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(54) **SKIN-ADHERABLE CRADLE FOR INFUSION PUMP OR CONTINUOUS BLOOD GLUCOSE MONITOR HAVING OPTICAL INDICATION MEANS**

AUF DIE HAUT KLEBBARER BASISTRÄGER MIT OPTISCHER ANZEIGEVORRICHTUNG FÜR INFUSIONSPUMPE ODER BLUTZUCKERMESSGERÄT

SUPPORT AUTO-COLLANT POUR POMPE À PERFUSION OU APPAREIL DE MESURE DE GLYCÉMIE COMPRENANT UN DISPOSITIF D'INDICATION OPTIQUE

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Description

Field of disclosure

[0001] The present discourse lies in the field of cradles for body-attachable medical devices, ambulatory medical systems including a cradle, and methods for providing optical indications to a patient carrying an ambulatory medical system.

[0002] Embodiments in accordance with the present disclosure may be typically be used in the therapy of diabetes mellitus.

Background, prior art

[0003] Continuous Subcutaneous Insulin Infusion (CSII) is an established and therapeutical advantageous way of treating diabetes mellitus. under CSII, a diabetic carries a miniaturized infusion device in form of an insulin pump substantially continuously, night and day. The insulin pump infuses minimal quantities of insulin in a substantially continuous way according to a person-specific, generally time-variable infusion schedule or regime, thus providing a so-called basal amount of insulin that is required by the diabetic's body for maintaining a normal or close-to-normal metabolism and in particular blood glucose concentration. Typically, the basal administration schedule follows a generally circadian cycle and is preset by a healthcare professional. In addition, insulin pumps are designed to administer larger insulin quantities, so called boli, within a short period of time on demand.

[0004] For a number of years, insulin pumps have virtually always been designed as battery-powered and self-contained devices with a footprint comparable, in recent years, to a credit card. This footprint allows them to be carried in a trousers' pocket, with a corresponding holster and a belt, as necklace, or the like. Via infusion tubing of typically 0.5m ... to 1.5m length, such devices are coupled to a subcutaneous infusion cannula. A typically syringe-like drug container that is received by a container compartment of the device as well as infusion tubing and the infusion cannula are designed as disposables and are replaced by the patient after a relatively short lifetime of typically a number of days. Over the last years, comparatively sophisticated devices have become available that may include wireless coupling to a remote controller, to a standard computer like a PC, or to glucose measurement devices or continuous glucose monitors (CGMs). A typical, commercially available state-of-the-art system includes the ACCU-CHEK® Combo Spirit infusion device and the ACCU-CHEK® Combo Aviva remote controller and glucose measurement device, provided by Roche Diagnostics, Inc.

[0005] US 2012/0004602 A1 discloses a medical system with a first part and a second part that are connectable via a connection structure. An e. g. optical indicator device may be present to indicate correct alignment and/or connection of the first part and the second part. The medical system may include a delivery device with a disposable housing and a disposable portion and a durable portion, with the disposable portion having a disposable housing with a bottom surface and an adhesive at the interface between the bottom surface and the skin of a user-patient.

Summary of disclosure

[0006] Mainly to increase application comfort and discreetness, alternative devices and systems have been developed and become available over the last years. Such devices, while operating according to the same technical principles, are designed as patch-devices that are adhesively attached directly to the infusion site. In addition to eliminating the need for additional tubing between infusion device and infusion cannula, the infusion site - in most cases the abdomen region - is normally covered by cloths and therefore allows carrying the device in a particularly discrete way during most everyday life situations. A commercial example of such a device is the fully remote-controlled OmniPod® device, manufactured by Insulet Cooperation.

[0007] The OmniPod® device as well as further similar devices that are known in the art are fully integrated disposable devices that need to be discarded and replaced once the application time - mainly determined by the container volume and the permissible indwelling time of the infusion cannula, both in the range of a number of days - has passed. Replacement is also required f the device is removed from the infusion site for further reasons, such as required for many sportive activities or occasionally to avoid personal embarrassment.

[0008] Mainly to improve cost efficiency, modular patch-based systems have been proposed that allow selective replacement of components. An example of such a system is disclosed in the WO 2009/016635 A2, directed towards a system with a patch unit or liquid drug infusion device that is removable attachable to a cradle, with the cradle being removable attachable to a patient's skin. A subcutaneous infusion cannula is attached to the cradle and fluidic couples, in operation, to the patch unit. The patch unit may itself be two-parted and include a disposable drug container and a reusable dispensing mechanism and control circuitry. In addition to the general advantages associated with a modular design, the architecture allows temporary removing the comparatively sensitive patch unit, including the drug container,

e.g. for sportive activity, with the less critical and rugged cradle remaining attached to the skin.

[0009] Another type of ambulatory medical systems that are increasingly carried by diabetics, often - but not necessarily - diabetics on CSII therapy, are continuous glucose monitors (CGM) systems that are designed to measure the diabetic's glucose level, typically in the blood or the interstitial liquid, in a virtually continuous way. The electronic monitoring device of such systems has dimensions comparable to insulin pumps or are even somewhat smaller. Those systems further rely on a -typically electrochemical - disposable sensor that is placed in the tissue similar to an infusion cannula and has a comparable lifetime. For those CGM systems, substantially the same requirements, boundary conditions and problems exist with respect to comfort and discreetness as described before for insulin pumps. The situation is particularly critical if a diabetic carries both an insulin pump and a CGM system, either completely separate or in operative and/or mechanical coupling.

[0010] In the present document, a device that is designed to be attached to a patient's skin via a cradle and fulfils - alone or in combination with further elements or devices - a diagnostic and/or therapeutic function, is referred to as "medical device". Two examples of medical devices that are especially referred to are insulin pumps and CGMs as described before. For a CGM, the glucose sensor may be part of or separate from the CGM as such.

[0011] In the present document, the cradle via which the medical device is attached to the skin is further distinct form and not part of the medical device as such. In some embodiments however, a CGM may, fully or partly, be part of the cradle and distinct from a separate medical device, such as an insulin pump, attached to the cradle.

[0012] Given the typical user requirement of keeping such systems as small and in particular as slim as possible and further considering their typical technical complexity, it is extremely difficult and may be substantially impossible to arrange an optical indication device in a way that allows economic and discrete view by the patient. Providing optical user indications, however, is desirable for a number of warning altering and information purposes that are described in more detail as the description proceeds.

[0013] The present disclosure is based on the insight that a cradle, which generally has by far less complexity, provides a better suited place for providing an indication device without substantially increasing the overall size.

[0014] The cradle may - in dependence of the diabetic's individual needs and the type of medical device - further have a longer lifetime than the medical device, such that the same cradle may be used in combination with two or more medical devices in sequence. Providing an optical indication device as part of the cradle allows its re-use.

[0015] The present disclosure aims at providing improvements to ambulatory infusion systems that include a cradle.

[0016] According to an aspect of the present disclosure, a cradle is disclosed. The cradle may have a proximal side, the proximal side having a skin attachment member for releasably attachment to a patient's skin. The cradle may further have a distal side, the distal side having a infusion device attachment member for attaching an initially separate medical device.

[0017] The cradle is accordingly a structurally distinct adapter element that is designed for attachment between the patient's skin and the medical device in a sandwich-like way. The medical device is accordingly attachable to the skin via the cradle. The footprint of a typical cradle largely corresponds to the footprint of the proximal, skin-facing side of the medical device, which, however, is not essential. Typically, the cradle has an essentially flat and disk-like shape.

[0018] The cradle may further include an electronically controlled optical indication device, the optical indication device being arranged to provide optical indications to the patient when the cradle is attached to the patient's skin.

[0019] The optical indication device includes an electrochromatic device.

[0020] The cradle may include a combination of one or more LEDs and an electrochromatic device.

