewed from the proximal end of the oximeter probe **110**. **FIG. 7** shows the strap **300** in use as viewed from the distal end of the oximeter probe **110**. As shown in **FIG. 5**, strap **300** is illustrated to have some of the same components as strap **200**. Numbers with identical second and third digits represent corresponding components.

[**0042**] The body **312** of the strap **300** preferably does not have a slit **216** as does the strap **200** depicted in **FIG. 3**. Instead, a third attachment mechanism **318** is attached to the body **302** of the strap **300** such that it preferably wraps around the distal end of the oximeter probe **110** and is attached to the opposite side of the body **302** of the strap **300** as shown in FIGS. **6-7**.

[**0043**] The attachment mechanisms **310, 314, 318** are preferably comprised of a patch of hook material, such as Velcro, which may be adhesively laminated **308, 312, 316** to the material of the strap **300** as shown in **FIG. 5**. Alternatively, the attachment mechanisms **310, 314, 318** are comprised of an adhesive strip or a patch of hook material separate from the strap **300**.

[**0044**] Referring to FIGS. **6-7**, the body **302** of the strap **300** is placed over the top portion of the hard shell **112** of the oximeter probe **110**. The first attachment mechanism **310** may be wrapped around the outer surface of the body **302** of the strap enclosing the upper and lower hard shells **112, 114** of the oximeter probe **110**. The second attachment mechanism **314** of the tab **306** may be wrapped around the tab **306**, enclosing the cord sleeve **126** of the oximeter probe **110**. As illustrated in FIGS. **6-7**, the third attachment mechanism **318** is attached **316** to the body **302** of the strap **300**, wrapped around the distal end of the oximeter probe **110** and attached to the body **302** of the strap **300** on the opposite side of the probe **110**.

[**0045**] The second attachment mechanism **314** may be placed around the tab **306** enclosing the cord sleeve **126** and the third attachment mechanism **318** may be placed around the distal end of the oximeter probe **110** to prevent excessive longitudinal movement of the strap **300** along the hard shells **112, 114** of the oximeter probe **110**. Likewise, the first attachment mechanism **310** of the body **302** of the strap **300** holds the oximeter probe securely to the appendage of the patient by reinforcing the spring action of the spring hinge **116**.

[**0046**] Another preferred embodiment is shown in FIGS. **8-10**. This embodiment of the oximeter probe strap **400** is comprised of a first flap **402**A and a second flap **402**B, a tab **406**, a connecting neck **418**, a first attachment mechanism **410** and a second attachment mechanism **414**. The first flap **402**A and the second flap **402**B are at opposite ends of the neck portion **418** of the strap **400**. The first attachment mechanism **410** attaches to the first flap **402**A and the second attachment mechanism attaches to the tab **406**.

[0047] In use, the first flap **402**A of the strap **400** is placed along the side of the oximeter probe **110** where the upper and lower shells **112**, **114** meet. The neck **418** of the strap **400** wraps around the distal end of the oximeter probe **110** and the second flap **402**B is placed along the side of the oximeter probe **110** where the upper and lower shells **112**, **114** meet, opposite the first flap **402**A. The first attachment mechanism **410** is wrapped around the surface of the first and second flaps **402**A, **402**B, such that the spring hinge **116** of the oximeter probe **110** is secured in an appropriately compressed position. The second attachment mechanism **414** is wrapped around the surface of the tab **406** enclosing the cord sleeve **126** of the oximeter probe **110**.

[0048] The first and second attachment mechanisms **410**, **414** preferably are comprised of a patch of hook material, such as Velcro, which may be adhesively laminated **408**, **412** to the material of the strap **400** as shown in **FIG. 8**. Alternatively, the first and second attachment mechanisms **408**, **412** are comprised of an adhesive strip or a patch of hook material separate from the strap **400**. If an adhesive strip is used, it is preferably wrapped completely around the surface of the strap **400** such that opposing ends of the adhesive strip overlap to ensure a secure bond. The use of hook material for the first and second attachment mechanisms **410**, **414** is preferred to facilitate readjustment of the attachment mechanisms **410**, **414**.

