

CERTIFICATE OF TRANSLATION ACCURACY

I, Kelly Heejung Park, declare:

1. I am well versed in both the Korean and English languages. I have a graduate degree in interpretation and translation and have over 18 years of experience translating Korean technical documents into English.
2. The following translation of Korean Patent Application No. 10-2017-0068964 from Korean into English is accurate and complete to the best of my knowledge.

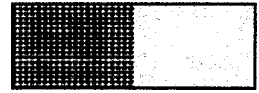
I declare under penalty of perjury under the laws of the United States of America that the foregoing is true and accurate.

Statements made herein are to the best of my knowledge true and are based on information that I believe to be true and further these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the patent application in the United States of America or any patent issuing thereon.

Executed April 30, 2024, at Seoul, South Korea.



Kelly Heejung Park



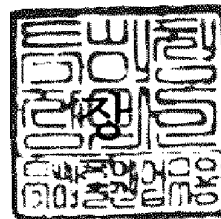
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This is to certify that the following application annexed hereto is a true copy from the records of the Korean Intellectual Property Office.

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[Name of the Invention in English] SENSOR AND APPLICATOR ASSEMBLY FOR CONTINUOUS GLUCOSE MONITORING SYSTEM

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[Project Name] Development of next generation medical device for creating new market

[Research Title] Development of a Compact Wearable Continuous Blood Glucose Monitoring System
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[Fee] 46,000 won

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【Attachment】

1. Document that demonstrates that it is a mid-sized company_one copy

【Invention Description】**【Invention Title】**

SENSOR AND APPLICATOR ASSEMBLY FOR CONTINUOUS GLUCOSE
MONITORING SYSTEM

【Technical Field】

[0001] The present invention relates to a sensor and applicator assembly for a continuous glucose monitoring system. More specifically, the invention involves the production of a sensor module assembled within an applicator, minimizing additional tasks for the user to attach the sensor module to the body. This allows for more convenient usage, as attaching the sensor module to the body can be achieved simply by operating the applicator. Additionally, the invention incorporates a built-in battery within the sensor module and connects a separate transmitter to the sensor module, supplying power to the sensor module. This continuous power supply to the transmitter enables economical and permanent usage. The invention further ensures accuracy and safety by designing the sensor module and applicator for one-time use, facilitating easy maintenance and contributing to a user-friendly sensor and applicator assembly for continuous glucose monitoring.

【Background Technology of the Invention】

[0002] Diabetes is a prevalent chronic disease affecting a significant portion of the modern population, with over two million individuals, equivalent to 5% of the total population, suffering from it in Korea.

[0003] Diabetes occurs due to various factors such as obesity, stress, improper dietary habits, and

congenital genetic factors, leading to an absolute or relative deficiency of insulin produced by the pancreas. This deficiency results in an imbalance of glucose in the blood, causing an absolute increase in blood sugar levels.

[0004] Normally, the blood contains a certain concentration of glucose, from which tissue cells derive their energy.

[0005] However, when glucose levels exceed the normal range, it cannot be appropriately stored in organs such as the liver, muscles, or adipose tissue. Instead, it accumulates in the bloodstream. As a result, individuals with diabetes maintain significantly higher blood sugar levels than those without the condition. The excess glucose, unable to be properly utilized by tissues, passes through the body and is excreted in the urine. This leads to an absolute shortage of essential sugars for various tissues in the body, causing abnormalities in each tissue.

[0006] Diabetes is characterized by the initial absence of noticeable symptoms. As the disease progresses, distinct symptoms of diabetes manifest, including excessive thirst, frequent urination, weight loss, general fatigue, itching of the skin, and persistent wounds on the hands and feet. Furthermore, as the disease advances, complications such as impaired vision, hypertension, kidney disease, stroke, periodontal disease, muscle cramps, and neuropathy may occur.

[0007] In order to diagnose diabetes and prevent its progression into complications, systematic blood glucose measurement and management must be carried out simultaneously.

[0008] For both diabetic patients and individuals with higher than normal blood sugar levels, who have not yet progressed to diabetes, many medical device manufacturers offer various types of blood glucose meters designed for at-home use. These devices are essential for systematic blood glucose monitoring and management.

[0009] Blood glucose monitoring system is available in two main approaches: one involves users taking blood samples from their fingertips for individual blood glucose measurements, while the other entails attaching the meter to areas such as the abdomen or arm to continuously monitor blood glucose levels.

[0010] In cases where diabetes has progressed to a severe state, stricter blood glucose management is necessary. Therefore, continuous glucose monitoring systems, which perform blood glucose measurements continuously, are employed for patients with advanced stages of diabetes.

[0011] A continuous glucose monitoring system consists of components attached to the user's body, including a sensor module that periodically extracts blood to measure glucose levels, a transmitter that transmits the measured glucose values, and a terminal device that displays the received glucose values. The sensor module is equipped with a sensor probe for blood extraction and a sensor for measuring glucose from the extracted blood. To attach the sensor module to the body, a separate applicator is used.

[0012] Continuous glucose monitoring systems are manufactured in various forms by different manufacturers, and their usage methods vary significantly. However, the majority of continuous glucose monitoring systems are distributed with a disposable sensor module attached to the body through the applicator. Users typically need to perform several steps to operate the applicator for attaching the disposable sensor module to the body. After attaching the sensor module to the body, users often need to carry out various follow-up procedures, such as directly removing the needle.

[0013] Consequently, there is an issue with the continuous glucose monitoring system, as the process of measuring blood glucose using the system is cumbersome and inconvenient. The transmitter, which transmits and receives information between the terminal device and the sensor module, is relatively expensive despite being

disposable after a single use. This poses an economic and environmental inefficiency.

【Prior Art Documents】

【Patent Documents】

[0014] (Patent Document 0001) **Korean Patent Registration Number** 10-1145668

【Invention Description】

【Issues to be Resolved】

[0015] The present invention has been made to address problems in the prior art. The objective of the present invention is to provide a sensor and applicator assembly for a continuous glucose monitoring system, wherein the sensor module is produced in an assembled state within the applicator. This minimizes additional tasks for the user to attach the sensor module to the body, allowing for convenient usage by simply operating the applicator.

[0016] Another objective of the present invention is to embed a battery in the sensor module and connect a separate transmitter to the sensor module, supplying power to the sensor module. This enables continuous and permanent use of the transmitter economically. The invention further ensures accurate and safe usage by designing the sensor module and applicator for one-time use, providing convenient maintenance for a continuous glucose monitoring system.

【Means for Resolving the Issue】

[0017] The present invention provides a sensor module that is designed to be attached to the body, periodically extracts blood to measure glucose, and can be connected to a separate transmitter. The sensor module is formed to be internally coupled and fixed, and an applicator is included, which, when operated by the user, externally ejects the sensor module. The sensor module is assembled in a state inserted into the applicator, and upon operation of the applicator by the user, it moves in the external ejection direction to be attached to the body. This characterizes a sensor and applicator assembly for a continuous glucose monitoring system.

[0018] In this case, the applicator may have a separate protective cap that can be detachably coupled to block external exposure when the sensor module is inserted into the applicator.

[0019] Furthermore, the sensor module's body-contacting surface may have adhesive tape and release paper attached to enable the sensor module to adhere to the body. The release paper of the adhesive tape may be designed to be removed from the adhesive tape during the process of separating the protective cap from the applicator.

[0020] In addition, the applicator may be designed to couple and fix the sensor module when the sensor module is inserted inside and to release the coupled and fixed state for the sensor module when the sensor module has externally ejected and moved.

[0021] Furthermore, the sensor module includes a bottom surface with adhesive tape attached to enable attachment to the body by external ejection and movement through the applicator; a port section in which a transmitter can be connected is formed on one side and is mounted inside the port section. As the port section

externally ejects and moves, it is inserted into the body to extract blood and measure glucose. The sensor module further comprises a PCB board inside the port section, controlling the operation of the sensor section, and a battery supplying power mounted on the PCB board. The power supplied by the battery may be formed to be supplied to the transmitter through the connection terminal in a state where the transmitter is connected.

[0022] Additionally, the sensor module is detachably coupled to the pod section. As the pod section externally ejects and moves, it wraps around a part of the sensor section, encloses a needle part together with the sensor section, and includes a needle part that is inserted into the body. The applicator can operate to withdraw and remove the needle part from the body as soon as the external ejection movement of the pod section is completed.