[0021] A liquid crystal element may be realized as liquid crystal display (LCD) as known in the art. Alternatively, it may be realized by an electronic skin, the electronic skin including a liquid crystal material and covering, fully, or partly, a cradle body of the cradle that may be formed from any suited state-of the art material, such as plastics. Designing such an electronic skin may be carried out in an analogue way to the disclosure of US 2010/0317951 A1.

[0022] The cradle is formed, at least in part, from electrochromatic material and/or is coated, at least at part, with an electrochromatic coating. The cradle may either be formed, fully or partly, from electrochromatic material, or may be formed from any suited state-of the art material, such as plastics, and subsequently be fully or partly coated by an electrochromatic coating.

[0023] Electrochromatic materials reversibly change colour and/or transmission/reflexion properties when a burst of electrical charge is applied. Typical electrochromatic materials include polyaniline, viologens, polyoxotungstates, and tungsten oxide.

[0024] In some embodiments, the cradle includes a communication interface in operative coupling to the optical indication device, the communication interface being further designed to operatively couple to the medical device.

[0025] The communication interface may be designed by electrical cradle contacts that are arranged on the cradle such that they contact, in an operative state, corresponding medical device contacts, thus establishing a galvanic coupling.

[0026] Alternatively, the communication interface may be designed for non-galvanic coupling and be designed, e.g., as electro-optical interface, capacitive interface or short range radio frequency (RF) interface.

[0027] In some embodiments, the cradle includes an electronic indication device control unit in operative coupling to

the optical indication device.

[0028] The indication device control unit may include all circuitry that is required for actuating and driving the optical indication device and is typically realized based on solid-state semiconductor technology. The indication device control unit may especially include components such as one or more microcontrollers, ASICS, logic circuitry, transistors, and the like.

[0029] In some embodiments, the optical indication device is designed to provide indications in at least two different colours.

[0030] To provide indications in at least two different colours, the optical indication device may, e.g., include a number of separate LEDs of different colour that may favourably be independently controlled. Similarly, one or more multi-colour-LEDs may be used. In further variants, the optical indication device may include a multi-colour liquid crystal element or a colour-changing electrochromatic element.

[0031] In some embodiments, the optical indication device is designed to change colour and/or transparency in a continuous or quasi-continuous way.

[0032] A continuous or quasi-continuous colour or transparency change is particularly favourable for indicating, via the colour, continuous data such as the glucose value or the remaining drug volume in a container, as will be further described below.

[0033] In some embodiments, the cradle includes a skin-piercing device or a skin-piercing device attachment member for attaching an initially separate skin-piercing device.

[0034] In some embodiments including a skin-piercing device, the skin-piercing device includes a continuous glucose sensor and the cradle couples or is designed to couple in an operative state the continuous glucose sensor to the optical indication device such that the optical indication device provides a glucose indication of the patient.

[0035] The continuous glucose sensor of such an embodiment may be designed in a variety of ways. It may especially be an electro-chemical cannula sensor as generally known in the art. In addition to the continuous glucose sensor, the cradle of such an embodiment may include further associated circuitry such as analogue and/or digital filters, amplifiers, signal conditioning circuitry, sensor power supply circuitry or the like. Alternatively, those components may, completely or partly, be included in the medical device..

[0036] In some embodiments involving a glucose sensor, the cradle is designed to provide the glucose indication independent of a presence of the medical device. As explained before, a patient may whish or need to occasionally remove a medical device that is normally attached to the skin while keeping the cradle attached to the skin. In such a situation, checking of the glucose value is still desirable, e.g. during sportive activities. For this type of embodiment, all required circuitry, including power supply, that is required for operative coupling the glucose sensor and the optical indication device, are part of the continuous glucose sensor and/or the cradle, thus forming a complete CGM.

[0037] In a variant of such an embodiment, glucose-related data may additionally be transmitted, in an operative state, to the medical device, e.g. for record keeping purposes. In embodiments where the medical device is or includes a drug infusion device, the glucose related data may further be used for temporarily suspending or reducing insulin delivery in case of low glucose values as disclosed, e.g., in the WO 2009/002455 A1 or the WO 2006/083831 A1. Blood-glucose related data, may, by the cradle itself or the medical device attached to the cradle, also be transmitted to further remote devices, such as a remote controller, a smart phone, or the like, for analysis and record keeping purposes, and the like.

[0038] In some embodiments, the skin-piercing device includes an infusion cannula. An infusion cannula or an infusion cannula attachment member may be provided additionally or alternatively to a glucose sensor or glucose sensor attachment member. If both a glucose sensor and an infusion cannula are foreseen, they may be provided integral with each other, i.e., with a common skin-piercing device, or they may be separate but in proximity, e.g. with a distance up to 1.5 cm relative to each other, or they may have a larger relative distance. In embodiments where attachment members are provided, a glucose sensor attachment member and an infusion cannula attachment member may be provided separately on the cradle or in form of a combined attachment member.

[0039] According to a further aspect, the present disclosure is directed towards an ambulatory medical system. The medical system may include a cradle as discussed above and further below in the context of exemplary embodiments. The medical system may further include a medical device that is initially separate and is designed for attachment to the cradle via the medical device attachment member.

[0040] The ambulatory medical system may be designed such that, in an operative state, the medical device and the optical indication device operatively couple such that the optical indication device provides indication to the patient with respect to at least one of an operative state or operative parameter of the medical device or the occurrence of a medical device hazard.

[0041] For the medical device including a drug infusion device, an operative state that may be indicated may include, e.g., whether the system is currently active or drug delivery is temporarily suspended or basal delivery is reduced below a scheduled value because of sportive activities or the like. Operative parameters that may be indicated may, e.g., be a remaining drug volume in the cartridge, the charging state of a power supply such as battery, or a remaining lifetime of the drug infusion device as a whole or any of its components, especially the infusion cannula. For many of those

operative parameters, it is helpful in many situations for the diabetic to get a rough and semi-quantitative estimate, while a precise numeric value may not be required in many situations.

[0042] In embodiments where a number of distinct optical indicators are present or an indicator is designed to provide indications in a number of distinct colours, semi-quantitative indication may be provided, e.g. in a traffic-light like way. e. g., a green indication may be provided if the reservoir is at least filled to 1 /32 of its full volume, yellow if it filled to a volume of 1/2 .. 1 /4, and red if it filled to a volume below 1 /4. In embodiments where the indication device allows a continuous or quasi-continuous colour-or transparency indication, the same principle may be applied on a continuous or quasi-continuous basis.

[0043] Medical device hazards are situations in which correct operation of the medical device is not further given and immediate user action is required. For a drug infusion device, medical device hazards are, e.g. a an empty drug reservoir, an empty power supply battery, a blocked or leaking infusion line, or a device error. In addition or alternatively to medical device hazards, the optical indication device may alert the user of any further situation where some user action or system checking by the user should be carried out, such as testing the tightness of an infusion cannula connection.

[0044] In some embodiments, the medical device includes a drug infusion device, the drug infusion device including an infusion cannula or an outlet that is designed to fluidic couple to an infusion cannula comprised by the cradle or attached to the cradle via a cannula attachment member.

[0045] In the context of CSII therapy, the drug infusion device may be designed to deliver insulin to the patient in accordance with a time-variable basal administration regime and to further deliver drug boli on demand.

[0046] Designs of the drug infusion device that may be used in the context of the present disclosure are disclosed, e.g., in the WO 2010/10055504 A1, WO 2001/72358 A1, WO 2009/077143 A1, or WO 20000/25844 A1. Alternatively, the drug infusion device may be based on a dosing unit as disclosed in the WO 20008/110263 A1 and the WO2010/028719 A1. The drug infusion device may alternatively be designed according to further principles that are known in the art for this type of application, and use, e. g. a micro-membrane pump or micro peristaltic pump.

