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(54) **PORTABLE REJUVENATING SKIN CARE APPARATUS**

(57) This invention provides a portable rejuvenating skin care apparatus, comprising: a function head configured to be in contact with the skin surface which is replaceable, a vibration module configured to vibrate the function head, a power module configured to supply energy to the vibration module, and a control module configured to control a vibration state of the vibration module; wherein the function head has a skin cleansing head configured to clean the skin surface and a skin rejuvenating head configured to generate a dioxide carbon in a gel; the portable rejuvenating skin care apparatus has a skin cleansing mode and a skin rejuvenating mode and is configured such that the skin cleansing head serves as the function head and moves over the skin surface to clean the skin surface when operating in the skin cleansing mode, and the skin rejuvenating head serves as the function head and contacts the skin surface smeared with a gel and generates carbon dioxide on the skin surface when operating in the skin rejuvenating mode, the gel comprises glycerol, water, escitalaria europaea extract, bilberry leaf extract, calendula extract, rhodiola root extract, grape seed extract, carbomer, and triethanolamine, the skin rejuvenating head is made of materials including sodium bicarbonate, water, centella asiatica extract, agnus stearate, glycerol, butylene glycol, rhodiola root extract, ginseng extract, grape seed extract, peony root extract, witch hazel extract, citric acid, acrylates, triethanolamine, xanthan gum, hydroxyethyl cellulose, p-hydroxyacetophenone, methyl paraben, phenoxyethanol, and CI16255 carmine pigment. Therefore, the skin of a

user can be cleaned, and high-concentration carbon dioxide can be generated on the skin surface in a certain environment to improve the condition of the skin of the user through the Bohr effect.



FIG. 1

Description**BACKGROUND OF INVENTION****Field of Invention**

[0001] This disclosure relates to a portable rejuvenating skin care apparatus.

Description of Related Art

[0002] Along with the improvement of living standard and the development of science and technology, the improved beauty caring and cosmetology are correspondingly required. Moreover, cell viability is reduced and the metabolism of skin slows down due to aging and environment deteriorating, as a result, problems such as dull and dry skin and coarse pore are easy to occur. It is known in the art to clean, lighten or rejuvenate facial skin by chemical treatment, laser treatment or by exfoliation of the epidermis using machine-driven means.

[0003] However, medical supervision is usually required and some risks including destructive side effects, pain and discomfort may occur during the treatment when using the method described above, and long recovery time is required after the treatment.

SUMMARY OF INVENTION

[0004] This disclosure has been put forward in view of the above-mentioned state of the prior art, and the object of this disclosure is to provide a portable rejuvenating skin care apparatus capable of effectively improving the skin condition while inhibiting damage to the skin.

[0005] Accordingly, an aspect of this invention provides a portable rejuvenating skin care apparatus, characterized by comprising: a replaceable functional head that is in contact with the skin surface, a vibration module that is provided inside the portable rejuvenating skin care apparatus and can vibrate the portable rejuvenating skin care apparatus, a power supply module that powers the vibration module, and a control module configured to control the vibration state of the vibration module, wherein the functional head has a skin cleansing head and a skin rejuvenating head, and the vibration module vibrates a hand-held part with a motor and an eccentric wheel; the portable rejuvenating skin care apparatus has a skin cleansing mode and a skin rejuvenating mode and is configured such that the functional head serves as the skin cleansing head and moves over the skin surface to clean when operating in the skin cleansing mode, and the functional head serves as the skin rejuvenating head that may contact the skin and generate carbon dioxide on the skin surface in a gel environment when operating in the skin rejuvenating mode.

[0006] In this invention, the portable rejuvenating skin care apparatus may have a replaceable functional head that is in contact with the skin surface, and the vibration

module that vibrates the portable rejuvenating skin care apparatus. Therefore, the skin of a user can be cleaned, and high-concentration carbon dioxide can be generated on the skin surface in a certain environment to improve the skin condition of the user through the Bohr effect.

[0007] Furthermore, in the portable rejuvenating skin care apparatus according to this invention, optionally, the motor is a miniature direct current motor, and the eccentric wheel is disposed on an output shaft of the miniature direct current motor. In this case, the vibration module may vibrate the portable rejuvenating skin care apparatus using the motor and the eccentric wheel.

[0008] Furthermore, in the portable rejuvenating skin care apparatus according to this invention, optionally, the portable rejuvenating skin care apparatus further includes a body shell, the body shell includes a functional part, and a hand-held part for holding and connected with the functional part, and the functional head is provided at the functional part. In this case, it is possible for the user to use the portable rejuvenating skin care apparatus by hand.

[0009] Furthermore, in the portable rejuvenating skin care apparatus according to this invention, optionally, the control module is an adjusting button provided in the body shell, and the vibration state includes a vibrating state and a static state. In this case, whether or not the vibration module vibrates can be adjusted by the control module.

[0010] Furthermore, in the portable rejuvenating skin care apparatus according to this invention, optionally, the vibration module is disposed in the body shell proximate the hand-held part. As such, the functional head of the portable rejuvenating skin care apparatus can be vibrated more properly.

[0011] Furthermore, in the portable rejuvenating skin care apparatus according to this invention, optionally, the portable rejuvenating skin care apparatus further includes a hand-held means formed by taking the body shell as a housing, and a base for placing the hand-held means. As such, the hand-held means can be placed on the base.

[0012] Furthermore, in the portable rejuvenating skin care apparatus according to this invention, optionally, the power supply module is a rechargeable power supply device, a receiving coil connected with the power supply module is provided in the hand-held means, the base is provided with a transmitting coil, and the transmitting coil and the receiving coil charge the battery wirelessly through magnetic energy coupling. As such, the portable rejuvenating skin care apparatus can be charged wirelessly.

[0013] Furthermore, in the portable rejuvenating skin care apparatus according to this invention, optionally, the portable rejuvenating skin care apparatus further includes a judgment module for controlling whether to perform charging, and the portable rejuvenating skin care apparatus further comprises a safety module for determining whether a shorted load exists. As such, the portable rejuvenating skin care apparatus can be used more

safely.

[0014] Furthermore, in the rejuvenating skin care apparatus according to this invention, optionally, the functional part is formed as a boss provided on the body shell, the boss having a socket for mounting the functional head. In this case, the functional head can be placed in the socket.

[0015] Furthermore, the rejuvenating skin care apparatus according to this invention further includes, optionally, a docking seat that is detachably provided in the socket and used for mounting the functional head. In this case, it can be more convenient to replace the functional head.

[0016] According to this invention, a portable rejuvenating skin care apparatus capable of effectively improving the skin condition and inhibiting damage to the skin can be provided.

BRIEF DESCRIPTION OF THE DRAWINGS

[0017] Embodiments of this disclosure will now be explained in further detail, by way of examples only, with reference to the accompanying drawings, wherein:

Fig. 1 is a schematic view showing an application scenario of a portable rejuvenating skin care apparatus according to an embodiment of this disclosure.

Fig. 2 is a schematic view showing a structure of the portable rejuvenating skin care apparatus according to an embodiment of this disclosure.