[0023] Additionally, the applicator comprises a main case with a pressure button mounted on one side for pressurized operation by the user; a plunger body coupled and fixed at the internal first position of the main case and released from the coupled and fixed state at the first position upon operation of the pressure button, linearly moving to the external ejection direction, and a plunger elastic spring applying elastic force to the plunger body to enable straight-line movement from the first position to the second position. The sensor module is coupled to one end of the plunger body, allowing it to move together with the plunger body.

[0024] Furthermore, the main case may include an outer case on one side where the pressure button is mounted and an inner case coupled to the inside of the outer case to guide the linear movement path of the plunger body.

[0025] Moreover, the outer case may include a separate safety lock device to prevent the pressurized operation of the pressure button, and the pressure button may be formed to be pressurized only when the safety

lock device is removed.

[0026] Moreover, the outer case may include a return prevention hook to prevent the plunger body from returning from the second position to the first position after linear movement.

[0027] Additionally, a sensor receiving portion may be formed on one end of the plunger body to accommodate the sensor module. The sensor receiving portion's edge may have a sensor fixation hook that engages with the sensor module inserted into the sensor receiving portion, allowing the sensor module to be coupled and fixed. The inner case is formed to press the sensor fixation hook when the plunger body is in the first position, engaging the sensor fixation hook with the sensor module. As the plunger body moves to the second position, the sensor fixation hook is formed to release the pressure, allowing it to disengage from the sensor module.

[0028] Furthermore, the applicator includes a separate elastic hook that engages with the plunger body, moving along with the inner case from the first position to the second position. It comprises a needle withdrawal body that is coupled with the needle part's end and moves with the needle withdrawal body, and a needle withdrawal elastic spring that applies elastic force to the needle withdrawal body in the direction of returning to the first position. The inner case includes a needle withdrawal pressure part that pressurizes the elastic hook to release the engagement with the plunger body as the needle withdrawal body moves to the second position. During the process of returning to the first position, the needle part moves along with the needle withdrawal body and can be withdrawn and removed from the body.

【Effect of the Invention】

[0029] The present invention has the advantage of minimizing additional user tasks for attaching the sensor module to the body by manufacturing the sensor module in an assembled state within the applicator. This

allows for the convenient attachment of the sensor module to the body simply by operating the applicator.

[0030] In addition, the effect of the present invention includes the integration of a battery into the sensor module and connecting a separate transmitter to the sensor module to supply power. This enables the continuous and permanent use of the transmitter, providing economic efficiency. The use of the sensor module and applicator as disposable items ensures accurate and safe usage, while also facilitating convenient maintenance.

[0031] Furthermore, by automatically removing the needle when attaching the sensor module to the body through the operation of the applicator, the invention prevents bodily injury during needle removal. This results in a painless and rapid needle removal, enhancing the overall convenience of use.

[0032] Additionally, when the protective cap is removed, the removal of the heterogeneous tape from the adhesive tape of the sensor module is facilitated. This allows for attaching the sensor module to the body without any additional tasks other than the protective cap removal, adding to the convenience of use.

[0033] Furthermore, by preventing reuse after operating the applicator, the invention aims to avoid abnormal user usage, thereby enhancing overall safety in usage.

【Short Description of Drawings】

【0034】 Figure 1 is a perspective view schematically illustrating the assembly geometry of a sensor applicator assembly for a continuous glucose monitor according to one embodiment of the present invention.

Figure 2 is a perspective view schematically illustrating a configuration of a sensor module according to one embodiment of the present invention.

Figure 3 is a perspective view schematically illustrating a method of coupling a transmitter to a sensor

module according to one embodiment of the present invention.

Figure 4 is an exploded perspective view schematically illustrating the configuration of a sensor applicator assembly for a continuous glucose monitor according to one embodiment of the present invention.

Figure 5 is a cross-sectional view taken along line "A-A" of Figure 1

Figure 6 is a cross-sectional view taken along the line "B-B" of Figure 1.

Figures 7 through 10 are diagrams illustrating the use of a sensor-afflicator assembly for a continuous glucose monitor in accordance with one embodiment of the present invention, step by step in a sequence of operations.

【Specific Details for Implementing the Invention】

[0035] Hereinafter, a preferred embodiment of the present invention will be described in detail with reference to the accompanying drawings. First, in assigning reference numerals to components of each drawing, it should be noted that, for the same components, as much as possible, the same reference numerals are used, even if they are shown on different drawings. Also, in describing the present invention, detailed explanations of related known structures or functions that may obscure the essence of the invention are omitted when deemed necessary.

[0036] Figure 1 is a schematic view showing the assembly configuration of a sensor applicator assembly for a continuous blood glucose monitor according to an embodiment of the present invention, and Figure 2 is a schematic view showing the configuration of a sensor module according to an embodiment of the present invention. FIG. 3 is a schematic view showing a method of coupling a transmitter to the sensor module according to an embodiment of the present invention, and FIG. 4 is a schematic view showing the configuration of a sensor

applicator assembly for a continuous blood glucose monitor according to an embodiment of the present invention.

FIG. 5 is a sectional view taken along line "A-A" of Figure 1, and Figure 6 is a sectional view taken along line "B-B" of Figure 1.

[0037] A sensor applicator assembly (1) for a continuous blood glucose monitor according to an embodiment of the present invention is an assembly produced with a sensor module (20) and an applicator (10) assembled. The usage is very simple in structure, minimizing additional tasks for the user.

[0038] The sensor module (20) is designed to be attached to the body to periodically extract blood and measure blood glucose, and can be connected to a separate transmitter (30).

[0039] The applicator (10) is formed to have the sensor module (20) coupled and fixed inside, and operates to externally expel the sensor module (20) by the user's manipulation.

[0040] In this case, the sensor module (20) is manufactured in an assembled state inside the applicator (10), and, in response to the operation of the applicator (10) by the user, it moves in the external expulsion direction and attaches to the body.

[0041] In other words, according to an embodiment of the present invention, the sensor applicator assembly (1) is assembled with the sensor module (20) inserted inside the applicator (10) in the manufacturing stage, and is supplied to the user in this state. Therefore, the user can attach the sensor module (20) to the skin simply by operating the applicator (10) without any additional tasks for attaching the sensor module (20) to the skin. After attaching the sensor module (20) to the skin in this way, by coupling a separate transmitter (30) to the sensor module (20), the blood glucose measurement results can be periodically output to the terminal of the continuous blood glucose monitor.

[0042] When using the sensor module (20) attached to the body for approximately a week, the lifespan ends, and a new sensor module (20) needs to be attached to the body again. At this time, the sensor module (20) and the applicator (10) are produced and used as disposable, while the transmitter

(30) is continuously used as a separate independent product. That is, the sensor module (20) is supplied to the user in a state assembled in the applicator (10) and attachable to the body. Therefore, the user does not need to insert the sensor module (20) into the applicator (10) or perform any additional tasks. The user simply attaches the sensor module (20) to the body by operating the applicator (10). After use, the used sensor module (20) and applicator (10) cannot be reused, and a new sensor applicator assembly (1) is used to attach a new sensor module (20). At this time, the transmitter (30) can be configured to be reusable as a separate independent product.

[0043] Meanwhile, a separate protective cap (200) can be detachably coupled to the applicator (10) to block external exposure of the sensor module (20) when the sensor module (20) is inserted into the applicator (10). After detaching the protective cap (200), the user can operate the applicator (10) to attach the sensor module (20) to the body.

[0044] In this case, the sensor module (20) has adhesive tape (560) and release liner (561) attached to the body contact surface of the sensor module (20) so that the sensor module (20) can be attached to the body. The release liner (561) of the adhesive tape (560) can be formed to be removed and separated from the adhesive tape (560) during the process of detaching the protective cap (200) from the applicator (10).

[0045] For example, the protrusion (561) can be configured to be adhered to one side of the protective cap (200), so when the user separates the protective cap (200) from the applicator (10), the protrusion (561) can be detached and removed together with the adhesive tape (560). Consequently, when the user removes the protective cap (200), the protrusion (561) is detached and removed from the adhesive tape (560), allowing the user to operate the applicator (10) in this state to attach the sensor module (20) to the body.

[0046] Additionally, the applicator (10) may be configured to secure and fix the sensor module (20)

when it is inserted inside, and to release the fixed state of the sensor module (20) when the sensor module (20) is externally expelled and moved. Therefore, when the sensor module (20) is assembled and inserted into the applicator (10), the sensor module (20) is maintained in a fixed state. When the applicator (10) is operated to externally expel the sensor module (20) and attach it to the skin, the coupling and fixing state between the applicator (10) and the sensor module (20) is released. In this state, detaching the applicator (10) separates it from the sensor module (20), leaving only the sensor module (20) attached to the skin.