[0047] In some embodiments, the medical device includes a continuous glucose monitor CGM circuitry. The CGM generally includes functional units and circuitry as required to provide an operable CGM system. The glucose sensor itself may, in dependence of the specific embodiment, be part of the medical device or separate from the medical device and be a structural part of or attached to the cradle.

[0048] In some embodiments where the medical device includes a drug infusion device, continuous glucose monitoring circuitry may be present in the drug infusion device, e.g. in form of a glucose data processing unit. The glucose data processing unit may receive glucose related data, such as a signal provided by the continuous glucose sensor, and include capabilities such as comparison with a low and/or high glucose thresholds, trend analysis, glucose prediction, and the like. Such an embodiment may allow the cradle with the continuous glucose sensor to operate in a stand-alone way when the drug infusion device is temporarily not attached. In this situation, a pure indication of the current glucose value may be provided that require only a minimum amount of circuitry and power consumption. More advanced capabilities, however, may be present when the drug infusion device is in place, i.e. attached to the cradle and the glucose data processing unit is accordingly present.

[0049] According to a still further aspect, a method for providing optical indications to a patient carrying an ambulatory medical system is disclosed. The method may include providing a cradle, the cradle having a proximal side, the proximal side having a skin attachment member for releasably attachment to a patient's skin. The cradle may further have a distal side, the distal side having a medical device attachment member for attaching an initially separated medical de-vice.

[0050] The cradle may further include an electronically controlled optical indication device, the optical indication device being arranged to provide optical indications to the patient when the cradle is attached to the patient's skin. The method may further include controlling the optical indication device to provide the optical indications.

[0051] In some embodiments, the method may include providing a continuous glucose sensor and controlling the optical indication device to provide a glucose indication of the patient.

[0052] In some of those embodiments, controlling the optical indication device may include controlling the optical indication device to change its colour in dependence of a glucose value of the patient.

[0053] In some embodiments, the method may include providing a medical device including a drug infusion device, the drug infusion device being designed for subcutaneous drug delivery and being initially separate and being designed for attachment to the cradle via the infusion device attachment member. The method may further include controlling the optical indication device to provide indication to the patient with respect to at least one of an operative state of the drug infusion device or the occurrence of a drug infusion hazard.

[0054] A cradle in accordance with the present disclosure may be used as part of an ambulatory medical system in accordance with the present disclosure. Similarly, a cradle and/or an ambulatory medical system may be used to carry out an indication method in accordance with the present disclosure. Therefore, disclosed embodiments of cradles and ambulatory medical systems disclose, at the same time, a corresponding indication method and vice versa.

Exemplary embodiments

[0055] In the following, exemplary embodiments in accordance with the present disclosure are discussed in more detail with reference to the figures.

Fig. 1a, 1b show an exemplary cradle in accordance with the present embodiment in a side view and a top view, respectively in a schematic way.

Fig 2a, 2b, 2c, 2d, 2e, 2f, 2g, 2h schematically show medical systems wit a cradle and a medical device.

Fig. 3a, 3b shows the coupling of a cradle and an infusion cannula and a glucose sensor in a schematic way.

[0056] In all figures, reference to positions of certain elements or to directions, such as "top", "bottom", upper", "lower", "left", right", refer, if not stated differently, to positions and directions in the figures and are meant to improve their understanding. They are generally not identical to positions and directions of the elements during application. Where reference is made to elements when attached to a patient's skin, an upright standing body position is generally assumed.

[0057] Fig. 1a and Fig. 1b schematically show a cradle 20 in accordance with the present disclosure in side view and top view, respectively. In the following, the cradle is generally assumed to be used in combination with a drug infusion device as medical device, in particular a drug infusion device for CSII therapy. Alternatively, however, the cradle may be used in combination with other medical devices, in particular a CGM. Functionality of a drug infusion device and a continuous glucose monitor may further be integrated into a common medical device.

[0058] Cradle 20 includes cradle base 300 that is typically made from injection-moulded plastics. At its proximal side, cradle base 300 has an adhesive layer (not referenced) that serves as attachment member for attaching the cradle to a diabetic's skin 5. At its distal side, cradle base 300 has a well 310. Well 310 constitutes a passageway through which an infusion cannula can be inserted into the patient's skin. Locking arrangements (not shown), such as latches, may be provided for securing the infusion cannula to well 310. Well 310 accordingly serves as cannula attachment member. Cradle base 300 further includes infusion device anchoring latches 302, 304 that serve as infusion device attachment member. While not essential, anchoring latches 302, 304 may be designed for a releasable and reconnectable attachment of the drug infusion device.

[0059] Cradle 20 further includes optical indication device 400 that is exemplary realized by a set of three distinct LEDs 401a, 401b, 401c of typically different colour. LEDs 401a, 401b, 401c are arranged on cradle base 300 in a way that allows direct visual access when cradle 20 is attached to the diabetic's abdomen region with LEDs 401a, 401b, 401c pointing upwards with respect to the diabetics body, i.e. towards his or her head.

[0060] A communication interface is provided in form of electrical contact elements 402a, 402b 402c, 402d, with one electric contact element being distinct for each of LEDs 401a, 401b, 40c, and one being common. Corresponding counter electrodes, such as springloaded contact pins, are provided on a proximal side of the drug infusion device that faces the skin. LEDs 401a, 401b, 401c and contact elements are wired via conductive paths (not shown) that may be screen-printed, or realized in Moulded Interconnected Device (MID) technology, as wires buried in the plastic body of cradle base 300, or the like.

[0061] In a variant, a second redundant optical indication device of generally identical design is assembled on the opposite top side of cradle base 300, such that convenient optical indications are possible for a larger range of orientations of cradle 20 relative to the patient's body. In a further variant, cradle 20 is designed symmetrically in left-right direction, including two symmetrically arranged wells, thus allowing a drug infusion device to be attached in different ways - resulting in the cannula position also being different, with LEDs 401a, 401b, 401c always pointing towards the diabetic's head. In such embodiments including more than one redundant optical indication devices, all of them may be activated in parallel for providing optical indications. Alternatively, the medical device may selectively only activate the indication device that is best visible for the patient, i.e. pointing towards his or her head.

[0062] The optical indication device 400 includes, additionally or alternatively to LEDs 401a, 401b, 401c, electrochromatic elements, e.g. by forming cradle base 300 fully or partly from electrochromatic material. Forming a number of sections or even the whole cradle base 300 from electrochromatic material is an efficient way for enabling optical indication substantially independent of the device orientation relative to the patient's body. One or more liquid crystal elements may be provided in a similar way.

[0063] Fig. 2a to Fig. 2h illustrate how a medical device, generally referred to as ref. 10, and cradle 20 may be combined and cooperate as ambulatory medical system. For the sake of clarity and conciseness, only those functional and structural units as well as operative connections between those units are shown and discussed in the following that are of relevance in context of the present disclosure.

[0064] In the example of Fig. 2a, medical device 10 includes medical device control circuitry 105 and indication device

control unit 110. Via a communication interface (not referenced), indication device control unit 110 couples to and thereby controls operation of optical indication device 400. Since all control circuitry for optical indication device 400 is, for this embodiment, included in medical device 10, optical indication device 400 is operable only with medical device 10 being attached and thereby operatively coupled to cradle 20. Indication device 400 of this embodiment is used to provide indication to the patient with respect to at least one of an operative state or operative parameter of the medical device or the occurrence of a medical device hazard. Medical device 10 of this embodiment may, e.g., be a drug infusion device. This type of embodiment may be advantageous if medical device 10 is comparatively high-priced and/or has a comparatively long useful life time,

[0065] while disposable cradle 20 should be as simple in design and as cheap in production as possible.