[0049] Another preferred embodiment is shown in FIGS. **11-12**. This embodiment of the oximeter probe strap **500** is preferably comprised of at least one patch of fabric **502** in a sock-like apparatus with an opening **530**, a first attachment mechanism **510** and a second attachment mechanism **514**.

[0050] **FIG. 12** depicts the strap **500** in use. The strap **500** may be slid over the oximeter probe **110** such that the body of the probe enclosing the patient's appendage is inside the fabric **502** and the cord **128** exits the strap **500** through the strap opening **530**. The first attachment mechanism **510** may be wrapped around the surface of the fabric **502** as a girth enclosing the first and second outer shells **112**, **114**, the spring hinge **116** and the first and second extending tabs **118**, **120** of the oximeter probe strap **110** such that the spring hinge **116** of the oximeter probe **110** is secured in an appropriately compressed position about the patient's appendage. The second attachment mechanism **514** is wrapped around the fabric **502** enclosing the cord sleeve **126** of the oximeter probe **110**.

[0051] The first and second attachment mechanisms **510**, **514** preferably are comprised of a patch of hook material, such as Velcro, which may be adhesively laminated **508**, **512** to the material of the strap **502** as shown in **FIG. 11**. Alternatively, the first and second attachment mechanisms **508**, **512** are comprised of an adhesive strip or a patch of hook material separate from the strap **500**. If an adhesive strip is used, it is preferably wrapped completely around the surface of the strap **500** such that opposing ends of the adhesive strip overlap to ensure a secure bond. The use of hook material for the first and second attachment mechanisms **510**, **514** is preferred to facilitate readjustment of the attachment mechanisms **510**, **514**.

[0052] As will be understood by those skilled in the art, the present invention may be embodied in other specific forms without departing from the essential characteristics thereof. Accordingly, the foregoing description is illustrative of the invention, but not limiting to the scope of the invention, which is set forth in the following claims.

What is claimed is:

1. A strap for an oximeter probe, comprising:

a patch comprising a body and a tab, the tab being connected by a strip to the body;

a first attachment mechanism for removably securing said body to outer shells of the oximeter probe; and

a second attachment mechanism for removably securing said tab to a cord of the oximeter probe.

2. The strap of claim 1 wherein said first attachment mechanism is substantially parallel to said second attachment mechanism.

3. The strap of claim 1, said patch comprising an elastic hook engagable material.

4. The strap of claim 3, said elastic hook engagable material comprising foam laminate with a brushed nylon surface.

5. The strap of claim 1 wherein said patch material is approximately 3.0 inches from a proximal end to a distal end, said body portion is approximately 3.5 inches wide, and said tab is approximately 1.25 inches wide.

6. The strap of claim 1, said first and second attachment mechanisms comprising hook material.

7. The strap of claim 1, said first and second attachment mechanisms comprising hook material and at least one of the attachment mechanisms being adhesively laminated to said patch.

8. The strap of claim 1 wherein said first and second attachment mechanisms are adhesive strips.

9. A strap for an oximeter probe, comprising:

a patch having a first flap, a second flap, a neck joining said first flap and said second flap, and a tab connected to said second flap;

a first attachment mechanism for removably securing said first and second flaps to outer shells of the oximeter probe; and

a second attachment mechanism for removably securing said tab to a cord of the oximeter probe.

10. The strap of claim 9 wherein said first attachment mechanism is substantially perpendicular to said neck.

11. The strap of claim 9 wherein said first attachment mechanism is substantially parallel to said second attachment mechanism.

12. The strap of claim 9, said patch comprising an elastic hook engagable material.

13. The strap of claim 12, said elastic hook engagable material comprising foam laminate with a brushed nylon surface.

14. The strap of claim 9 wherein said flaps are approximately 1.5 inches square and said neck is approximately 1.5 inches in length.

15. The strap of claim 9 wherein said first and second attachment mechanisms are comprised of hook material.

16. The strap of claim 9 wherein said first and second attachment mechanisms are comprised of hook material, and at least one of the attachment mechanisms is adhesively laminated to said patch.