[0047] Next, the detailed components are presented below.

[0048] First, the sensor module (20) includes a pod part (510), a sensor part (520), a PCB board (530), and a battery (540).

[0049] The pod part (510) is designed to be externally expelled and attached to the body by the applicator (10), with adhesive tape (560) attached to the bottom surface, and a connection terminal (513) formed on one side for connecting a transmitter (30). It may be formed in a flat shape with adhesive tape (560) attached to the bottom surface, consisting of a pod base (511), and a pod body (512) formed in a case shape on the upper surface of the pod base (511). The pod body (512) is positioned on one side of the upper surface of the pod base (511), with a connection terminal (513) formed on one side, and the internal space accommodates the sensor part (520), PCB board (530), battery (540), etc. The pod part (510) is attached to the body by the operation of the applicator (10), where the pod base (511) is attached to the body by adhesive tape (560), and later a separate transmitter (30) is attached to the upper surface of the pod base (511) in a manner that connects to the connection terminal (513) of the pod body (512).

[0050] The sensor part (520) is mounted in the internal space of the pod part (510), and as the pod part (510) is externally expelled and inserted into the body, it extracts blood and measures blood glucose. The sensor

part (520) may include a sensor probe (521) mounted to protrude downward from the lower surface of the pod base (511) to enable insertion into the body to extract blood, and a sensor body (522) that measures the blood glucose extracted by the sensor probe (521).

[0051] The PCB board (530) is mounted in the internal space of the pod part (510) to control the operation of the sensor part (520) and is connected to the connection terminal (513) for connection to the transmitter (30). In other words, the sensor body (522) of the sensor part (520) is embedded in the PCB board (530) to control the operation for measuring blood glucose, and the result of the blood glucose measurement is transmitted to the transmitter (30) through the connection terminal (513), which is then transmitted to the user terminal device via the transmitter (30).

[0052] The battery (540) is mounted in the internal space of the pod part (510) to supply power to the sensor part (520) and others. The power supplied by the battery (540) is supplied to the transmitter (30) through the connection terminal (513) when the transmitter (30) is connected.

[0053] Therefore, when the pod part (510) is externally expelled and attached to the body by the operation of the applicator (10), simultaneously, the sensor probe (521) of the sensor part (520) is inserted into the body to extract blood, and the blood glucose is measured by the sensor body (522). The result of the blood glucose measurement is then authorized to the transmitter (30) and transmitted to the user terminal device through the transmitter (30). In this case, since the transmitter (30) operates by receiving power from the battery (540) of the sensor module (20), there is no need for a separate battery inside the transmitter (30). Therefore, the transmitter (30) is permanent and easy to use without the need for replacement due to battery depletion.

[0054] On the other hand, the sensor module (20) may include a separate needle part (550) to facilitate the smooth insertion process of the sensor probe (521). The needle part (550) is detachably coupled to the pod part

(510), and as the pod part (510) is externally expelled, it surrounds a part of the sensor part (520) to ensure stable insertion of the sensor probe (521) into the body.

[0055] This needle part (550) is mounted in the direction penetrating the pod part (510) vertically, as shown in Figure 2, and is detachably attached so that the sensor probe (521) is surrounded, and a needle head (551) is formed at the top. When the pod part (510) is externally expelled by the applicator (10), this needle part (550) is inserted into the body before the sensor probe (521), assisting in the stable insertion of the sensor probe (521) into the skin.

[0056] The applicator (10) operates to withdraw and remove the needle part (550) from the body at the completion of the external expulsion of the pod part (510). Consequently, while the pod part (510) remains attached to the body, only the sensor probe (521) is maintained inserted into the body. The needle part (550) is retracted, as shown in Figure 3. In this state, as shown in Figure 3, the transmitter (30) is coupled to the pod part (510) to be connected to the connection terminal (513).

[0057] The applicator (10) includes a main case (100) with a pressure button (110) attached to one side, which is pressed by the user. It also includes a plunger body (300) that is coupled and fixed at the first position inside the main case (100) and is released from the coupling at the first position to move linearly to the second position in the external expulsion direction according to the operation of the pressure button (110). The plunger body (300) further includes a plunger elastic spring (S1) applying elastic force to enable the linear movement from the first position to the second position. The sensor module (20) is coupled to the plunger body (300) and moves integrally with the plunger body (300).

[0058] The main case (100) can be separably formed with an external case (101) where the pressure button (110) is attached and an inner case (102) coupled inside the external case (101) to guide the linear movement

path of the plunger body (300). Moreover, the external case (101) can be formed in a hollow pipe shape. At the top, a separate cover case (103) can be attached, and the cover case (103) may have a return prevention hook (104) formed to prevent the plunger body (300) from returning to the first position when it moves linearly to the second position.

[0059] In addition, an external safety lock device (120) can be coupled to the external case (101) to prevent the pressure button (110) from being pressed, and the pressure button (110) may be configured to be press-operable only when the safety lock device (120) is removed.

[0060] If the user inadvertently presses the pressure button (110) without properly positioning the applicator (10), the sensor module (20) located inside the main case (100) will be expelled externally. To prevent the expulsion of the sensor module (20) due to such mistakes, an additional safety lock device (120) is attached, enabling safer use.

【0061】 The plunger body (300) is subject to the elastic force of the plunger elastic spring (S1) to move linearly from the internal first position of the main case (100) to the second position. In a state where the plunger body (300) is located at the first position, an elastically deformable elastic hook (310) is formed, engaging with the inner case (102) to secure its position. As shown in Figure 5, pressing the pressure button (110) of the external case (101) inwardly causes the inner protrusion (111) of the pressure button (110) to press the elastic hook (310) of the plunger body (300). This releases the engagement between the elastic hook (310) and the inner case (102), allowing the plunger body (300) to move linearly to the second position under the elastic force of the plunger elastic spring (S1). The pressure button (110) can only be pressed when the safety lock device (120) is removed. Additionally, the plunger body (300) may have a stopper pin (320) to limit the range of movement to the second

position, engaging with one side of the inner case (102) to restrict movement as the plunger body (300) moves to the second position.

[0062] Additionally, on one side of the plunger body (300), a sensor receiving portion (301) is formed to accommodate the sensor module (20). The sensor module (20) is inserted into the sensor receiving portion (301) and moves linearly from the first position to the second position along with the plunger body (300). As the plunger body (300) moves linearly to the second position, the sensor probe (521) and needle unit (550) of the sensor module (20) are inserted into the body.

[0063] At the edge of the sensor receiving portion (301), a sensor locking hook (330) is attached, which can engage and fix the sensor module (20) inserted into the sensor receiving portion (301). The sensor locking hook (330) is pivotally coupled around a rotation axis (331). When the plunger body (300) is in the first position, the sensor locking hook (330) is pressed inward by the inner case (102), engaging and fixing the sensor module (20). When the plunger body (300) is in the second position, the pressure on the sensor locking hook (330) is released, and the engagement and fixation with the sensor module (20) are also released.

[0064] For this purpose, the inner case (102) has an inwardly concave area, as shown in Figure 6, corresponding to the second position of the plunger body (300). The upper area of the concave surface (140) is formed to be relatively concave in the inward direction. Therefore, the sensor retention hook (330) is pressed inward by the inner surface of the inner case (102) when the plunger body (300) is in the first position, engaging with the sensor module (20) inserted into the sensor receiving portion (301). When the plunger body (300) moves linearly to the second position, the sensor retention hook (330) is released from pressure by the concave surface (140) of the inner case (102), and the engaged state with the sensor module (20) is released. In this state, that is, when the plunger body (300) is in the second position along with the sensor module (20), the sensor module (20)

is attached to the body by the adhesive tape (560). When the applicator (10) is separated from the body in the direction of removal, the engagement between the sensor retention hook (330) and the sensor module (20) is released. Only the applicator (10) is removed from the body, leaving the sensor module (20) attached to the body.

[0065] The applicator (10), meanwhile, may further comprise the needle extraction body (400) that linearly moves along the inner case (102) from the first position to the second position together with the plunger body (300), being engaged with the needle head (551) of the needle portion (550) and interlocked with the plunger body (300), and comprise the needle-drawing elastic spring (S2) that exerts an elastic force on the said needle extraction body (400) in the direction of the needle extraction body (400) moving back to the first position.