[0066] In the example of Fig. 2b, the overall design is similar to the one of Fig. 2a. Indication device control unit 110, however, is not part of medical device 10. Instead, indication device control unit 410 is provided as part of cradle 20 and is in operative coupling with medical device 10 via a communication interface (not referenced). For this type of embodiment, the control circuitry that is required for controlling optical indication device 400 is accordingly part of cradle 20, while information that shall be indicated is received from medical device 10, requiring presence of medical device 10 for providing indication via optical indication device 400. This type of embodiment may be advantageous if cradle 20 is comparatively high-priced and/or has a comparatively long useful life time, resulting in providing additional components as part of cradle 20 being justified. It may further be advantageous if medical device 10 is intended for use in alternative way, e. g. to be carried either without or with cradle, or alternatively with cradle 20 and a simpler low-cost cradle without optical indication device. Here, the embodiment of Fig. 2b is advantageous in so far as indication device control unit 410 is present only in scenarios where actually required.

[0067] In the embodiment of Fig. 2c, cradle 20 includes continuous glucose monitor 500 with a skin-piercing continuous glucose sensor (not referenced). Optical indication device 400 operatively couples to continuous glucose sensor 500 via indication device control unit 410 to provide glucose information. For the embodiment of Fig. 2c, no operative coupling is present between medical device 10 and optical indication device 400. Cradle 20 is therefore fully operative and may provide glucose indication independent of the presence of medical device 10.

[0068] The embodiment of Fig. 2d is similar to the embodiment of Fig. 2c. In addition, however, an operative galvanic or non-galvanic coupling from medical device control circuitry 105 to optical indication device 400 is present via indication device control unit 410. This allows optical indication device 400 to additionally provide indication to the patient with respect to at least one of an operative state or operative parameter of the medical device or the occurrence of a medical device hazard, if medical device 10 is attached to cradle 20. If medical device 10 is temporarily not present, glucose indication can still be provided.

[0069] The embodiment of Fig. 2e is similar to the embodiment of Fig. 2d. In addition, however, operative coupling from indication device control unit 410 and/or glucose monitor 500 to medical device control circuitry 105 is present, i.e., coupling between medical device control circuitry and indication device control circuitry 410/glucose monitor 500 is bidirectional. In this way, indications related to operation of the continuous glucose monitor, such as glucose indications, status information or glucose monitor hazards can be transmitted to medical device control circuitry, e.g. for additional indication, storing and record keep, and/or further processing purposes. Information that is received from indication device control circuitry 410 and/or continuous glucose monitor 500 may be simply transmitted or relayed to remote device 600. Alternatively, information may be processed by medical device control circuitry 105.

[0070] The embodiment of Fig. 2f is similar to the embodiment of Fig. 2e. In addition, however, a remote device 600 is provided and operative coupling, e.g. by wireless RF coupling, is present between medical device control circuitry 105 and remote device 600. Remote device 600 may be a dedicated device of the ambulatory medical system, e.g. in form of a special-purpose remote control device, or may be a general-purpose device, such as a smart phone. Via the operative coupling to remote device 600, glucose indication and/or other useful information that is related to operation of medical device 10 and/or continuous glucose monitor 500 may be transmitted to remote device 600. Remote device 600 may, e.g., include a comparatively large graphical display (not separately shown) which allows comfortable and clear presentation of glucose data in form of tables, graphs, or the like. While not shown, operative coupling between medical device control circuitry 105 and remote device 600 may be bidirectional, thus allowing remote device 600 to provide commands like control instructions to medical device 10 and/or glucose monitor 500.

[0071] The embodiment of Fig. 2g is similar to the embodiment of Fig. 2f. In addition, however, additional operative coupling is present between indication device control unit 410 and/or glucose monitor 500 to remote device 600. Providing such operative coupling may be advantageous for different reasons. By transmitting data directly to remote device 600, the communication effort between medical device 10 and cradle 20 may be reduced. Additionally or alternatively, data may be transmitted to and indication may be provided by remote device 600 also in situations where medical device 10 is temporarily not present or communication between cradle 20 and medical device 10 and/or communication between medical device 10 and remote device 600 is not established, is disturbed, or the like.

[0072] In a further exemplary configuration as shown in Fig. 2h, glucose monitor 500 is a fully separate device that is not realized integral with cradle 20. The indication device of cradle 20, however, is used for providing glucose information

to the user as described before. For this purpose, typically wireless operative coupling is present between glucose monitor 500 and indication device control unit 410. Additionally or alternatively, the indication device of cradle 20 may be used for providing optical indications with respect to data originating from remote device 600 in generally the same way. If remote device 600 is, e.g., a remote control device for an insulin infusion pump as exemplary medical device 10, remote device 600 may include a single-spot electrochemical blood glucose meaning device and the indication device of cradle 20 may be used to provide easy accessible and discrete blood glucose readings. While not explicitly shown, operative coupling between medical device 10 and indication device control unit 410 may optionally be additionally present in the same way as described before.

[0073] In all of Fig. 2a to Fig 2g, communication channels are generally shown as being unidirectional, with the direction of information flow being indicated by arrows. It is to be understood however, that alternative bidirectional communication is well possible, thus providing further options and capabilities. In Fig. 2f and Fig. 2g, for example, a communication channel may be present that is directed from remote device 600 to medical device control circuitry 105 and/or indication device control unit 410, thus allowing, e.g. , medical device 10 or the optical indication device of cradle 20 to provide indications with respect to data that is generated by or related to operation of remote device 600. Similarly, additional communication channels and operative couplings may be present between devices or units that are not reflected in the figures for clarity reasons. In the configuration of Fig. 2h, for example, direct operative coupling may, e.g. be additionally be present, between remote device 500 and glucose monitor 500, thus allowing remote device 600 to be used as remote control device for glucose monitor 600.

[0074] It is further noted that Fig. 2a to Fig. 2g show typical exemplary configurations that may well be combined or modified. Remote device 600, may, e.g. be additionally present in either of the exemplary configurations as shown in Fig. 2a to Fig. 2e.

[0075] Fig. 3a, 3b exemplary and schematically illustrate the coupling of a cradle in accordance with the present disclosure, e.g. a cradle 20 with cradle base 300 as shown in Fig. 1a, 1b, with an infusion cannula having an integral glucose sensor.

[0076] Fig. 3a shows an area of cradle base 300 with well 310 in an enlarged view without an infusion cannula being attached. Cradle base 300 includes one or more electrical cradle connectors(s) 405 that are arranged on an inner surface of - typically but not necessarily - cylindrical well 410. One or more electric cradle line(s) 407 are provided as part of cradle base 300 to provide direct coupling of cradle connector(s) 405 and further components of cradle base 300, such as communication interface, indication device control unit, and LEDs 401a, 401b, 401c. Electric cradle line(s) 407 are exemplarily shown as buried wire(s) that may be realized, e.g., via insert moulding during manufacture of cradle base 300. Alternative technologies, such as screen-printing or MID as mentioned above, may also be used.

[0077] Fig. 3b shows an exemplary configuration after attachment of an infusion cannula 700, infusion cannula 700 having a skin-piercing element 701 with a drug-delivery-lumen (not referenced). Infusion cannula 700 may be of substantially rigid material, e.g. medical-grade stainless steel, or may be made of comparatively soft and flexible material, such as Teflon. A piercable septum (not shown) may be present that seals the drug delivery lumen when no infusion device is attached and is pierced by a drug delivery conduit (not shown) of a drug infusion device upon attachment of the drug infusion device to cradle 20. Exemplary infusion cannula 700 further includes hub 702 that is arranged around skin-piercing element 701 and serves for establishing the mechanical connection with cradle base 300 and for aligning skin-piercing element 701 with well 310. The attachment of cradle and infusion cannula 700 may be releasable or non-releasable, e.g. via force-fit or a snap-fit or bayonet connector with a variety of designs being known in the art. In the shown example, a snap-fit or a bayonet connector (not shown) may be present.