Fig. 3 is a schematic view showing a structure in which a docking base is separated from a function portion in the portable rejuvenating skin care apparatus according to an embodiment of disclosure.

Fig. 4 is a schematic view showing a structure of the portable rejuvenating skin care apparatus including a function head according to an embodiment of this disclosure.

Fig. 5 is a block diagram showing the structure of the portable rejuvenating skin care apparatus according to an embodiment of this disclosure.

Fig. 6 (6a and 6b) are schematic views showing a structure of a base according to an embodiment of this disclosure from different perspectives.

Fig. 7 is a schematic view showing a structure in which a hand-held means mates with the base according to an embodiment of this disclosure.

DETAILED DESCRIPTION

[0018] Hereinafter, this disclosure will be described in further detail with reference to the accompanying drawings and embodiments. In the drawings, the same reference numerals are used for the same parts or the parts having the same function to avoid repeated description.

[0019] This disclosure provides a portable rejuvenating skin care apparatus 1 (see Fig. 1 and Fig. 2). The portable rejuvenating skin care apparatus 1 according to

the embodiments of this disclosure can clean the skin of a user, generate high-concentration carbon dioxide in a certain environment so as to improve the skin condition of the user through Bohr effect, and the like.

[0020] Fig. 1 is a schematic view showing an application scenario of the portable rejuvenating skin care apparatus 1 according to an embodiment of this disclosure.

[0021] In some exemplary embodiments, the portable rejuvenating skin care apparatus 1 may be hand-held by

the user for use (see Fig. 1). The portable rejuvenating skin care apparatus 1 may be configured in a skin cleansing mode to clean the user's skin surface, or in a skin rejuvenating mode to generate carbon dioxide and effectively improve the skin condition during use of the portable rejuvenating skin care apparatus 1. Specifically,

when using the portable rejuvenating skin care apparatus 1, the user may hold the portable rejuvenating skin care apparatus 1 by hand, take the portable rejuvenating skin care apparatus 1 close to the skin surface to be treated (e.g., facial surface, etc.), and then perform cleansing on the skin surface. Moreover, a carbon dioxide may be generated on the skin surface to improve the skin condition by the portable rejuvenating skin care apparatus 1.

[0022] Fig. 2 is a schematic view showing a structure of the portable rejuvenating skin care apparatus 1 according to an embodiment of this disclosure. Herein, Fig. 2 (a) is a 3-dimension structure view of the portable rejuvenating skin care apparatus 1. Figs. 2 (b) and 2 (c) are 3-dimension structure views of the portable rejuvenating skin care apparatus 1 of Fig. 2(a) from two different perspectives, respectively. In an embodiment shown in Fig. 2, a detailed description of portable rejuvenating skin care apparatus 1 may be made based on an X-Y-Z orthogonal coordinate system (see Figs. 2 (a) and 2 (b)).

Herein, the X-axis may correspond to a horizontal left-right direction, the Y-axis may correspond to a horizontal front-rear direction, and the Z-axis may correspond to a vertical up-down direction. The Y-axis and the Z-axis may be orthogonal to the X-axis, respectively. In various cases, the X-axis may be shown leftwards or rightwards, the Y-axis may be shown frontwards or rearwards, and the Z-axis may be shown upwards or downwards.

[0023] In various embodiments of this disclosure, the shape of the main body housing 10 may not be so limited, and wherein the main body housing 10 may be generally shaped to facilitate holding. The main body housing 10 will be described in detail with reference to the accompanying drawings.

[0024] In some exemplary embodiments, the portable rejuvenating skin care apparatus 1 may comprise a main body housing 10 (see Fig. 1 and Fig. 2). In some exemplary embodiments, the main body housing 10 may comprise a function portion 120 and a hand-held portion 110 for use as a handle (see Fig. 2). Herein, the hand-held portion 110 may be connected with the function portion 120. In this case, the user can use the portable rejuvenating skin care apparatus 1 with hand holding.

[0025] In some exemplary embodiments, the main

body housing 10 may have a hollow structure. Specifically, the main body housing 10 may be formed as a hollow shell divided into a front shell 10a and a rear shell 10b. In some exemplary embodiments, the main body housing 10 may be generally elongated. In some exemplary embodiments, the front shell 10 has a certain curvature in a length direction (i.e., from top to bottom). That is, the length direction of the front shell 10a may not be parallel to the Z-axis. In some exemplary embodiments, the front shell 10a may be bent rearwards in the length direction. In some exemplary embodiments, a front surface of the front shell 10a may gradually narrow in the length direction. In this case, it can be convenient for user to hold the portable rejuvenating skin care apparatus 1 by hand.

[0026] In some exemplary embodiments, the rear shell 10b may be shaped and sized to match the front shell 10a. In some exemplary embodiments, the rear shell 10b and the front shell 10a are assembled together through a smooth transition therebetween. In some exemplary embodiments, the rear surface of the rear shell 10b may have a certain curvature in the length direction. In some exemplary embodiments, the curvature of the rear surface of the rear shell 10b in the length direction may be no greater than that of the front surface of the front shell 10a.

[0027] In some exemplary embodiments, the main body housing 10 may be made of a resin material such as PS757K ABS plastic through a molding process.

[0028] Fig. 3 is a schematic view showing a structure in which the docking base 123 is separated from the function portion 120 in the portable rejuvenating skin care apparatus 1 according to an embodiment of this disclosure. Fig. 4 is a schematic view showing the structure of the portable rejuvenating skin care apparatus 1 including a function head 122 according to an embodiment of this disclosure.

[0029] In some examples, as described above, the main body housing 10 may comprise a function portion 120 and a hand-held portion 110 for use as a handle.

[0030] In some exemplary embodiments, the function portion 120 may be disposed on an upper front surface of the front shell 10a (see Figs. 2 to 4). In some exemplary embodiments, the function portion 120 may be generally formed as a boss protruding out of the upper front surface of the front shell 10a. In some exemplary embodiments, the function portion 120 may be generally frustoconical.

[0031] In some exemplary embodiments, the function portion 120 may have a socket 121 (see Fig. 3 and Fig. 4) for mounting the function head 122. In some exemplary embodiments, the socket 121 may be a recess provided at the front surface of the function portion 120. In some exemplary embodiments, the socket 121 may be circular in shape. However, embodiments of this disclosure are not limited thereto, and in some exemplary embodiments, the shape of the socket 121 may be other shapes, for example, the shape of the socket 121 may be a regular shape such as a triangle, a quincunx or a polygon, and

may be an irregular shape.

[0032] In some exemplary embodiments, the function portion 120 may be used for mounting the function head 122 (see Fig. 4). In some exemplary embodiments, the function head 122 may be removably mounted to the socket 121 of the function portion 120.

[0033] In some exemplary embodiments, the socket 121 may be used directly to mount the function head 122 (not shown). In this case, the function head 122 may be disposed in the socket 121. The function head 122 may be shaped and sized to match the socket 121. For example, the shape of the function head 122 may be generally the same as the shape of the socket 121. In some exemplary embodiments, an outer diameter of the function head 122 may be no greater than an inner diameter of the socket 121. In other embodiments, if the function head 122 is an elastic member, the outer diameter of the function head 122 may be greater than the inner diameter of the socket 121. In this case, the function head 122 can be stably mounted to the socket 121.