[0066] The needle extraction body (400) is interlocked and coupled to the plunger body (300), for which the separate elastically transformable elastic hook (410) is formed on the needle extraction body (400), and the elastic hook (410) is coupled to the hook engagement portion (340) of the plunger body (300). Thus, when the plunger body (300) moves linearly from the first position to the second position under the operation of the pressure button (110), the needle extraction body (400) also moves linearly with the plunger body (300).

[0067] At this time, needle withdrawing pressing portion (130) is formed which presses the elastic hook (410) inward to make the elastic hook (410) disengage from the hook engagement portion (340) of the plunger body (300) as the needle extraction body (400) in the inner case (102) moves to the second position.

[0068] In accordance with this structure, when the pressure button (110) is pushed and operated, the needle extraction body (400) moves linearly from the first position to the second position along with the plunger body (300), and at the same time, the elastic hook (410) of the needle extraction body (400) is disengaged with the hook engagement part 340 by the needle withdrawing pressing portion (130) of the inner case (102). Then the needle extraction body (400) moves back to the first position by the elastic force of the needle-drawing elastic spring (S2). At this time, since the needle extraction body (400) is engaged with the needle head (551) of the needle portion (550) via the needle head coupling part (420), the needle extraction body (400) moves with the needle portion (550) during the return movement to the first position is removed from the body.

[0069] Next, the sensor applicator assembly in use described above will be explained, with particular reference to Fig. 7 and Fig. 10.

[0070] Fig. 7 through 10 are the drawings illustrating the use of the sensor applicator assembly for the continuous glucose monitoring, in accordance with the embodiments of the present invention, in a step-by-step sequence of operations.

[0071] First, the protective cap (200) of the applicator (10) is disengaged, as shown in Fig. 7. In the process of removing the protective cap (200), the release paper (561) of the adhesive tape (560) of the sensor module (20) is separated along with the protective cap (200) and removed from the adhesive tape (560). The sensor applicator assembly is then positioned on the body to which the sensor module (20) is to be attached, and the safety lock (120) is removed at this point.

[0072] When the pressure button (110) is pushed with the safety lock (120) removed, the plunger body (300) moves downward in the direction of being ejected by the plunger elastic springs (S1), as shown in Fig. 8a and 8b, and in this process, the needle portion (550) of the sensor module (20) and the sensor probe (521) are inserted into the body (E). Of course, at this time, the sensor module (20) is adhered to the surface of the body (E) by the adhesive tape (560). When the plunger body (300) is thus e in the direction of external discharge, as shown in Fig. 8B, the plunger body (300) is engaged by return preventing hook (104) of the outer case (101) and cannot be moved upwardly again. Therefore, the applicator (10) cannot be reused once it has been used.

[0073] When the plunger body (300) is moved downward, the sensor fixing hook (330) of the sensor receiving portion (301) is released by the concave plate (140) of the inner case (102), as shown in Fig. 8A, thus releasing it from the sensor module (20). Furthermore, the elastic hook (410) of the needle extraction body (400) is pressurized inwardly by needle withdrawing pressing portion (130) of the inner case (102), thereby releasing the engagement state with the plunger body (300).

【0074】 Therefore, when the plunger body (300) is moved downward, the needle extraction body (400) is simultaneously moved upward by the needle-drawing elastic spring (S2), as shown in Fig. 9. At this time, the needle portion (550) is moved upward together with the needle extraction body (400), so that the needle portion (550) is removed from the body (E).

[0075] In this state, the sensor fixing hook (330) and the sensor module (20) are disengaged from the sensor module (20) as described above, allowing the applicator (10) to be upwardly disengaged and removed as shown in Fig. 10. Upwardly disengaging and removing the applicator (10), as shown in Fig. 10, it leaves only the sensor module (20) attached to the body (E).

A separate transmitter (30) is then coupled to the sensor module (20) such that it is connected to the connection terminal (513), and the blood glucose measurement results from the sensor module (20) are transmitted by the transmitter (30) to the user terminal.

[0076] The description in this document is merely an exemplary description of the technical ideas of the present invention, and a person with ordinary skills in the field of the invention might be able to make modifications and variations without deviating from the essential characteristics of the invention.

Thus, the embodiments shown with the present invention are not intended to limit the technical ideas of the invention, but to give explanations. The scope of the technical ideas of the present invention is therefore not confined by these embodiments.

The scope of protection for the present invention shall be construed in accordance with the following claims, and all technical ideas within the same scope shall be construed as being within the scope of rights of the present invention.

【Description of figures of drawings】

[0077] 10 : Applicator

110: Pressure button

30: Transmitter

20: Sensor module

100: Main case

101: Outer case

103: Cover case

102: Inner case

104: Return preventing

hook120: Safety lock

130: Needle withdrawing
pressing portion

200 : Protective cap

300: Plunger body

301: Sensor receiving portion

320: Stopper projection

400: Needle extraction body

410 : Elastic hook

S1 : Plunger elastic spring

510 : Pod part

530 : PCB substrate

550 : Needle portion

561 : Release paper

140 : concave plate

310: Elastic hook

330: Sensor fixing hook

420: Needle head coupling part

S2: Needle-drawing elastic spring

520 : Sensor part

540 : Battery

560: Adhesive tape

【Scope of Claim】**【Claim 1】**

A sensor module that is attached to the body and periodically draws blood to measure blood glucose and is formed to be connected to a separate transmitter; and

An applicator formed to connect and hold the above mentioned sensor module inside, and be operated to eject the sensor module outward by a user.

A sensor applicator assembly for a continuous glucose monitoring device, comprising: the sensor module, able to be assembled as being inserted inside the above mentioned applicator, and be attached to the body as being ejected to the outside in response to the operation of the applicator by a user.

【Claim 2】

In Claim 1,

The present sensor applicator assembly for continuous blood glucose monitoring, comprising: the applicator in which the sensor module is inserted into the applicator and a separate detachable protective cap is coupled to the applicator such that external exposure is blocked when the sensor module is inserted into the applicator.

【Claim 3】

In Claim 2,

The present sensor applicator assembly for continuous blood glucose monitoring, wherein the adhesive tape and the release paper are attached to the body contact point of the sensor module so that the sensor module can be attached to the body and the releasable paper of the adhesive tape is separated from the adhesive tape together with the protective cap in the process of separating the protective cap from the applicator.

【Claim 4】

In Claim 2,

The present sensor applicator assembly for continuous blood glucose monitoring, comprising: the applicator that engages the sensor module when it is inserted inside and releases the coupled sensor module when it is ejected to the outside.

【Claim 5】

In Claim 3,

The present sensor module, comprising:

The pod part having an adhesive tape attached to its lower end so that it can be externally ejected by the

applicator and attached to the body, and having a connection terminal formed on one side so that said transmitter can be connected thereto;

The sensor part mounted inside the said pod part and inserted into the body to draw blood and measure glucose as the said pod part moves to the outside;

The PCB substrate disposed inside the said pod part to operationally control the said sensor part; and

The sensor applicator assembly for continuous blood glucose monitoring, comprising: a battery mounted on the PCB substrate to supply power, which allows the power to be supplied to the transmitter via the connection terminal with the transmitter connected thereto.

【Claim 6】

In Claim 5,

The present sensor module, which can be detachable from and coupled to the pod part, comprising:

The needle portion that surrounds a portion of the sensor part and is inserted into the body with the sensor part so that a portion of the sensor part is inserted into the body as the pod part moves outwardly;

The sensor applicator assembly for continuous blood glucose monitoring, characterized in that the applicator withdraws the needle portion from the body upon completion of the ejection movement of the pod part.

【Claim 7】

In Claim 6,

The present applicator, comprising:

The main case having a pressure button mounted on one side thereof for pressurization by a user; the plunger body coupled to the internal first position of the main case and, upon operation of the pressure button, being decoupled from the first position and moving linearly to the second position in discharging direction outside; and

The plunger elastic spring exerting an elastic force on the plunger body to cause the plunger body to move in a straight line from the first position to the second position;

The sensor applicator assembly for continuous blood glucose monitoring, characterized in that the sensor module is coupled to the plunger body and moves integrally with the plunger body.

【Claim 8】

In Claim 7,

The present main case, comprising:

The sensor applicator assembly for continuous blood glucose monitoring, characterized in that it comprises an outer case with the pressure button on one side, and an inner case coupled to an interior of the outer case and formed to guide a linear travel path of the plunger body.

【Claim 9】

In Claim 8,

The sensor applicator assembly for continuous blood glucose monitoring, characterized in that the outer case is coupled to a separate safety lock to prevent trigger by the pressure button, and the pressure button is configured to be triggered only when the safety lock is removed.