[0078] Infusion cannula 700 further includes an electrochemical glucose sensor with one or more tissue-contacting sensor electrode(s) 501 which are shown as being arranged on the outer circumferential surface of skin-piercing element 701. Tissue-contacting sensor electrode(s) 501 are placed such that they reside in the subcutaneous tissue after placing the infusion cannula. The infusion cannula further includes cannula connector(s) 505 for establishing a galvanic electric connection of sensor electrode(s) 501, with cannula connector(s) 505 being in galvanic connection with sensor electrode(s) 501 via cannula line(s) 502. In an assembled state, cradle connector(s) 405 and cannula connector(s) are aligned with each other and establish a galvanic connection.

[0079] In a variant, skin-piercing element 701 is not part of an infusion cannula but part of a continuous glucose sensor only. In such an embodiment, skin piercing element 701 may not have a lumen. In further variants, skin piercing element 701 may formed integral with or rigidly attached to cradle base 300. In such embodiments, cradle connector(s) 405 and cannula connector(s) 505 may not be present but electric cradle line(s) may be directly coupled to or integral with cannula line(s) 502.

Reference signs

5	skin
10	medical device

(continued)

20	cradle
105	medical device control circuitry
110	indication device control unit
300	cradle base
302,304	anchoring latches
310	well
400	optical indication device
401a, 401b, 401c	LEDs
402a, 402b, 402c, 402d	contact elements
405	cradle connector(s)
407	cradle line(s)
410	indication device control unit
500	continuous glucose monitor
501	sensor electrode(s)
502	cannula line(s)
505	cannula connector(s)
600	remote device
700	infusion cannula
701	skin-piercing element
702	hub

Claims

1. Cradle (20),

- the cradle (20) having a proximal side, the proximal side having a skin attachment member for releasably attachment to a patient's skin (5);
- the cradle having a distal side, the distal side having a device attachment member (302, 304) for attaching an initially separate medical device (10),
- the cradle (20) including an electronically controlled optical indication device (400), the optical indication device (400) being arranged to provide optical indications to the patient when the cradle (20) is attached to the patient's skin (5),

characterized in that the cradle (20) is formed, at least in part, from electrochromatic material and/or is coated, at least at part, with an electrochromatic coating, the electrochromatic material and/or electrochromatic coating serving as optical indication device (400).

2. Cradle (20) according to claim 1, including a communication interface (402a, 402b, 402c, 402d) in operative coupling to the optical indication device (400), the communication interface being further designed to operatively couple to the medical device (10).

3. Cradle (20) according to either of the preceding claims, including an electronic indication device control unit (410) in operative coupling to the optical indication device (400).

4. Cradle (20) according to either of the preceding claims, wherein the optical indication device (400) is designed to provide indications in at least two different colours.

5. Cradle (20) according to either of the preceding claims, wherein the optical indication device (400) is designed to change colour and/or transparency in a continuous or quasi-continuous way.

6. Cradle (20) according to either of the preceding claims, including a skin-piercing device (700) or a skin-piercing device attachment member for attaching an initially separate skin-piercing device.

7. Cradle (20) according to claim 6, wherein the skin-piercing device includes a continuous glucose sensor and the cradle (20) couples or is designed to couple in an operative state the continuous glucose sensor to the optical indication device (400) such that the optical indication device (400) provides a glucose indication of the patient.

8. Cradle (20) according to claim 7, wherein the cradle (20) is designed to provide the glucose indication independent of a presence of the medical device (10).

9. Cradle (20) according to claim 8, wherein the cradle (20) is further designed to transmit blood-glucose related data, in an operative state, to the medical device, and/or to a remote device (600).

10. Cradle (20) according to either of claim 6 to claim 9, wherein the skin-piercing device includes an infusion cannula (700).

11. Ambulatory medical system, including

- a cradle (20) according to either of the preceding claims;
- medical device (10), the medical device being initially separate and being designed for attachment to the cradle (20) via the device attachment member (302,304).

12. Ambulatory medical system according to claim 11, wherein the ambulatory medical system is designed such that, in an operative state, the medical device (10) and the optical indication device (400) operatively couple such that the optical indication device (400) provides indication to the patient with respect to at least one of an operative state or operative parameter of the medical device (10) or the occurrence of a medical device hazard.

13. Ambulatory medical system according to either of claim 11 or claim 12, wherein the medical device (10) includes a drug infusion device, the drug infusion device including an infusion cannula (700) or an outlet that is designed to fluidic couple to an infusion cannula comprised by or attached to the cradle (20).

14. Ambulatory medical system according to either of claim 11 to claim 13, wherein the medical device (10) includes continuous glucose monitor circuitry.

15. Method for providing optical indications to a patient carrying an ambulatory medical system, including:

- providing a cradle (20)

  - - the cradle (20) having a proximal side, the proximal side having a skin attachment member for releasably attachment to a patient's skin (5);
  - - the cradle having a distal side, the distal side having a medical device attachment member (302, 304) for attaching an initially separate medical device (10),
  - - the cradle (20) including an electronically controlled optical indication device (400), the optical indication device (400) being arranged to provide optical indications to the patient when the cradle (20) is attached to the patient's skin (5), wherein the cradle (20) is formed, at least in part, from electrochromatic material and/or is coated, at least at part, with an electrochromatic coating, the electrochromatic material and/or electrochromatic coating serving as optical indication device (400).

- controlling the optical indication device (400) to provide the optical indications.

16. Method according to claim 15 including:

- providing a continuous glucose sensor;
- controlling the optical indication device (400) to provide a glucose indication of the patient.

17. Method according to claim 16, wherein controlling the optical indication device includes controlling the optical indication device (400) to change its colour in dependence of a glucose value of the patient.

18. Method according to either of claim 15 to claim 17, including:

- providing a medical device (10) including a drug infusion device, the drug infusion device being designed for subcutaneous drug delivery and being initially separate and being designed for attachment to the cradle (20) via the infusion device attachment member (302, 304);
- controlling the optical indication device (400) to provide indication to the patient with respect to at least one of an operative state of the drug infusion device or the occurrence of a drug infusion hazard.

Patentansprüche

1. Basisträger (20),

- wobei der Basisträger (20) eine proximale Seite aufweist, wobei die proximale Seite ein Hautbefestigungselement zur lösbaren Befestigung an der Haut (5) eines Patienten aufweist;
- wobei der Basisträger eine distale Seite aufweist, wobei die distale Seite ein Vorrichtungsbefestigungselement (302, 304) zur Befestigung einer anfänglich separaten medizinischen Vorrichtung (10) aufweist;
- wobei der Basisträger (20) eine elektronisch gesteuerte optische Anzeigevorrichtung (400) aufweist, wobei die optische Anzeigevorrichtung (400) eingerichtet ist, um dem Patienten optische Angaben bereitzustellen, wenn der Basisträger (20) an der Haut (5) des Patienten befestigt ist;

dadurch gekennzeichnet, dass der Basisträger (20) wenigstens teilweise aus einem elektrochromatischen Material gebildet ist und/oder wenigstens zum Teil mit einer elektrochromatischen Beschichtung überzogen ist, wobei das elektrochromatische Material und/oder die elektrochromatische Beschichtung als optische Anzeigevorrichtung (400) dient.

2. Basisträger (20) nach Anspruch 1, aufweisend eine Kommunikationsschnittstelle (402a, 402b, 402c, 402d) in einer operativer Kopplung mit der optischen Anzeigevorrichtung (400), wobei die Kommunikationsschnittstelle ferner zur operativen Kopplung mit der medizinischen Vorrichtung (10) gestaltet ist.