[0034] In some exemplary embodiments, the portable rejuvenating skin care apparatus 1 may further comprise a docking base 123 (see Figs. 3 and 4). In some exemplary embodiments, the docking base 123 may be used to connect the function portion 120 with the function head 122. That is, the docking base 123 may be disposed between the function portion 120 and the function head 122. In some exemplary embodiments, the docking base 123 may be removably disposed in the socket 121. In some exemplary embodiments, the docking base 123 may be used to mount the function head 122. In this case, it can be more convenient to replace the function head 122.

[0035] In some exemplary embodiments, the docking base 123 may have a connecting part 1231 which may be disposed in the socket 121 (see Figs. 3 and 4). In some exemplary embodiments, the connecting part 1231 may be generally oblate cylindrical. In some exemplary embodiments, the connecting part 1231 may be shaped and sized to match to the socket 121. For example, the shape of the connecting part 1231 may be generally the same as the shape of the socket 121. In some exemplary embodiments, an outer diameter of the connecting part 1231 may be no greater than the inner diameter of the socket 121. In some exemplary embodiments, the connecting part 1231 may be removably disposed inside the socket 121. For example, the connecting part 1231 may be disposed inside the socket 121 through snapping or adhering.

[0036] In some exemplary embodiments, the docking base 123 may have a mounting part 1232 (see Figs. 3 and 4) for mounting the function head 122. In some exemplary embodiments, the mounting part 1232 may be generally oblate cylindrical. In some exemplary embodiments, the mounting part 1232 may be connected with the connecting part 1231. In some exemplary embodiments, the mounting part 1232 may be removably connected with the connecting part 1231. In other embodiments, the mounting part 1232 may be integrally formed with the

connecting part 1231. In some exemplary embodiments, an outer diameter of the mounting part 1232 may be no greater than an outer diameter of the docking base 123. However, the embodiments of the disclosure is not limited thereto, and the outer diameter of the mounting part 1232 may be greater than the outer diameter of the docking base 123.

[0037] In some exemplary embodiments, the connecting part 1231 may be closer to the function portion 120 than the mounting part 1232. In some exemplary embodiments, the function head 122 may be removably disposed on the mounting part 1232.

[0038] In some exemplary embodiments, the mounting part 1232 may have a recess that mates with the function head 122. In some exemplary embodiments, the inner diameter of the socket may match the inner diameter of the function head 122. In this case, the function head 122 may be mounted within the recess (not shown).

[0039] In other exemplary embodiments, the function head 122 may have a recess that mates with the mounting part 1232. In some exemplary embodiments, the inner diameter of the recess may match the outer diameter of the mounting part 1232. In some exemplary embodiments, snap-fit features may be provided on the outer periphery of the mounting part 1232. In some exemplary embodiments, the function head 122 may be mounted on the docking base 123 in a way of shielding the mounting part 1232 (see Figs. 3 and 4).

[0040] In some exemplary embodiments, the function head 122 may be provided in such a manner as to protrude forwards with respect to the front surface of the function portion 120 or the front surface of the docking base 123 (see Figs. 3 and 4). In other embodiments, the function head 122 may be configured to lie flat with the front surface of the function portion 120 or the front surface of the docking base 123.

[0041] In some exemplary embodiments, the function head 122 may have a skin cleansing head for cleansing the skin and a skin rejuvenating head for rejuvenating the skin.

[0042] In some exemplary embodiments, the skin cleansing head may be a silicone sheet. In the embodiments of this disclosure, when the skin cleansing head serves as the function head 122, the user may apply a skin cleaning liquid such as facial cleanser to the skin to be treated, and then contact the skin cleansing head with the skin to clean the skin.

[0043] In some exemplary embodiments, the skin rejuvenating head may react in a gel to generate carbon dioxide. In some exemplary embodiments, the skin rejuvenating head is made of materials including sodium bicarbonate, water, centella asiatica extract, magnesium stearate, glycerol, butylene glycol, rhodiola root extract, ginseng extract, grape seed extract, peony root extract, witch hazel extract, citric acid, acrylates, triethanolamine, xanthan gum, hydroxyethyl cellulose, p-hydroxyacetophenone, methyl paraben, phenoxyethanol, and CI16255 carmine pigment. In this case, the skin rejuvenating head can be made of the above materials.

[0044] In some exemplary embodiments, the gel may include glycerol, water, escitalaria europaea extract, bilberry leaf extract, calendula extract, rhodiola root extract, grape seed extract, carbomer, and triethanolamine. In this case, the gel can react with the skin rejuvenating head to generate carbon dioxide without adversely affecting the skin of the user or the like. However, embodiments of this disclosure are not limited thereto, and in some exemplary embodiments, the skin rejuvenating head and the gel may be made of other materials capable of reacting to generate carbon dioxide without adversely affecting the skin.

[0045] In the embodiments of this disclosure, when the skin rejuvenating head serves as the function head 122, the user may apply the gel to the skin to be treated, and then contact the skin rejuvenating head with the skin to treat the skin, and carbon dioxide may be generated on the skin surface. In this case, on the one hand, the generated carbon dioxide will lead to the Bohr effect which promotes the entry of oxygen in the capillaries into the tissue, the oxygen content in the cells will increase, the capillaries will expand, more oxygen will be supplied, and the metabolism of the cells will be promoted; on the other hand, the generated carbon dioxide can generate carbonic acid on the skin surface after meeting water, so that the cutin may be effectively removed. In this way, the skin can be effectively cared.

[0046] In some exemplary embodiments, the function head 122 may be removably mounted in a snap-fit or adhesive manner, or the like. In this case, the user can select an appropriate function head 122 to use according to the actual situation.

[0047] In some exemplary embodiments, as described above, the main body housing 10 may also include a hand-held portion 110 for use as a handle. In some exemplary embodiments, the hand-held portion 110 may be elongated. In some exemplary embodiments, the main body housing 10 other than the function portion 120 may be all regarded as the hand-held portion 110. In some exemplary embodiments, the hand-held portion 110 may be formed as a hollow shell.

[0048] Fig. 5 is a block diagram showing the structure of the portable rejuvenating skin care apparatus 1 according to an embodiment of this disclosure.

[0049] In some exemplary embodiments, the portable rejuvenating skin care apparatus 1 may further include a vibration module 111 (see Fig. 5). In some examples, the vibration module 111 may be disposed within the hollow shell of the main body housing 10. In some exemplary embodiments, the vibration module 111 may be disposed within the main body housing 10 proximate to the hand-held portion 110. In this way, the portable rejuvenating skin care apparatus 1 can be better vibrated. In other embodiments, the vibration module 111 may be disposed in the main body housing 10 proximate to the function part 120. In some exemplary embodiments, the vibration module 111 may include a motor and an eccentric wheel

(not shown). In some exemplary embodiments, the motor may be a miniature direct current (DC) motor. The eccentric wheel can be disposed on an output shaft of the miniature DC motor. In some exemplary embodiments, the vibration module 111 may be in contact with the main body housing 10. In some exemplary embodiments, the main body housing 10 may vibrate when the vibration module 111 is in an operating state (i.e., when in vibration), and the function head 122 may be vibrated along with the main body housing 10. In this case, the vibration module 111 may vibrate the portable rejuvenating skin care apparatus 1 with the motor and the eccentric wheel.