【Claim 10】

In Claim 8,

The sensor applicator assembly for continuous blood glucose monitoring, characterized in that the outer case has a return preventing hook formed therein to prevent the plunger body from moving back to the first position after linear movement to the second position.

【Claim 11】

In Claim 8,

The sensor applicator assembly for continuous blood glucose monitoring, characterized by: the sensor fixing hook is formed which is engaged with the sensor module to form a sensor fixing hook capable of engaging and fixing the sensor module; the sensor receiving portion is formed on a first end of the plunger body to receive a sensor module inserted therein; the sensor fixing hook on an edge of the sensor receiving portion which can be

coupled with the inserted sensor module to hold the sensor module in place;

The sensor applicator assembly for continuous blood glucose monitoring, characterized in that the inner case pressurizes the sensor fixing hook when the plunger body is in the first position so that the sensor fixing hook is engaged with the sensor module and releases the sensor fixing hook when the plunger body is moved to the second position so that the sensor fixing hook is disengaged with the sensor module.

【Claim 12】

In Claim 8,

The present applicator consists of

A sensor applicator assembly for continuous blood glucose monitoring, comprising:

A needle extraction body having a separate elastic hook coupled to the plunger body and moving linearly with the plunger body along the inner case from the first position to the second position, with an end portion which is engaged with one end of the needle portion; and

A needle-drawing elastic spring exerting an elastic force on the needle extraction body in the direction of the the needle extraction body moving back to the first position;

An inner case where needle withdrawing pressing portion is formed that pressurizes the elastic hook to disengage from the plunger body as the needle extraction body moves to the second position; and

A sensor applicator assembly for continuous blood glucose monitoring, characterized in that the needle portion is moved with the needle extraction body in the process of being moved back to the first position by the needle-drawing elastic springs and is withdrawn from the body.

【Abstract of Disclosure】**【Abstract】**

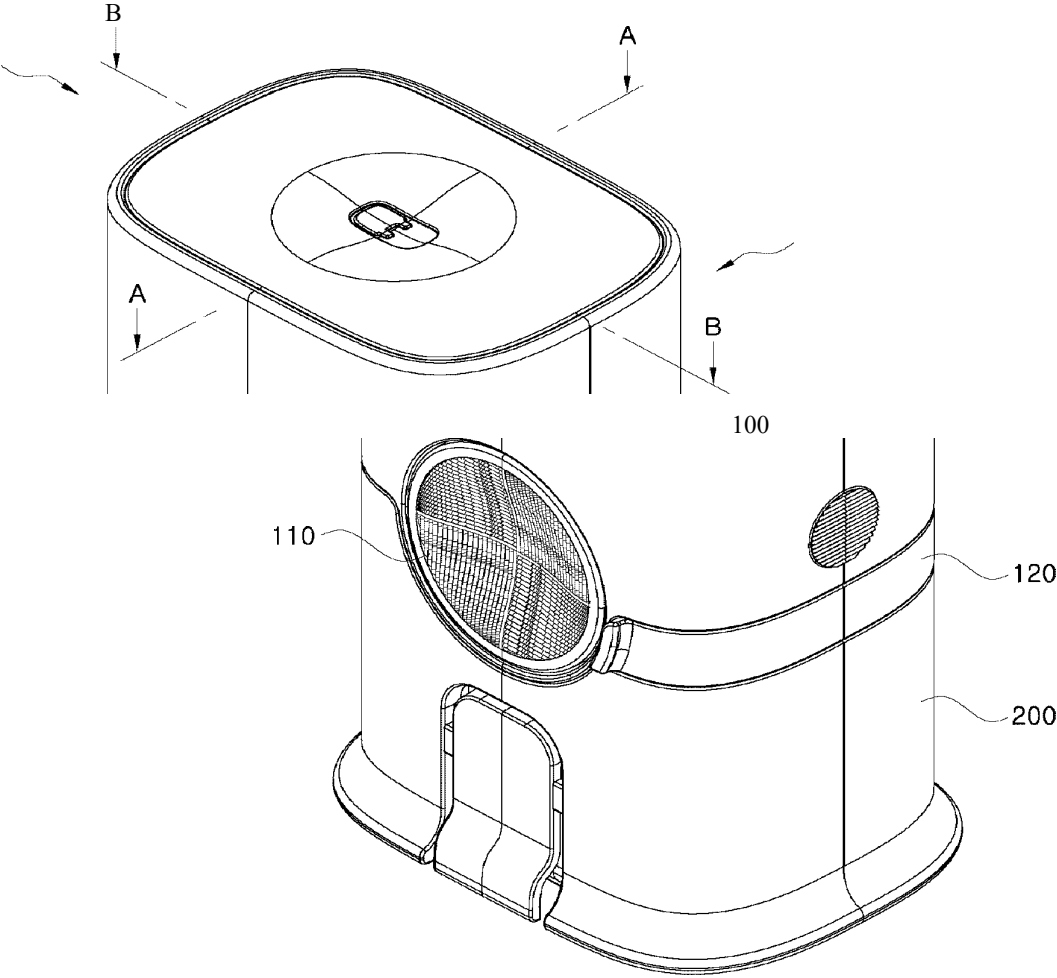
The present invention is related to a sensor applicator assembly for continuous blood glucose monitoring, wherein the sensor module is assembled within the applicator, thereby minimizing the additional work required by the user to attach the sensor module to the body by simply turning the applicator on and off. By embedding a battery in the sensor module and connecting a separate transmitter to the sensor module to power sensors, the transmitter can be used continuously and semi-permanently, which is economical, and the sensor module and applicator are disposable, which enables accurate and safe use, and provides an easily maintainable sensor applicator assembly for continuous glucose monitoring.

