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(71) Applicant: **La Pierres, Inc.**
San Jose CA 95138 (US)

(72) Inventors:
- **Wahng, Chao Uei**
  San Jose, CA 95138 (US)
- **Zhou, Yuchen**
  San Jose, CA 95138 (US)
- **Tieu, Hieu**
  San Jose, CA 95138 (US)

(74) Representative: **Beresford, Keith Denis Lewis**
Beresford & Co.
16 High Holborn
London
WC1V 6BX (GB)

(54) Skin treatment device with integrated dispenser

(57) An electronic skin treatment device with an integrated treatment material dispenser is disclosed, with which skin treatment material may be applied to a target skin area concurrently with a skin treatment applied by a treatment surface of a skin treatment element of the device. The skin treatment element may comprise means to deliver ultrasonic vibrations, mechanical massaging motions, galvanic stimulations, or light illumination. The skin treatment material is applied directly to the skin treatment surface of the device via an outlet opening in the skin treatment surface. Control means within the device may control the operation of the skin treatment element and the dispensing of skin treatment material during operation of the device.

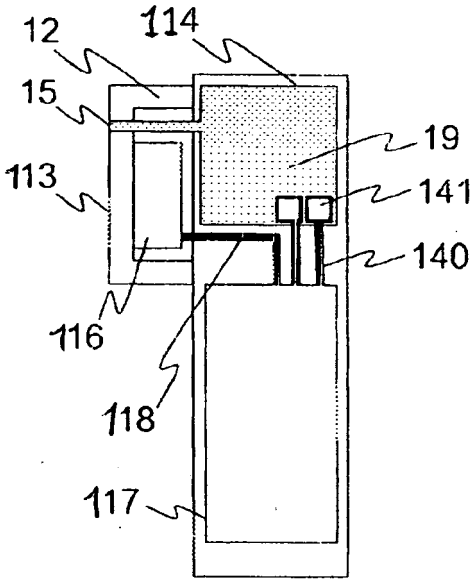

FIG. 6B

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Description

FIELD OF THE INVENTION

[0001] The present invention generally relates to electrical and electronic massage technology and more particularly to a skin treatment device with an integrated dispenser for skincare materials such as lotions, serums and/or creams.

BACKGROUND OF THE INVENTION

[0002] Skin treatment with electronic devices is a widely accepted method to enhance skin beautification process to achieve better results than application of cream, lotion, serum or other treatment materials alone. The devices usually introduce certain kind of physical means to the human skin to either help activate chemical molecules within the cream or lotion or serum products, or help such molecules further penetrate into the skin by agitating the skin cells and opening up chemical pathways into the cells.

[0003] It has been well realized that ultrasonic technologies can be used in skin treatment and beautification. Figure 1 is a schematic diagram illustrating a typical ultrasonic skin treatment device, the structure of which is commonly shared by all available products in the market. The device contains a device body 1, i.e. a handle or a casing, where resides electronics that controls an ultrasound transducer 3. The device body 1 may have other functions such as power control and charging which are not shown in Figure 1. The device contains a vibration plate 2, which is usually metallic, that contacts human skin with its external surface 4 and is driven by the ultrasound transducer 3 which is coupled to the internal surface of the plate 2. The vibration at ultrasonic frequency from the transducer 3 is transmitted to the human skin or skin treatment material via the external surface 4. For easy handling, the plate 2 and the transducer 3 are enclosed in a housing, which is not shown in Figure 1, of the device body 1.

[0004] In prior art devices, due to the design feature as Figure 1 shows, skin treatment material is dispensed from a separate material container either directly onto the skin surface or onto the external surface 4 of the plate 2 before treatment on target skin area with simultaneous application of the ultrasound vibration from the plate 2. This process of application of skin treatment material from an external container limits the device's portability, where the material application from separate container not only increases the complexity of the skin treatment process but also imposes hygiene concerns if such skin treatment process is not to be performed in a dedicated area such as a beauty spa or a private room, but in a public area with frequent traffic such as office, public transportation or elevator. For daily beautification purpose, it is desired that such ultrasound treatment process can be extended into a typical user's day time, other than the usual limited time skin treatment process in the morning or at night, in order to benefit from the full scale that ultrasonic treatment can offer. Prior art devices due to their limited portability and need for separate material containment, can not meet the stated treatment requirement because of the complexity of the application process.