[0050] In some exemplary embodiments, the portable rejuvenating skin care apparatus 1 further includes a control module 112 (see Fig. 5) for controlling the vibration module 111. In some exemplary embodiments, the control module 112 may control the vibration state of the vibration module 111. Herein, the vibration state may include a vibrating phase and a static phase. That is, the control module 112 may control whether to operate the vibration module 111 or not. In some exemplary embodiments, the control module 112 may be an adjusting button disposed on the main body housing 10 (see Fig. 2). Specifically, the control module 112 may be a mechanical switch having mechanical contacts. Alternatively, the control module 112 may be an electronic switch that detects finger contact and switches electronically. For example, a window may be provided on the front surface of the front shell 10a for mounting the control module 112. The control module 112 may be a button switch. The control module 112 may be mounted at the window in such a manner that the control module 112 can be pressed back and forth. In this case, it is possible to adjust whether to operate the vibration module 111 or not by pressing the control module 112, for example, to control whether to connect the power module 113 with the vibration module 111 or not by pressing the control module 112. In some exemplary embodiments, before the vibration module 111 starts operating, i.e., starting from the static phase, the user may switch the vibration module 111 to an operating mode, i.e., to the vibrating phase, by pressing the adjusting button. After the vibration module 111 starts to operate, the user may also turn off the vibration module 111 by pressing the adjusting button.

[0051] In other exemplary embodiments, the control module 112 may also be used to control the vibration frequency of the vibration module 111. In this case, the control module 112 may be an adjusting button provided on the main body housing 10 and a control unit provided inside the body shell 10. In some exemplary embodiments, the control unit may be caused to control and adjust the vibration frequency of the vibration module 111 by adjusting the adjusting button. For example, before the vibration module 111 starts operating, i.e., starting from the static phase, the user may switch the vibration module 111 to the operating mode, i.e., to the vibrating phase, by long pressing the adjusting button. In some exemplary embodiments, a plurality of different levels

may be set for the operating mode. Different levels may correspond to different vibration frequencies at which vibration module 111 vibrates. For example, the plurality of different levels may include a high level, a medium level, and a low level, respectively. Among them, the high level means that the vibration module 111 vibrates at a high vibration frequency. The high level corresponds to a relatively higher vibration frequency at which the vibration module 111 vibrates, followed by the medium level,

5 and the low level. In some exemplary embodiments, after the vibration module 111 starts operating, the user may cause the vibration module 111 to vibrate at different vibration frequencies by briefly pressing the adjusting button. In some exemplary embodiments, after the vibration module 111 starts operating, the user may also turn off the vibration module 111 by long pressing the adjusting button.

[0052] In some exemplary embodiments, the portable rejuvenating skin care apparatus 1 further includes a 10 power module 113 for supply power. In some exemplary embodiments, the power module 113 may be a battery or other power supply devices. In some exemplary embodiments, the power module 113 may be disposed within the main body housing 10.

[0053] In some exemplary embodiments, the power module 113 may be a rechargeable power supply. For example, the power module 113 may be a rechargeable lithium battery. In some exemplary embodiments, the power module 113 may be charged wirelessly. For example, a receiving coil connected to the power supply module 113 may be provided in the main body housing 10. And the portable rejuvenating skin care apparatus 1 further has a base 20 (described in more detail below) including a transmitting coil. The transmitting coil and the receiving coil may charge the power supply module 113 wirelessly through magnetic energy coupling. In this way, the portable rejuvenating skin care apparatus 1 can be charged wirelessly.

[0054] In other exemplary embodiments, the power module 113 may be charged in a wired manner. For example, the portable rejuvenating skin care apparatus 1 may also have a charging port for connecting an external power source and charging the power module 113.

[0055] In other exemplary embodiments, the power supply module 113 may be a power interface connected with an external power source which is enabled to power the portable rejuvenating skin care apparatus 1. In this way, the external power source is enabled to directly power the portable rejuvenated skin care apparatus 1.

[0056] In some exemplary embodiments, the portable rejuvenating skin care apparatus 1 may also have a determination module 114 for controlling whether to perform charging or not. In some exemplary embodiments, the determination module 114 may be disposed within the main body housing 10. In some exemplary embodiments, the determination module 114 may be connected with the power module 113. In some exemplary embodiments, the determination module 114 may detect power

information of the power supply module 113. If the power amount is smaller than a first threshold value, a charging circuit of the power module 113 is not influenced, and the power module 113 can be charged; if the power amount is greater than a second threshold, the charging circuit of the power supply module 113 may be opened. In this way, the portable rejuvenating skin care apparatus 1 can be used more safely.

[0057] In some exemplary embodiments, the first threshold value and the second threshold value may be determined by those skilled in the art on the basis of the maximum capacity of power of the power module 113 and the minimum power required to drive the portable rejuvenating skin care apparatus 1 into normal operation. In some exemplary embodiments, the first threshold value may be smaller than the second threshold value.

[0058] In some exemplary embodiments, the portable rejuvenating skin care apparatus 1 may also have a safety module 115. In some exemplary embodiments, the safety module 115 may be connected to the power module 113. In some exemplary embodiments, the safety module 115 may be used to determine whether a shorted load exists or not. For example, the safety module 115 may determine whether a load connected to the power module 113 is shorted or the like from the magnitude of the current or not. In some exemplary embodiments, if a short circuit occurs, the safety module 115 may disable the portable rejuvenating skin care apparatus 1, for example, by disabling the output from the power module 113. In this way, the portable rejuvenating skin care apparatus 1 can be used more safely.

[0059] In some exemplary embodiments, the portable rejuvenating skin care apparatus 1 also includes a rotation module 116. In some exemplary embodiments, the rotation module 116 may be a miniature DC motor. The rotation module 116 has a rotatable shaft. In some exemplary embodiments, the rotation module 116 may be disposed inside the main body housing 10. In some exemplary embodiments, the docking base 123 may be partially mounted within the socket 121. The docking base 123 is rotatable with respect to the socket 121. In some exemplary embodiments, the docking base 123 may be connected with the rotatable shaft of the rotation module 116 and may rotate within the socket 121 along with the rotation shaft.

[0060] In some exemplary embodiments, the function head 122 may be mounted on the docking base 123 and may rotate with the docking base. In this way, the skin care effect of the portable rejuvenating skin care apparatus 1 can be improved.

[0061] Fig. 6 is a schematic view showing a structure of the base 20 according to an embodiment of this disclosure from different perspectives. Fig. 7 is a schematic view showing a structure in which a hand-held means 10' mates with the base 20 according to an embodiment of this disclosure. Fig. 7 (a) is a schematic view of the hand-held means 10' separated from the base 20. Fig. 7 (b) is a schematic view of the hand-held means 10'

secured to the base 20.