【Drawing】

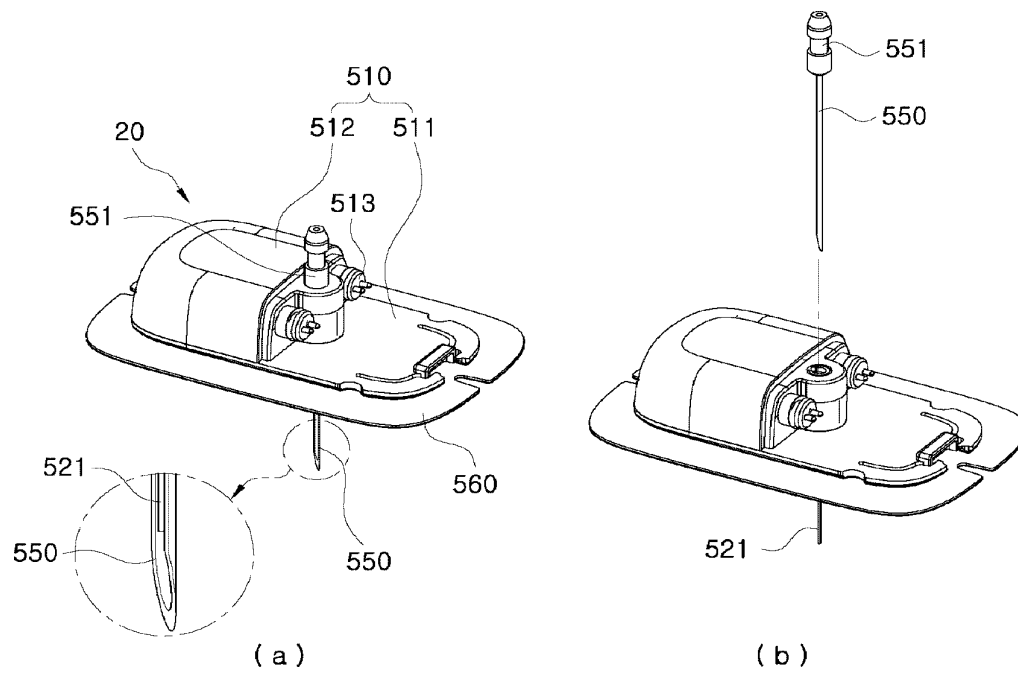
Figure 4

【Figure】

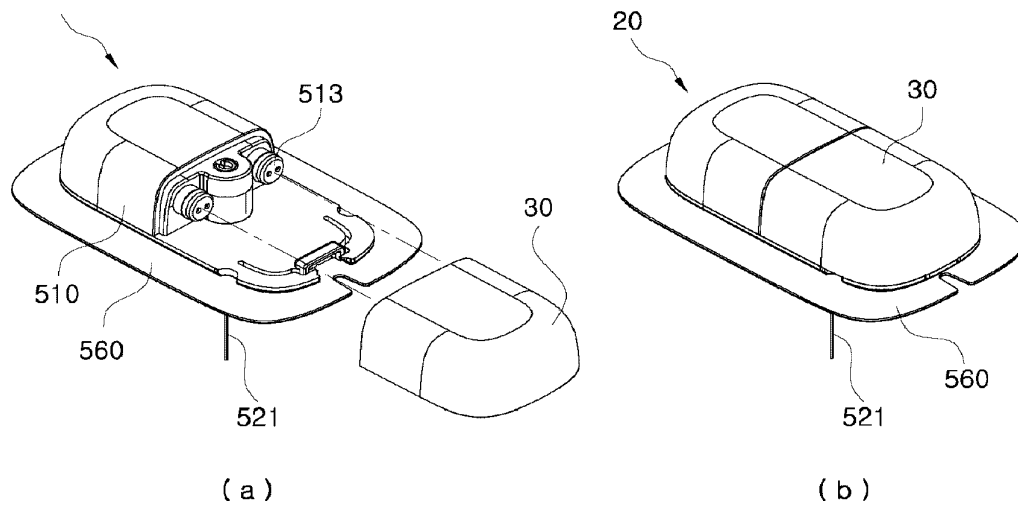
【Fig. 1】



【Fig. 2】



【Fig. 3】



【Fig. 4】