3. Basisträger (20) nach einem der vorhergehenden Ansprüche, aufweisend eine Steuereinheit (410) für die elektronische Anzeigevorrichtung in operativer Kopplung mit der optischen Anzeigevorrichtung (400).

4. Basisträger (20) nach einem der vorhergehenden Ansprüche, wobei die optische Anzeigevorrichtung (400) so gestaltet ist, dass sie Angaben in wenigstens zwei unterschiedlichen Farben bereitstellt.

5. Basisträger (20) nach einem der vorhergehenden Ansprüche, wobei die optische Anzeigevorrichtung (400) so gestaltet ist, dass sie die Farbe und/oder die Transparenz auf eine fortlaufende oder quasifortlaufende Weise verändern kann.

6. Basisträger (20) nach einem der vorhergehenden Ansprüche, aufweisend eine Hautdurchstechvorrichtung (700) oder ein Befestigungselement für eine Hautdurchstechvorrichtung, um eine anfänglich separate Hautdurchstechvorrichtung zu befestigen.

7. Basisträger (20) nach Anspruch 6, wobei die Hautdurchstechvorrichtung einen kontinuierlich messenden Glukosesensor aufweist und der Basisträger (20) den kontinuierlich messenden Glukosesensor in einem Betriebszustand mit der optischen Anzeigevorrichtung (400) verbindet oder zu dessen Verbindung damit gestaltet ist, so dass die optische Anzeigevorrichtung (400) eine Angabe des Glukoses des Patienten bereitstellt.

8. Basisträger (20) nach Anspruch 7, wobei der Basisträger (20) so gestaltet ist, dass er die Glukoseangabe unabhängig von einem Vorhandensein der medizinischen Vorrichtung (10) bereitstellt.

9. Basisträger (20) nach Anspruch 8, wobei der Basisträger (20) ferner so gestaltet ist, dass er Daten im Zusammenhang mit dem BlutGlukose in einem Betriebszustand zu der medizinischen Vorrichtung und/oder einer entfernt befindlichen Vorrichtung (600) überträgt.

10. Basisträger (20) nach einem von Anspruch 6 bis Anspruch 9, wobei die Hautdurchstechvorrichtung eine Infusionskanüle (700) aufweist.

11. Ambulantes medizinisches System, aufweisend

- einen Basisträger (20) nach einem der vorhergehenden Ansprüche;
- eine medizinische Vorrichtung (10), wobei die medizinische Vorrichtung anfänglich separat ist und zur Befestigung über das Vorrichtungsbefestigungselement (302, 304) an dem Basisträger (20) ausgelegt ist.

12. Ambulantes medizinisches System nach Anspruch 11, wobei das ambulante medizinische System so gestaltet ist, dass die medizinische Vorrichtung (10) und die optische Anzeigevorrichtung (400) in einem Betriebszustand derart operativ gekoppelt sind, dass die optische Anzeigevorrichtung (400) dem Patienten eine Angabe hinsichtlich wenigstens eines aus einem Betriebszustand oder Betriebsparametern der medizinischen Vorrichtung (10) oder dem Auftreten eines Gefahrenumstands der medizinischen Vorrichtung bereitstellt.

13. Ambulantes medizinisches System nach einem von Anspruch 11 oder Anspruch 12, wobei die medizinische Vorrichtung (10) eine Arzneimittelinfusionsvorrichtung aufweist, wobei die Arzneimittelinfusionsvorrichtung eine Infusionskanüle (700) oder einen Auslass aufweist, welcher zur fluidischen Verbindung mit einer vom Basisträger (20) umfassten oder an diesem beferstigten Infusionskanüle gestalteten ist.

14. Ambulantes medizinisches System nach einem von Anspruch 11 bis Anspruch 13, wobei die medizinische Vorrichtung (10) eine fortlaufend messende Glukoseüberwachungsschaltung aufweist.

15. Verfahren, um einem Patienten, der ein ambulantes medizinisches System trägt, optische Angaben bereitzustellen, umfassend:

- Bereitstellen eines Basisträgers (20),

  - - wobei der Basisträger (20) eine proximale Seite aufweist, wobei die proximale Seite ein Hautbefestigungselement zur lösbaren Befestigung an der Haut (5) eines Patienten aufweist,
  - - wobei der Basisträger eine distale Seite aufweist, wobei die distale Seite ein Befestigungselement (302, 304) für eine medizinische Vorrichtung, um eine anfänglich separate medizinische Vorrichtung (10) zu befestigen, aufweist,
  - - wobei der Basisträger (20) eine elektronisch gesteuerte optische Anzeigevorrichtung (400) aufweist, wobei die optische Anzeigevorrichtung (400) eingerichtet ist, um dem Patienten optische Angaben bereitzustellen, wenn der Basisträger (20) an der Haut (5) des Patienten befestigt ist,
    wobei der Basisträger (20) wenigstens teilweise aus einem elektrochromatischen Material gebildet ist und/oder wenigstens zum Teil mit einer elektrochromatischen Beschichtung überzogen ist, wobei das elektrochromatische Material und/oder die elektrochromatische Beschichtung als optische Anzeigevorrichtung (400) dient,

- derartiges Steuern der optischen Anzeigevorrichtung (400), dass die optischen Angaben bereitgestellt werden.

16. Verfahren nach Anspruch 15, beinhaltend:

- Bereitstellen eines fortlaufend messenden Glukosesensors;
- derartiges Steuern der optischen Anzeigevorrichtung (400), dass eine Angabe des Glukoses des Patienten bereitgestellt wird.

17. Verfahren nach Anspruch 16, wobei das Steuern der optischen Anzeigevorrichtung das derartige Steuern der optischen Anzeigevorrichtung (400) beinhaltet, dass diese ihre Farbe abhängig von einem Glukosewert des Patienten ändert.

18. Verfahren nach einem von Anspruch 15 bis Anspruch 17 beinhaltend:

- Bereitstellen einer medizinischen Vorrichtung (10), die eine Arzneimittelinfusionsvorrichtung aufweist, wobei die Arzneimittelinfusionsvorrichtung für eine subkutane Arzneumittelabgabe gestaltet ist und anfänglich separat ist und zur Befestigung über das Infusionsvorrichtungsbefestigungselement (302, 304) an dem Basisträger (20)

gestaltet ist;
- derartiges Steuern der optischen Anzeigevorrichtung (400), dass dem Patienten eine Angabe in Bezug auf wenigstens eines aus einem Betriebszustand der Arzneimittelinfusionsvorrichtung oder dem Auftreten eines Arzneimittelinfusionsgefahrenumstands bereitgestellt wird.

Revendications

1. Support (20),

- le support (20) présentant un côté proximal, le côté proximal présentant un élément de fixation sur la peau, lequel est destiné à être fixé de façon détachable sur la peau (5) d'un patient ;
- le support présentant un côté distal, le côté distal présentant un élément de fixation de dispositif (302, 304) pour la fixation d'un dispositif médical (10) initialement séparé,
- le support (20) comprenant un dispositif d'indication optique (400) commandé de façon électronique, le dispositif d'indication optique (400) étant conçu pour fournir des indications optiques au patient lorsque le support (20) est fixé sur la peau (5) du patient,

caractérisé en ce que le support (20) est au moins partiellement constitué d'un matériau électro-chromatique et/ou est au moins partiellement revêtu d'un revêtement électro-chromatique, le matériau électro-chromatique et/ou le revêtement électro-chromatique servant de dispositif d'indication optique (400).

2. Support (20) selon la revendication 1, comprenant une interface de communication (402a, 402b, 402c, 402d) fonctionnellement reliée au dispositif d'indication optique (400), l'interface de communication étant en outre conçue pour être fonctionnellement reliée au dispositif médical (10).