[0062] In the embodiment according to this disclosure, the shape of the base 20 may not be so limited, wherein the base 20 may be formed in a shape for placing the hand-held means 10'. Description will now be made in detail to the embodiments of the base 20 in accordance with the accompanying drawings.

[0063] In some exemplary embodiments, the portable rejuvenating skin care apparatus 1 may also have the base 20 for mating with the main body housing 10 (see Figs. 6 and 7). In this case, the portable rejuvenating skin care apparatus 1 may include the hand-held means 10' having the main body shell 10 as a shell, and the base 20 for placing the hand-held means 10'. Herein, the user can hold the hand-held means 10' by hand to clean or rejuvenate the skin. In this way, the hand-held means 10' can be placed on the base 20.

[0064] In some exemplary embodiments, the base 20 may be generally cylindrical. In some exemplary embodiments, an end face 20a proximate the hand-held means 10' may be no larger than an end face 20b distal to the hand-held means 10'. In some exemplary embodiments, a smooth transition may be formed between the end face 20a and the end face 20b to form the base 20.

[0065] In some exemplary embodiments, the end face 20a has a certain curvature in the horizontal direction. In some exemplary embodiments, the end face 20a may have a recess 21. In some exemplary embodiments, the shape of the recess 21 may match the shape of the front shell 10a. In some exemplary embodiments, the recess 21 may also have a receiving part 211 for receiving the function portion 120 and the docking seat 123. In some exemplary embodiments, the receiving part 211 may be formed as a through-hole vertically penetrating the base 20. In some exemplary embodiments, the hand-held means 10' may be positioned laterally within the recess 21 of the base 20 with the front shell 10a facing the base 20. In some exemplary embodiments, the front shell 10a may be placed completely or partially within the recess 21. In some exemplary embodiments, the function head 122 may be removed prior to placing the hand-held means 10' on the base 20. In other exemplary embodiments, the hand-held means 10' may be placed on the base 20 with the functional head 122 mounted thereon.

[0066] In some exemplary embodiments, when the hand-held means 10' is placed on the base 20, the transmitting coil and receiving coil may be correspondingly arranged in parallel. In this way, the power module 113 can be better charged. However, the embodiments of this disclosure are not limited thereto, and when the hand-held means 10' is placed on the base 20, the transmitting coil and receiving coil may be correspondingly arranged otherwise.

[0067] In some exemplary embodiments, the base 20 may have a power interface 22 in communication with the external power source. In some exemplary embodiments, the hand-held means 10' may be placed on the base 20 and the power interface 22 is connected to the

external power source via a power cable to charge the power supply module 113. In this case, the transmitting coil can be energized, together with the receiving coil, to further wirelessly charge the power module 113 through magnetic energy coupling.

[0068] In some exemplary embodiments, the power module 113 may also be disposed within the base 20, and the base 20 may be connected to the hand-held means 10' via a transmission cable to supply power to the hand-held means 10'.

[0069] Hereinafter, a method for using the portable rejuvenating skin care apparatus 1 according to embodiments of this disclosure will be described in detail with reference to the accompanying drawings.

[0070] In some exemplary embodiments, as described above, the portable rejuvenating skin care apparatus 1 may have a skin cleansing mode and a skin rejuvenating mode.

[0071] In some exemplary embodiments, the user may hold the portable rejuvenating skin care apparatus 1 by hand and may clean or rejuvenate the skin by using a skin cleansing head or skin rejuvenating head as the function head 122.

[0072] In some exemplary embodiments, when the portable rejuvenating skin care apparatus 1 is in the skin cleansing mode, the user may select the skin cleansing head as the function head 122 and may hold the portable rejuvenating skin care apparatus 1 by hand with the function head 122 in contact with the skin to be treated to clean the skin.

[0073] Specifically, when the portable rejuvenating skin care apparatus 1 is in the skin cleansing mode, the user can replace with the skin cleansing head as the function head 122, apply a cleansing liquid such as facial cleanser to the skin surface to be treated, enable the vibration module 111 to operate by adjusting the control module 112 (for example, pressing the adjusting button), and then contact the skin cleansing head with the skin surface while keeping the skin cleansing head moving continuously and spirally in the skin area. In this case, a better skin care effect for the portable rejuvenating skin care apparatus 1 can be rendered.

[0074] In some exemplary embodiments, when the portable rejuvenating skin care apparatus 1 is in the skin rejuvenating mode, the user may select the skin rejuvenating head as the function head 122 and may hold the portable rejuvenating skin care apparatus 1 by hand with the function head 122 in contact with the skin to be treated to perform skin caring.

[0075] Specifically, when the portable skin-rejuvenating skin care apparatus 1 is in the skin rejuvenating mode, the user can replace with skin rejuvenating head as the function head 122, apply a gel or the like to the skin surface to be treated, enable the vibration module 111 to operate by adjusting the control module 112 (for example, pressing the adjusting button), and then contact the skin rejuvenating head with the skin surface while keeping the skin rejuvenating head moving continuously and

spirally in the skin area. In this way, the skin rejuvenating head can more fully react with the gel and generate carbon dioxide on the skin surface. In this case, on the one hand, the generated carbon dioxide will lead to the Bohr effect which promotes the entry of oxygen in the capillaries into the tissue, the oxygen content in the cells will increase, the capillaries will expand, more oxygen will be supplied, and the metabolism of the cells will be promoted; on the other hand, the generated carbon dioxide can

5 generate carbonic acid on the skin surface after meeting water, so that the cutin can be effectively removed. As such, this enables effective care of the skin.

[0076] In some exemplary embodiments, the user may first set the portable rejuvenating skin care apparatus 1 to clean the skin to be treated in the skin cleansing mode when using a portable rejuvenating skin care apparatus 1. The portable rejuvenating skin care apparatus 1 is then set to perform skin caring in the rejuvenating mode to improve the skin condition.

[0077] Although the present disclosure has been described in detail with reference to the accompanying drawings and embodiments, it should be understood that the above description does not limit the present disclosure in any form. The present disclosure may be modified and changed as needed by those skilled in the art without departing from the spirit and scope of the present disclosure, and such modifications and variations are within the scope of the present disclosure.

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Claims

1. A portable rejuvenating skin care apparatus, characterized by comprising:

35 a function head configured to be in contact with the skin surface which is replaceable, a vibration module configured to vibrate the function head, a power module configured to supply energy to the vibration module, and a control module configured to control a vibration state of the vibration module;

40 wherein the function head has a skin cleansing head configured to clean the skin surface and a skin rejuvenating head configured to generate a dioxide carbon in a gel;

45 the portable rejuvenating skin care apparatus has a skin cleansing mode and a skin rejuvenating mode and is configured such that the skin cleansing head serves as the function head and moves over the skin surface to clean the skin surface when operating in the skin cleansing mode,

50 and the skin rejuvenating head serves as the function head and contacts the skin surface smeared with a gel and generates carbon dioxide on the skin surface when operating in the skin rejuvenating mode,

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the gel comprises glycerol, water, escitalaria europaea extract, bilberry leaf extract, calendula extract, rhodiola root extract, grape seed extract, carbomer, and triethanolamine, the skin rejuvenating head is made of materials including sodium bicarbonate, water, centella asiatica extract, magnesium stearate, glycerol, butylene glycol, rhodiola root extract, ginseng extract, grape seed extract, peony root extract, witch hazel extract, citric acid, acrylates, triethanolamine, xanthan gum, hydroxyethyl cellulose, p-hydroxyacetophenone, methyl paraben, phenoxyethanol, and CI16255 carmine pigment.