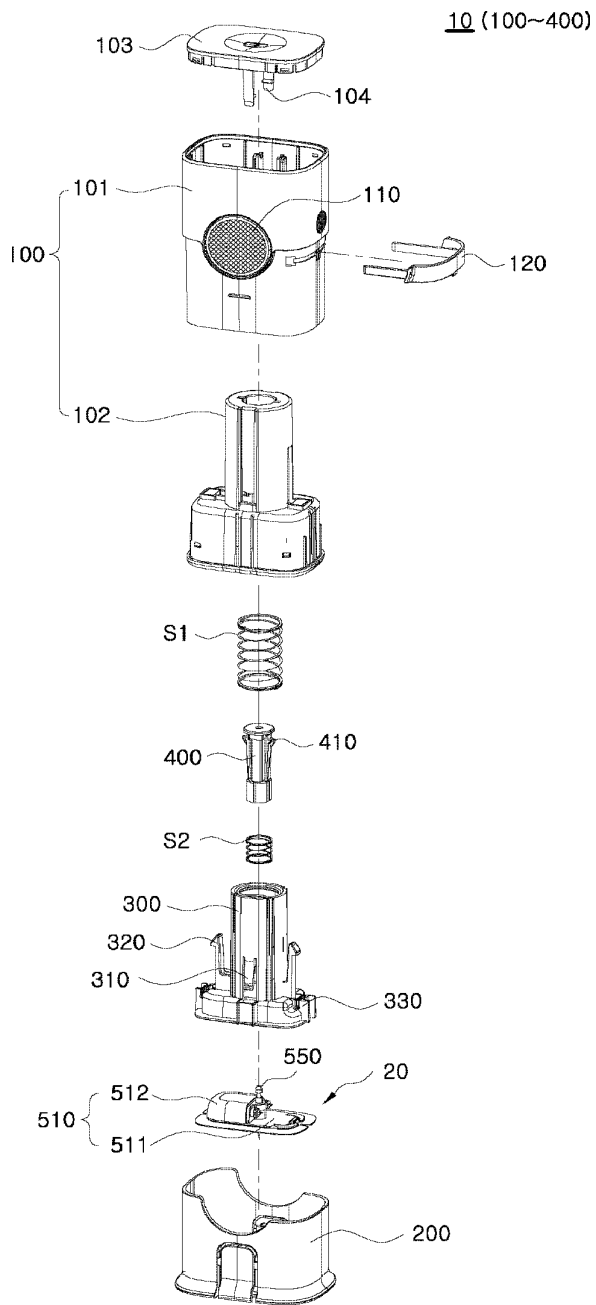


图 51

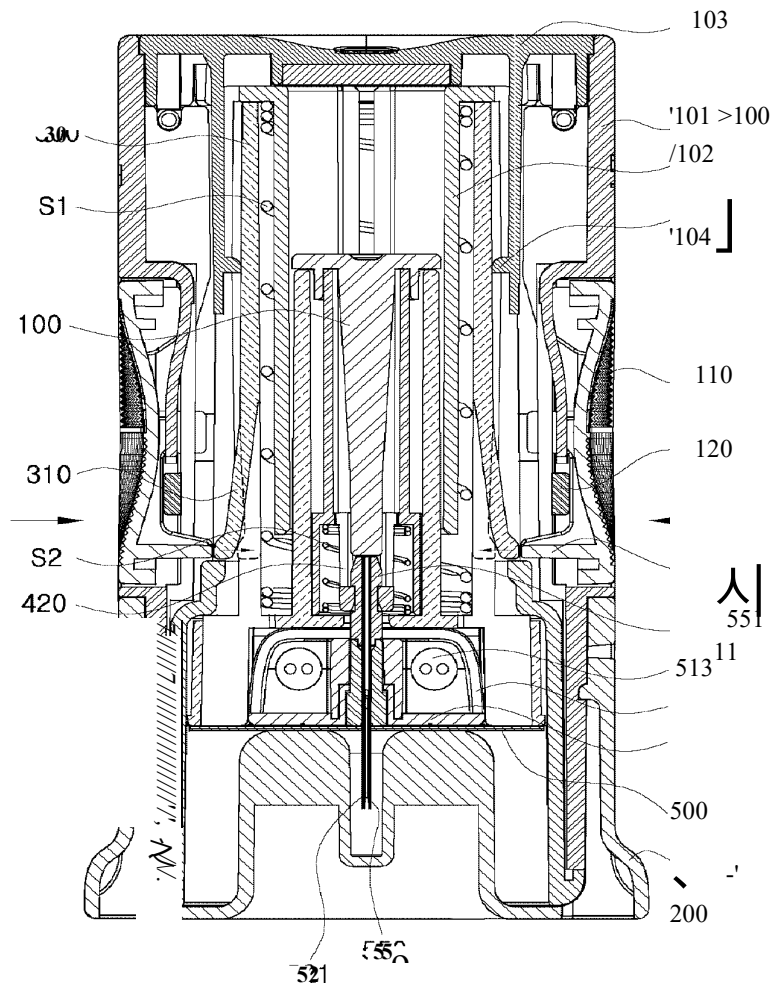
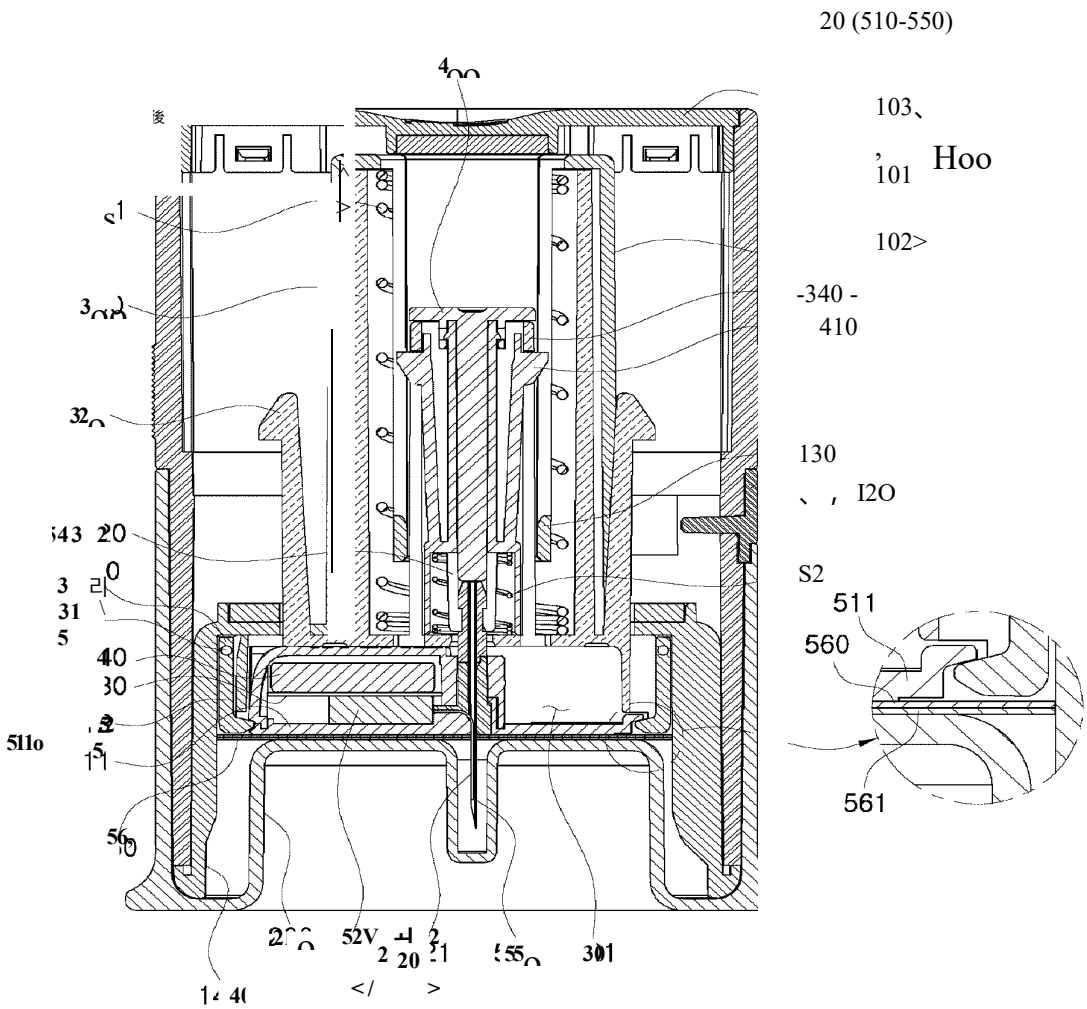
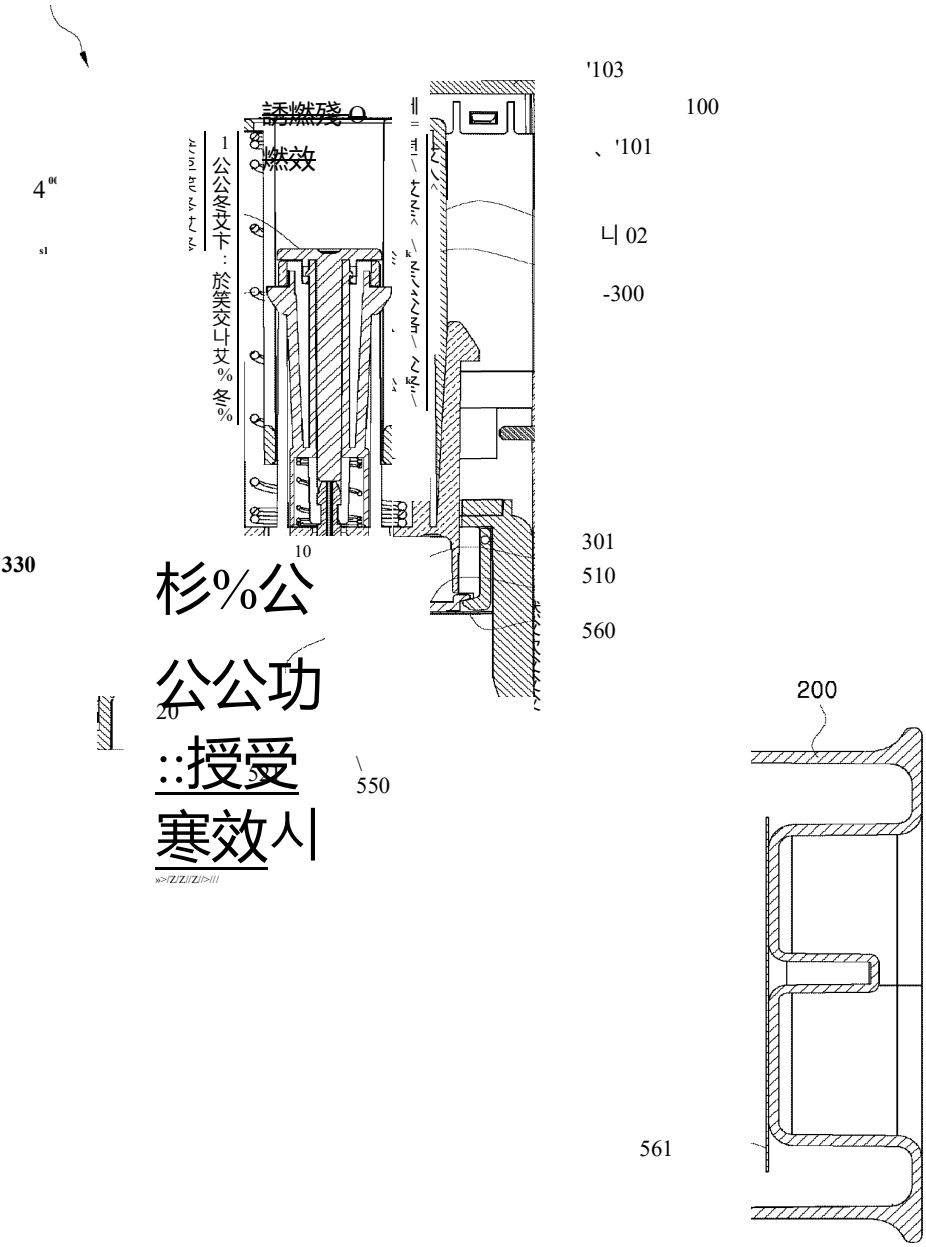