17. The strap of claim 9 wherein said first and second attachment mechanisms are adhesive strips.

18. A strap for an oximeter probe, comprising:

a sock having an opening;

a first attachment mechanism for removably securing said sock to outer shells of the oximeter probe; and

a second attachment mechanism positioned between the first attachment mechanism and the opening for removably securing the sock to a cord of the oximeter probe.

19. The strap of claim 18 wherein said first attachment mechanism is substantially parallel to said second attachment mechanism.

20. The strap of claim 18 wherein said first attachment mechanism is substantially perpendicular to a length of the sock.

21. The strap of claim 18 wherein said second attachment mechanism is substantially perpendicular to a length of the sock.

22. The strap of claim 18, said sock comprised of an elastic hook engagable material.

23. The strap of claim 22, said elastic hook engagable material comprising foam laminate with a brushed nylon surface.

24. The strap of claim 18 wherein said first and second attachment mechanisms are comprised of hook material.

25. The strap of claim 18 wherein said first and second attachment mechanisms are comprised of hook material, and at least one of the attachment mechanisms is adhesively laminated to the sock.

26. The strap of claim 18 wherein said first and second attachment mechanisms are adhesive strips.

27. A strap for an oximeter probe, comprising:

a body having a first attachment mechanism secured thereto, the body dimensioned to be removably secured to an oximeter probe via the first attachment mechanism;

a tab having a second attachment mechanism secured thereto, the tab dimensioned to be removably secured to a cord of the oximeter probe; and

a neck portion connecting the body to the tab.

28. The strap of claim 27 wherein the body and the tab comprise an elastic hook engagable material.

29. The strap of claim 28 wherein the elastic hook engagable material comprises foam laminate with a brushed nylon surface.

30. The strap of claim 27 wherein the first and second attachment mechanisms comprise hook material.

31. The strap of claim 27 wherein the body has a width of approximately 3.5 inches, and the tab has a width of approximately 1.25 inches.

32. A strap for an oximeter probe, comprising:

a patch comprising:

a flexible body dimensioned to firmly secure an oximeter probe to a finger of a patient via a first attachment mechanism;

a flexible tab dimensioned to be removably secured to a cord of the oximeter probe via a second attachment mechanism; and

a neck connecting the flexible body to the flexible tab.

33. The strap of claim 32 wherein the patch has a length from a proximal end to a distal end of approximately 3.0 inches.

34. A method of securing an oximeter probe to an appendage of a patient with a strap, comprising the steps of:

placing the oximeter probe onto the appendage of the patient;

placing a body of the strap over the oximeter probe, and a tab of the strap over a cord of the oximeter probe;

wrapping the body around the oximeter probe;

securing a first attachment mechanism located on a first portion of the body to a second portion of the body, such that the body firmly secures the oximeter probe to the appendage of the patient;

wrapping the tab around the cord of the oximeter probe; and

securing a second attachment mechanism located on a first portion of the tab to a second portion of the tab, such that the tab is secured to the cord of the oximeter probe.

35. The method of claim 34 further comprising the step of placing an extending tab of the oximeter probe through a slit in the strap during the step of placing the body over the oximeter probe.

36. The method of claim 34 further comprising the steps of:

wrapping a third attachment mechanism located on a third portion of the body of the strap around a distal end of the oximeter probe; and

connecting the third attachment mechanism to a fourth portion of the body of the strap, such that longitudinal movement of the oximeter probe along the appendage of the patient is substantially prevented.

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专利名称(译)	用于将血氧计探针固定到患者的装置和方法		
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摘要(译)

一种带子或紧固件，用于将血氧计探针可拆卸地固定到患者的附肢上。带子由弹性材料制成，其围绕血氧计探头的外部并且通过诸如Velcro的附接机构固定到血氧计探针上，所述附接机构可以在初始应用之后重新调整，而不会在血氧计探针的弹簧铰链上产生过大的应力。