2. The portable rejuvenating skin care apparatus according to claim 1, **characterized in that:** the vibration module comprises a motor and an eccentric wheel, wherein the motor is a miniature direct current motor, and the eccentric wheel is disposed on an output shaft of the miniature direct current motor.
3. The portable rejuvenating skin care apparatus according to claim 1, **characterized in that:** the portable rejuvenating skin care apparatus further comprises a main body housing, wherein the main body housing comprises a function portion and a hand-held portion connected with the function portion for hand-holding, and the function head is disposed on the function portion.
4. The portable rejuvenating skin care apparatus according to claim 3, **characterized in that:** the control module is an adjusting button provided on the main body housing.
5. The portable rejuvenating skin care apparatus according to claim 3, **characterized in that:** the vibration module is disposed inside the main body housing and proximate to the hand-held portion.
6. The portable rejuvenating skin care apparatus according to claim 3, **characterized in that:** the portable rejuvenating skin care apparatus further comprises a hand-held means formed by taking the main body housing as a shell, and a base for placing the hand-held means.
7. The portable rejuvenating skin care apparatus according to claim 6, **characterized in that:** the power module is a rechargeable energy supply, wherein the hand-held means is provided with a receiving coil connected with the power module, the base is provided with a transmitting coil, and the transmitting coil and the receiving coil charge the power module wirelessly through magnetic energy

coupling.

8. The portable rejuvenating skin care apparatus according to claim 7, **characterized in that:** the portable rejuvenating skin care apparatus further comprises a determination module for controlling whether to perform charging or not, and the portable rejuvenating skin care apparatus further comprises a safety module for determining whether a short circuit exists or not.
9. The portable rejuvenating skin care apparatus according to claim 3, **characterized in that:** the function portion has a socket for mounting the function head.
10. The portable rejuvenating skin care apparatus according to claim 9, **characterized by** further comprising: a docking base which is removeably provided inside the socket and configured for mounting the function head.
11. The portable rejuvenating skin care apparatus according to claim 3, **characterized in that:** the function head is arranged to protrude forwards with respect to a front surface of the function portion.
12. The portable rejuvenating skin care apparatus according to claim 10, **characterized in that:** further comprises a rotation module connected with the docking base and configured to rotate the docking base.
13. The portable rejuvenating skin care apparatus according to claim 10, **characterized in that:** the docking base has a connecting part configured to be disposed in the socket and a mounting part for mounting the function head, wherein the connecting part is connected with the mounting part.
14. The portable rejuvenating skin care apparatus according to claim 13, **characterized in that:** the mounting part has a groove matching with the function head, wherein the function head is mounted within the groove.
15. The portable rejuvenating skin care apparatus according to claim 9, **characterized by** further comprising: the function head has a groove matching with mounting part and the mounting part is provided with snap-fit features on an outer periphery, wherein the function head is mounted on the docking base by way of shielding the mounting part.



FIG. 1

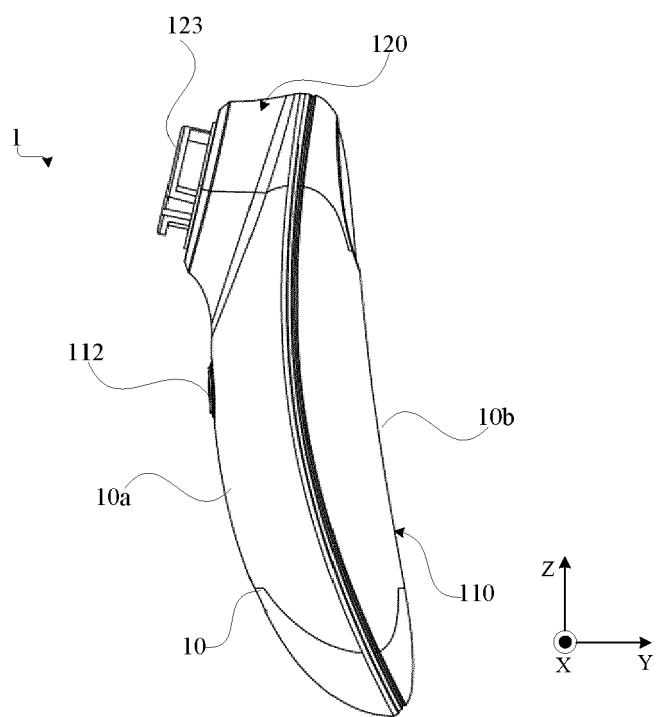


FIG. 2 (a)

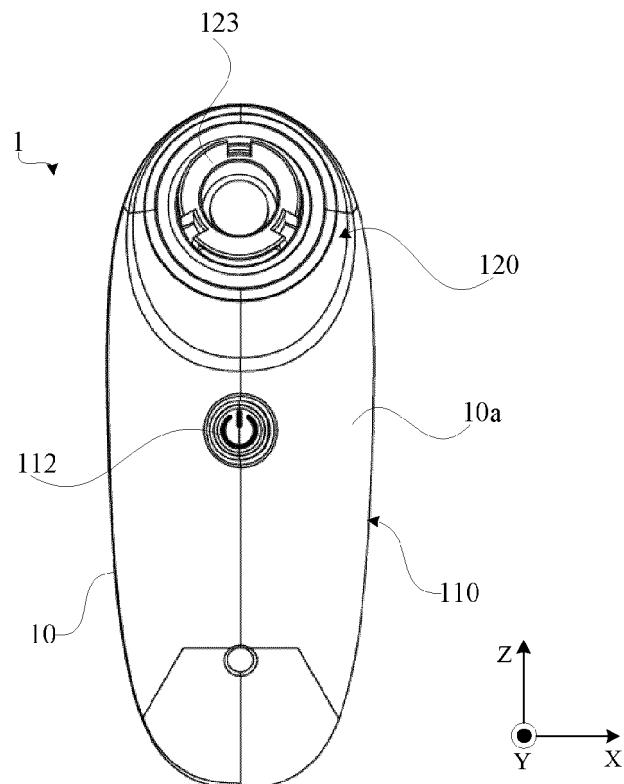


FIG. 2 (b)