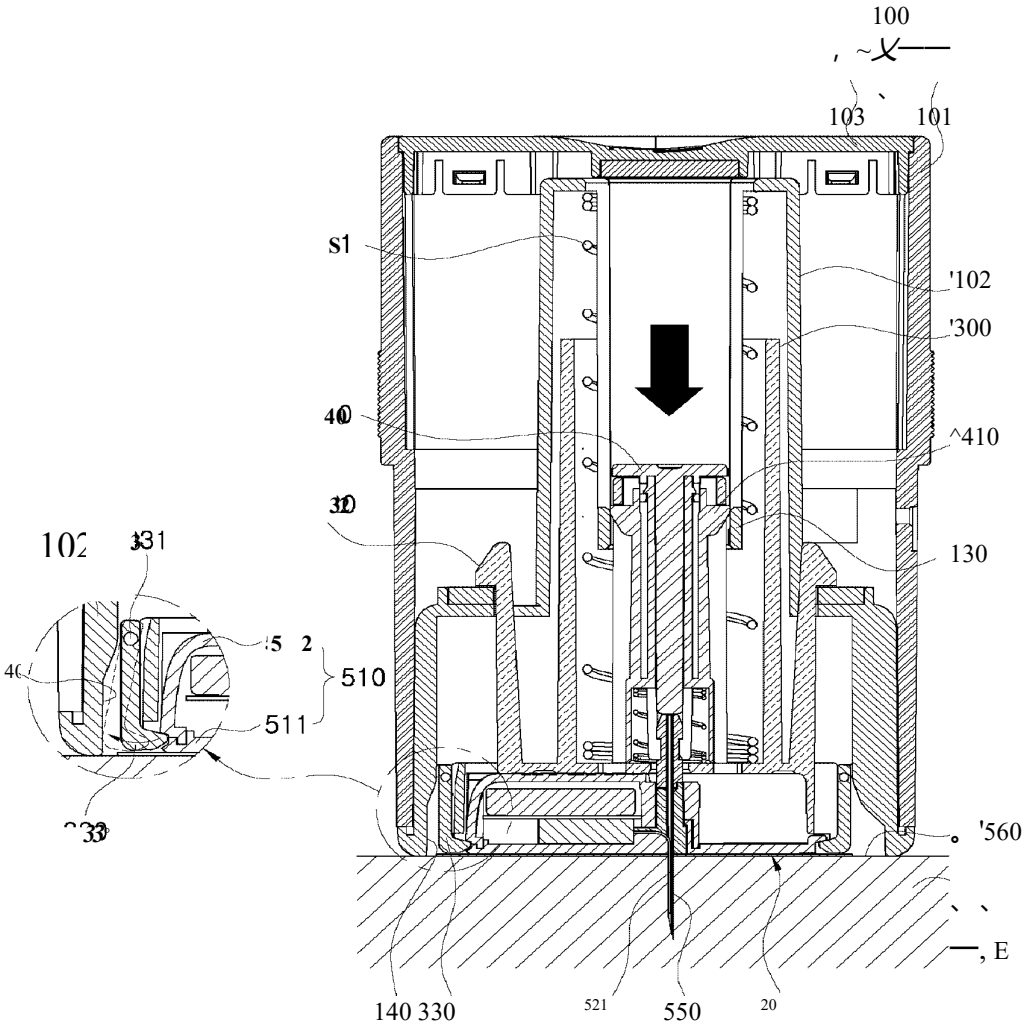
图 61



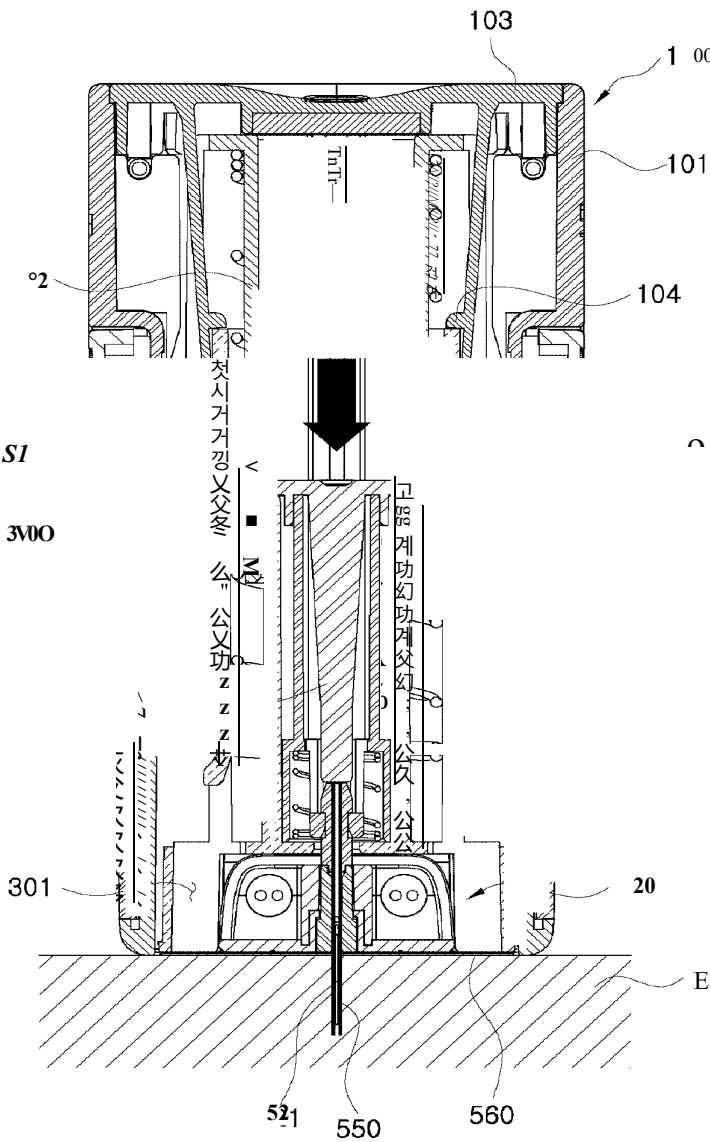
【Fig. 71



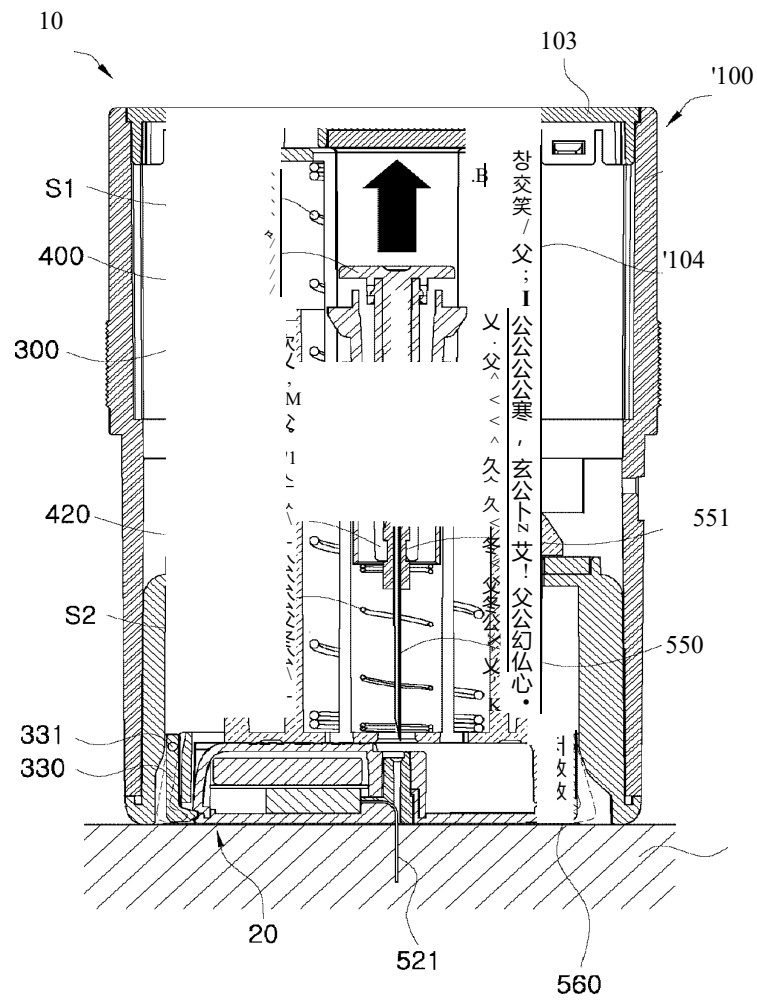
【Fig. 8a】



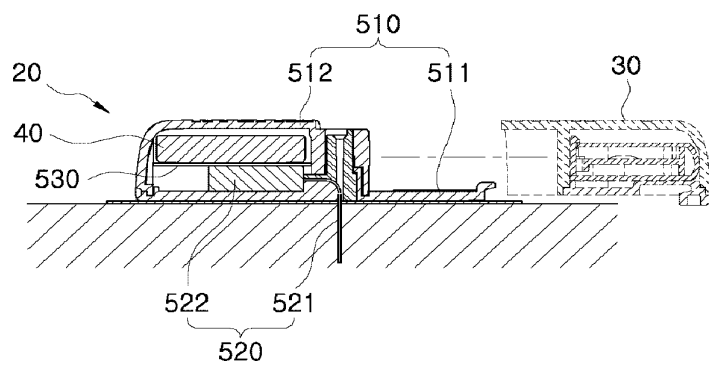
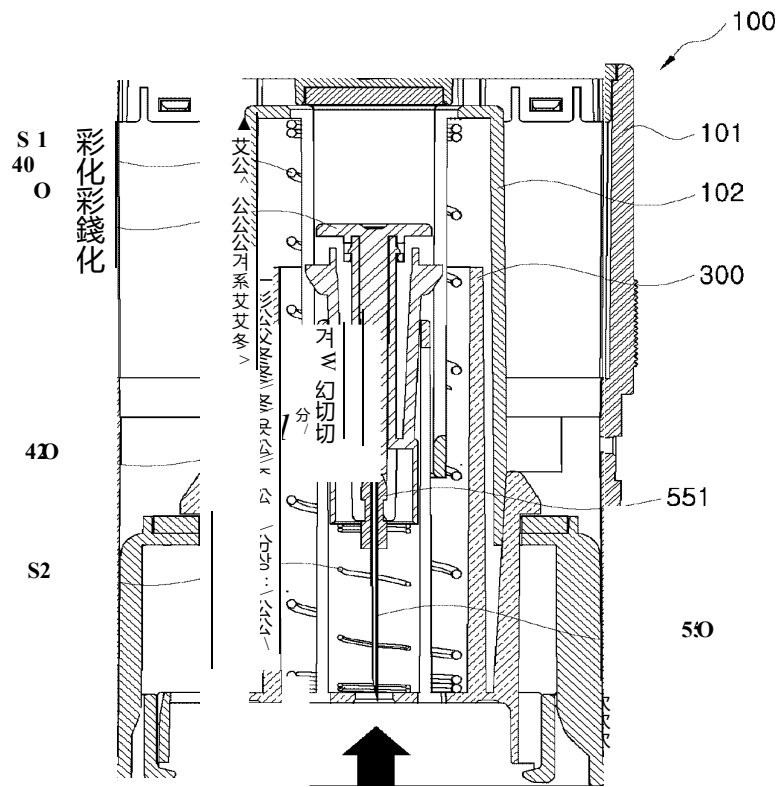
[Fig. 8b]



【Fig. 9】



【Fig. 10】





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