3. Support (20) selon l'une quelconque des revendications précédentes, comprenant une unité de commande de dispositif d'indication électronique (410) fonctionnellement reliée au dispositif d'indication optique (400).

4. Support (20) selon l'une quelconque des revendications précédentes, dans lequel le dispositif d'indication optique (400) est conçu pour fournir des indications dans au moins deux couleurs différentes.

5. Support (20) selon l'une quelconque des revendications précédentes, dans lequel le dispositif d'indication optique (400) est conçu pour changer de couleur et/ou de transparence de façon continue ou quasi-continue.

6. Support (20) selon l'une quelconque des revendications précédentes, comprenant un dispositif de perforation de la peau (700) ou un élément de fixation de dispositif de perforation de la peau pour la fixation d'un dispositif de perforation de la peau initialement séparé.

7. Support (20) selon la revendication 6, dans lequel le dispositif de perforation de la peau comprend un capteur de glucose continu et le support (20) accouple ou est conçu pour accoupler dans un état fonctionnel le capteur de glucose continu au dispositif d'indication optique (400) de manière à ce que le dispositif d'indication optique (400) fournisse une indication glycémique du patient.

8. Support (20) selon la revendication 7, dans lequel le support (20) est conçu pour fournir l'indication glycémique indépendamment d'une présence du dispositif médical (10).

9. Support (20) selon la revendication 8, dans lequel le support (20) est en outre conçu pour transmettre des données relatives à la glycémie, dans un état fonctionnel, au dispositif médical et/ou à un dispositif distant (600).

10. Support (20) selon l'une quelconque des revendications 6 à 9, dans lequel le dispositif de perforation de la peau comprend une canule de perfusion (700).

11. Système médical ambulatoire, comprenant

- un support (20) selon l'une quelconque des revendications précédentes ;
- un dispositif médical (10), le dispositif médical étant initialement séparé et étant conçu pour être fixé au support (20) par le biais de l'élément de fixation de dispositif (302, 304).

12. Système médical ambulatoire selon la revendication 11, dans lequel le système médical ambulatoire est conçu de telle façon que dans un état fonctionnel, le dispositif médical (10) et le dispositif d'indication optique (400) s'accouplent fonctionnellement de manière à ce que le dispositif d'indication optique (400) fournisse une indication au patient par rapport à l'un au moins parmi un état fonctionnel ou un paramètre fonctionnel du dispositif médical (10) ou l'apparition d'un risque lié au dispositif médical.

13. Système médical ambulatoire selon l'une quelconque des revendications 11 ou 12, dans lequel le dispositif médical (10) comprend un dispositif de perfusion médicamenteuse, le dispositif de perfusion médicamenteuse comprenant une canule de perfusion (700) ou un orifice conçu pour être accouplé fluidiquement à une canule de perfusion comprise dans le support (20) ou fixée à celui-ci.

14. Système médical ambulatoire selon l'une quelconque des revendications 11 à 13, dans lequel le dispositif médical (10) comprend des circuits de surveillance continue du glucose.

15. Procédé destiné à fournir des indications optiques à un patient portant un système médical ambulatoire, comprenant :

- la mise à disposition d'un support (20),

  - - le support (20) présentant un côté proximal, le côté proximal présentant un élément de fixation sur la peau, lequel est destiné à être fixé de façon détachable sur la peau (5) d'un patient ;
  - - le support présentant un côté distal, le côté distal présentant un élément de fixation de dispositif (302, 304) pour la fixation d'un dispositif médical (10) initialement séparé,
  - - le support (20) comprenant un dispositif d'indication optique (400) commandé de façon électronique, le dispositif d'indication optique (400) étant conçu pour fournir des indications optiques au patient lorsque le support (20) est fixé sur la peau (5) du patient,

dans lequel le support (20) est au moins partiellement constitué d'un matériau électro-chromatique et/ou est au moins partiellement revêtu d'un revêtement électro-chromatique, le matériau électro-chromatique et/ou le revêtement électro-chromatique servant de dispositif d'indication optique (400),

- la commande du dispositif d'indication optique (400) pour fournir les indications optiques.

16. Procédé selon la revendication 15, comprenant :

- la mise à disposition d'un capteur de glucose continu ;
- la commande du dispositif d'indication optique (400) pour fournir une indication glycémique du patient.

17. Procédé selon la revendication 16, dans lequel la commande du dispositif d'indication optique comprend la commande du dispositif d'indication optique (400) pour changer sa couleur en fonction d'une valeur de glucose du patient.

18. Procédé selon l'une quelconque des revendications 15 à 17, comprenant :

- la mise à disposition d'un dispositif médical (10) comprenant un dispositif de perfusion médicamenteuse, le dispositif de perfusion médicamenteuse étant conçu pour l'administration sous-cutanée de médicaments et étant initialement séparé et étant conçu pour être fixé au support (20) par le biais de l'élément de fixation de dispositif de perfusion (302, 304) ;
- la commande du dispositif d'indication optique (400) pour fournir une indication au patient par rapport à l'un au moins parmi un état fonctionnel du dispositif de perfusion médicamenteuse ou l'apparition d'un risque de perfusion médicamenteuse.