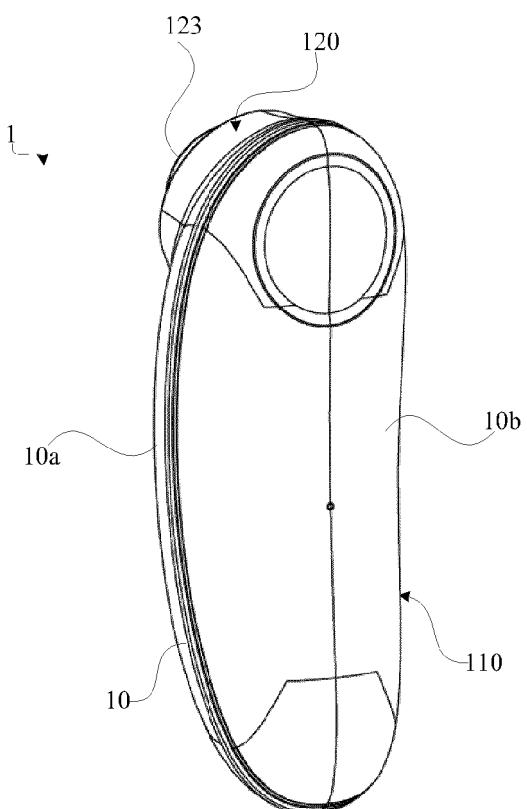


FIG. 2 (c)

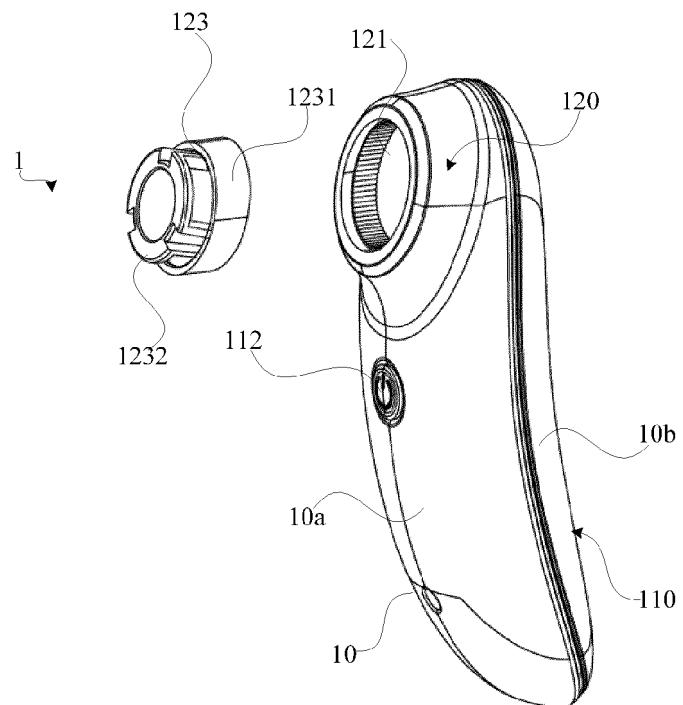


FIG. 3

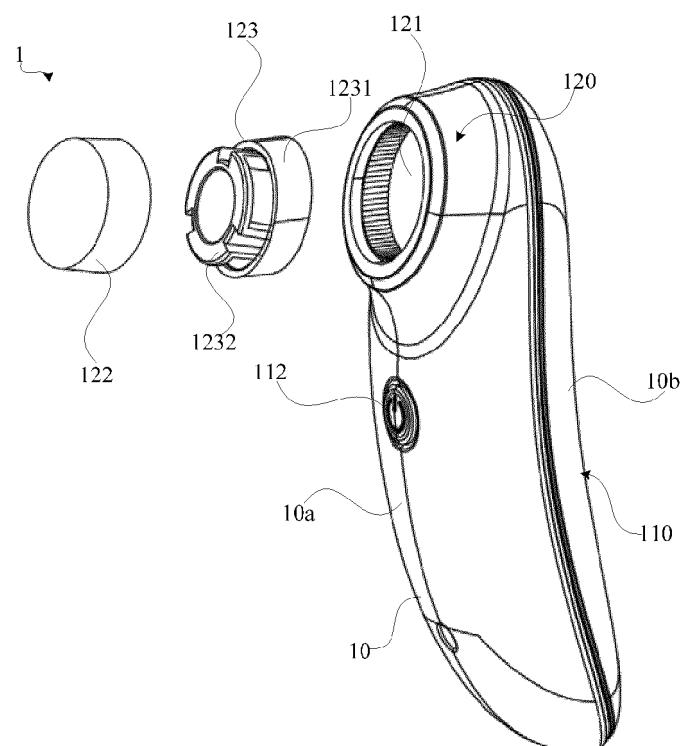


FIG. 4 (a)

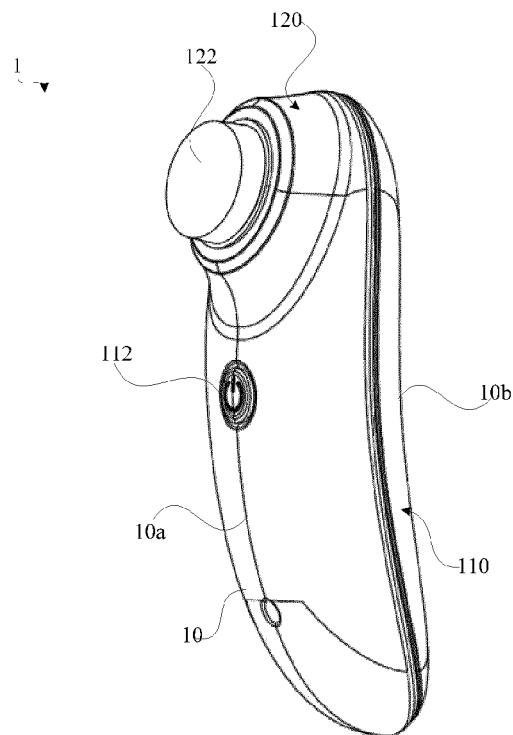


FIG. 4 (b)