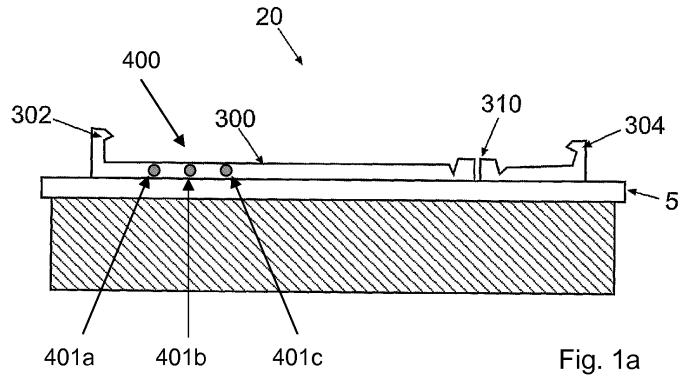

Fig. 1a

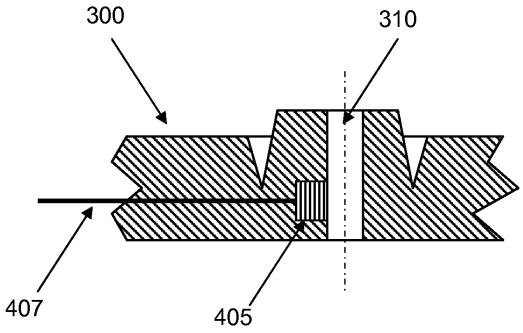

Fig. 3a

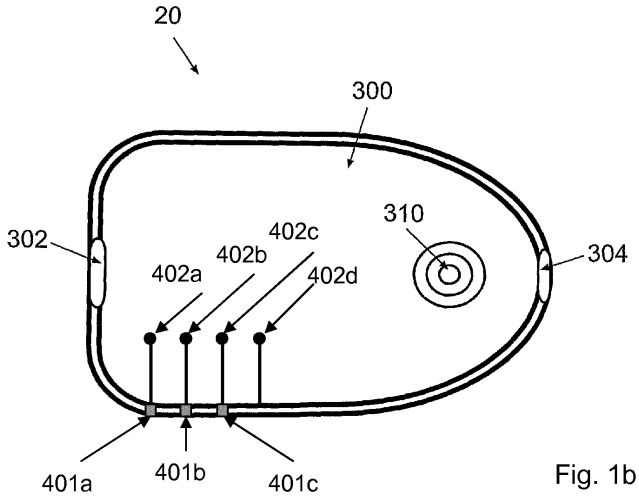

Fig. 1b

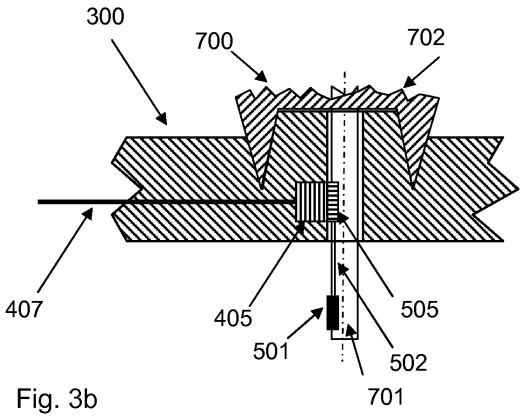

Fig. 3b

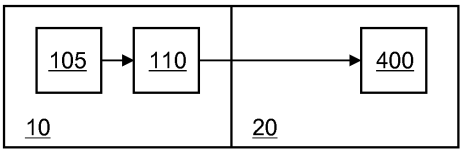

Fig. 2a

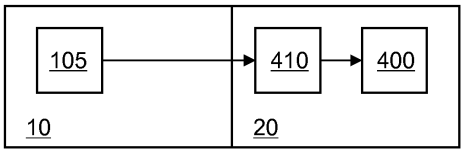

Fig. 2b

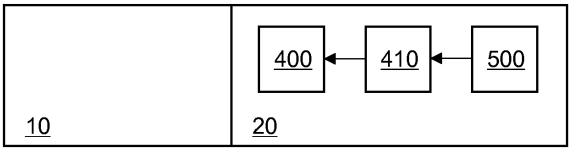

Fig. 2c

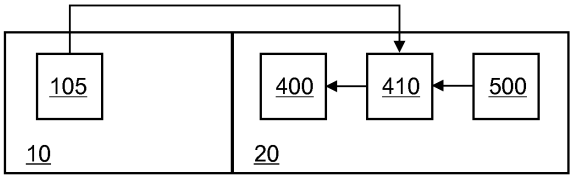

Fig. 2d

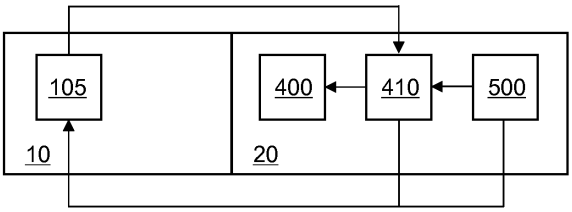

Fig. 2e

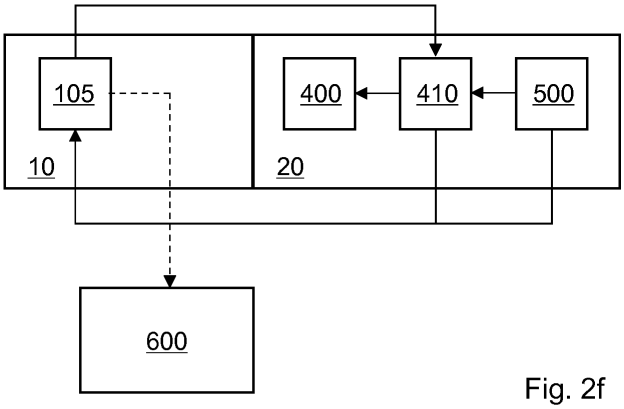

Fig. 2f

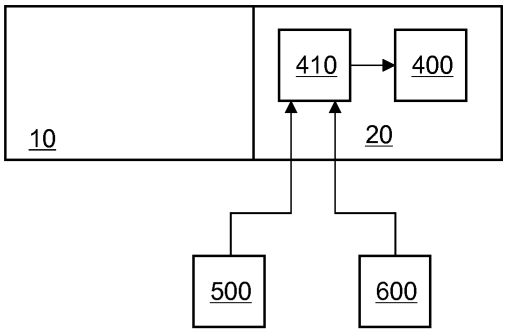

Fig. 2h

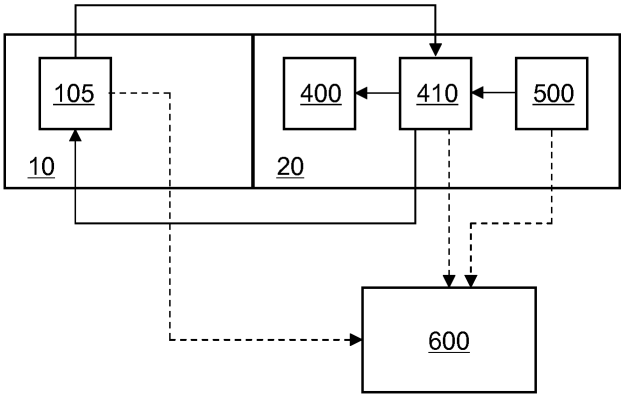

Fig. 2g

REFERENCES CITED IN THE DESCRIPTION

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专利名称(译)	用于输液泵或具有光学指示装置的连续血糖监测器的可皮肤粘附的支架		
公开(公告)号	EP2865325B1	公开(公告)日	2017-11-22
申请号	EP2013189895	申请日	2013-10-23
[标]申请(专利权)人(译)	罗氏诊断公司		
申请(专利权)人(译)	F.霍夫曼罗氏公司 罗氏诊断有限公司		
当前申请(专利权)人(译)	F.霍夫曼罗氏公司 罗氏糖尿病护理GMBH		
[标]发明人	GESCHEIT ILLAI J		
发明人	GESCHEIT, ILLAI J.		
IPC分类号	A61B5/00 A61B5/145 A61M5/14 A61M5/142		
CPC分类号	A61M25/02 A61B5/14532 A61B5/4839 A61B5/6802 A61B5/6823 A61B5/742 A61B2090/0807 A61B2560/04 A61M5/1413 A61M5/14248 A61M5/1723 A61M5/5086 A61M2005/14268 A61M2005/1726 A61M2205/0227 A61M2205/0238 A61M2205/3303 A61M2205/3306 A61M2205/3523 A61M2205/3561 A61M2205/3569 A61M2205/3592 A61M2205/50 A61M2205/502 A61M2205/52 A61M2205/583 A61M2205/584 A61M2205/6063 A61M2205/6081 A61M2209/01 A61M2230/201		
其他公开文献	EP2865325A1		
外部链接	Espacenet		

摘要(译)

公开了一种包括支架（20）的移动医疗系统，该支架具有近侧，近侧具有用于可释放地附接到患者皮肤（5）的皮肤附接构件，该支架具有远侧，远侧具有装置附接构件（302,304），用于附接最初分离的医疗装置（10），例如输液泵或连续血糖监测器，该支架包括电子控制的光学指示装置（400），后者被设置为提供当支架附接到患者皮肤时，例如与测量的血糖值或操作状态或操作参数或输注泵的最终故障相关的患者的光学指示。

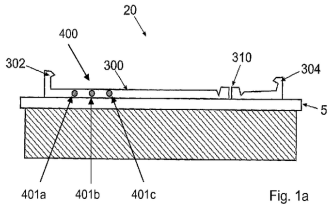

Fig. 1a

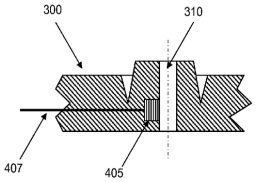

Fig. 3a

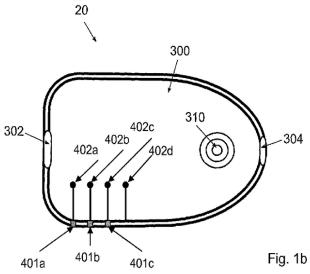

Fig. 1b

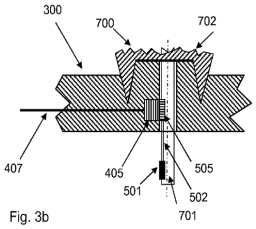

Fig. 3b