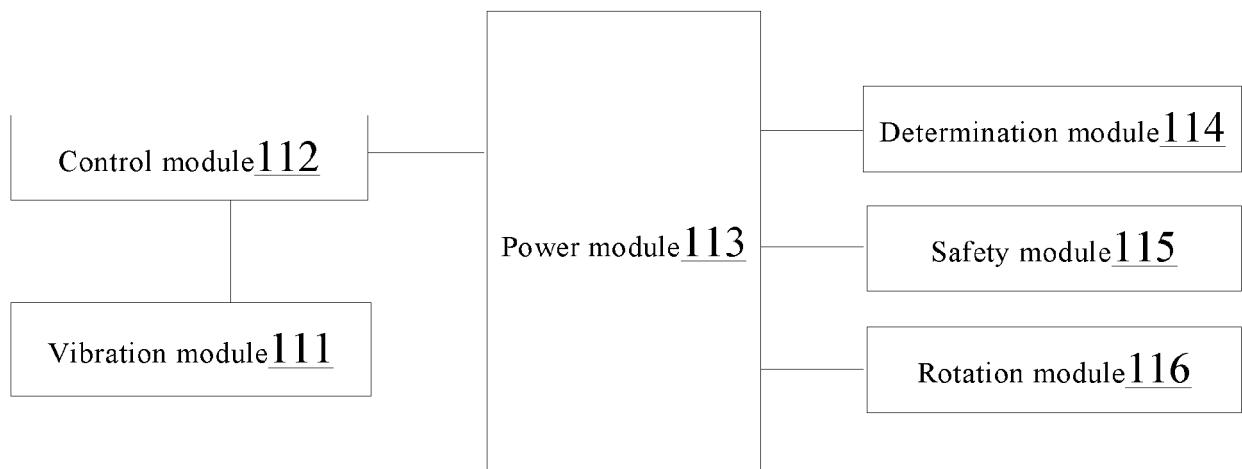


FIG. 5

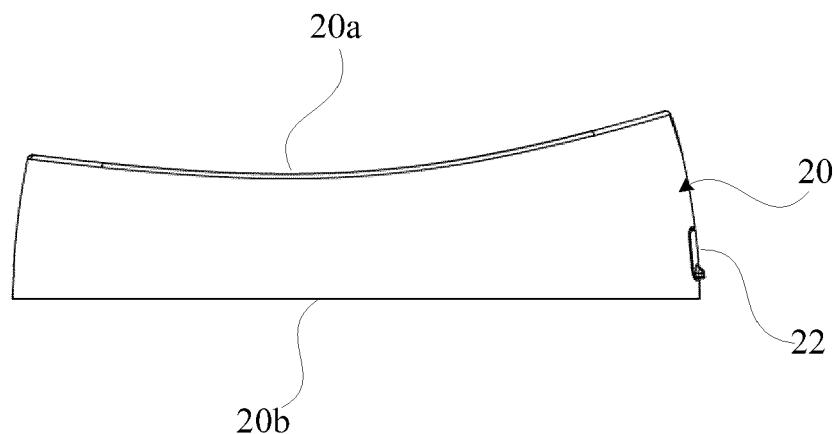


FIG. 6 (a)

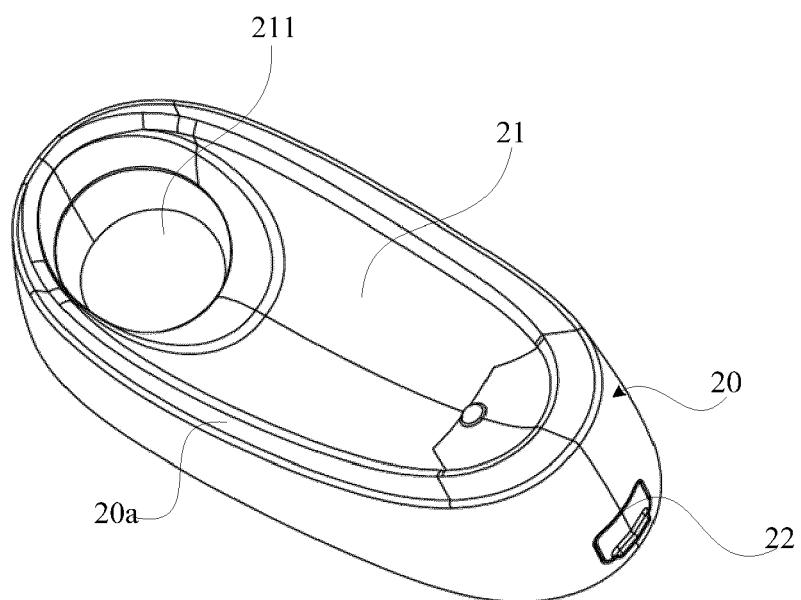


FIG. 6 (b)

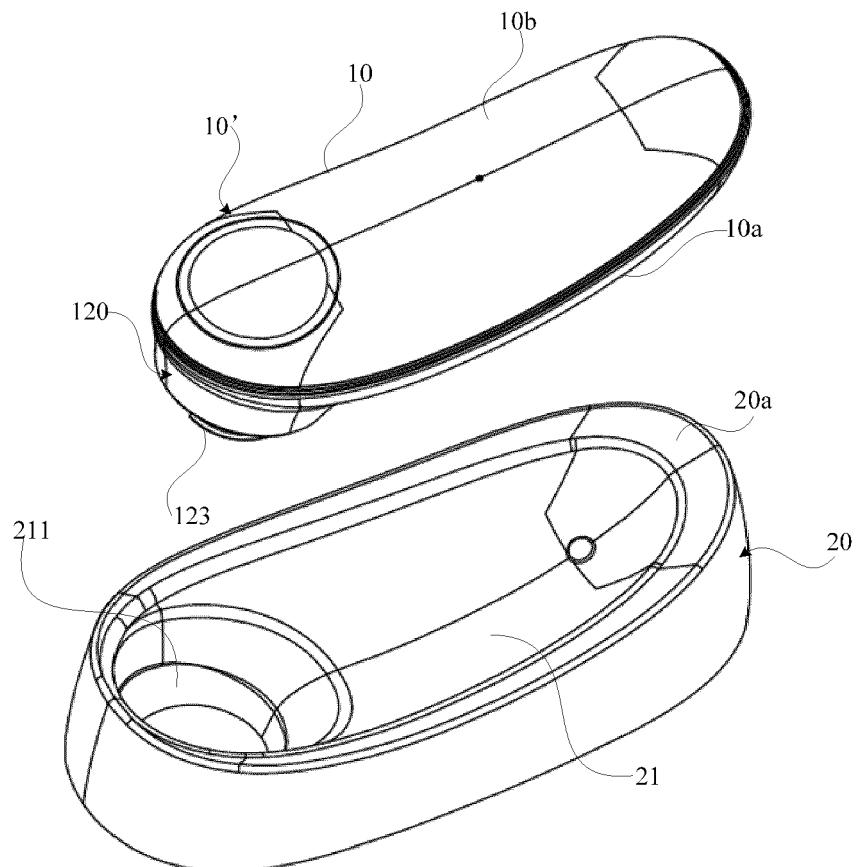


FIG. 7 (a)

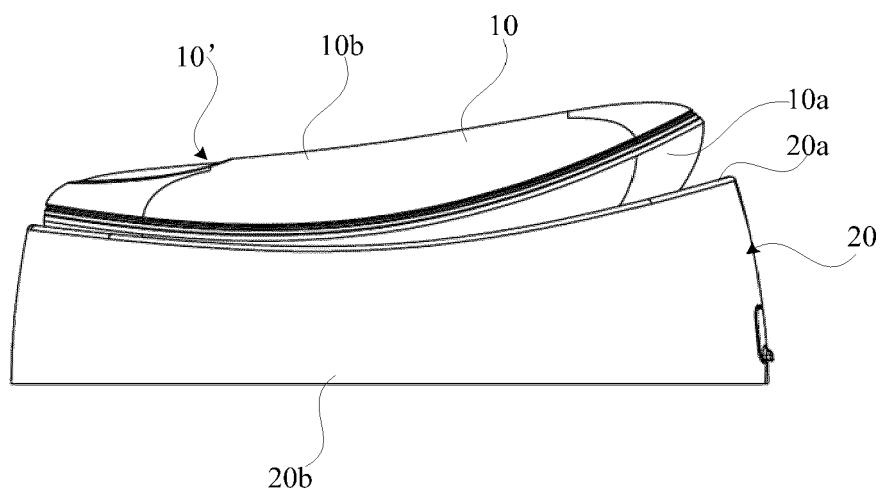


FIG. 7 (b)



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55	Place of search Munich	Date of completion of the search 20 July 2021	Examiner Borrás González, E
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EP 21 15 2959

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page 1 of 2

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page 2 of 2