[0005] The inventors believe that the following listed are relevant prior art:

(1) Y. Mitsu, "Skin beautification cosmetic system using iontophoresis device, ultrasonic facial stimulator, and cosmetic additive," Patent No. US7,427,273 B2 (2008);
(2) M. Nunomura, and T. Oba, "Ultrasound applying skin care device," Pub. No. US 2006/0149169 (2006);
(3) U. Motoyoshi, "ULTRASONIC FACIAL AND BEAUTY APPLIANCE," Pub. No. JP2007050204 (A) (2007);
(4) H. Hisao, "ULTRASONIC FACE MASSAGER," Pub. No. JP2001314473 (A) (2001);
(5) J. Reed, and et al, "Ultrasound based cosmetic therapy method and apparatus," Pub. No. US 2009/0318853 (2009);
(6) D. G. Kern, "Galvanic current skin treatment," Pub. No. US 2007/0185431 A1(2007); and
(7) Z. Geva, and et al, "Multi-application skin care system," Pub. No. US 2011/0106067 A1 (2011).

[0006] The physical means that are introduced to act on the skin may include ultrasound, powered brushing, powered vibration, powered tapping, electric current and radiation such as light illumination. These electrically powered physical means increase the efficiency of skin treatment process.

[0007] However, in prior art devices, skin treatment materials such as lotion, cream and serum products (referred to as "lotion" hereinafter) are either applied externally to the target skin area or directly onto the skin treatment surface of the electronic device before treating the skin. In all these prior art devices, the lotion is either applied from a lotion container that is separate from the electronic device or externally attached to the electronic device, which all require operation by both hands of the user to apply the lotion or install the container before treatment. This process makes skin treatment by the prior art devices not suitable for on- the- go usage where single- hand operation is generally required.

[0008] Additionally, all prior art devices only use skin care material of a predetermined composition and does not allow for adjustment of the composition according to each different user's own skin condition.

[0009] Prior art devices do not contain an integrated dispenser for skin care products that is functionally part of the device itself and which requires no preparation before a treatment process, and the portability and convenience of prior art devices is therefore reduced.

[0010] What is desired is an integrated material dispenser for the electronic massage devices.

SUMMARY OF THE INVENTION

[0011] By introducing an integrated dispenser for skin treatment material, the various types of electronic skin treatment devices can have much better portability, flexibility and feasibility of customized skin treatment. The integrated dispenser may comprise a plurality of dispensers or a plurality of compartments containing different treatment materials which may be dispensed in combination to synthesize customized skin care material according to the different user's own skin condition.

[0012] In various embodiments of this invention, there are described skin-treatment material dispensers being integrated within various electronic skin treatment devices. The skin treatment devices may be vibrating plates, brushes, electrodes for galvanic treatment, or radiation devices for treating the skin with radiation such as light. The skin treatment device has a treatment surface adapted to contact the skin when the device is in use, and the treatment material dispenser is arranged to deliver skin treatment material to an outlet on the treatment surface.

[0013] It is an object of this invention to integrate a skin treatment material dispenser with a skin treatment electronic device to provide a portable, convenient and hygienic solution to enable skin treatment to be performed anytime and anywhere.

[0014] It is yet another object of this invention to use a dispenser for skin care material which has an electrical interface to further enhance portability, flexibility and customizability of skin treatment devices, and to personalize both the skin treatment process as well as the skin care material preparation before the treatment process.

[0015] A first aspect of the invention provides a skin treatment device, comprising a body, a skin treatment member coupled to the body, said skin treatment member having a treatment surface suitable for treating human skin, a driver coupled to said treatment surface, said driver producing the treatment effect at the treatment surface, and means for containing and dispensing treatment material to said treatment surface via an outlet in said treatment surface. The means for containing and dispensing treatment material may be within the body, or may be mounted to the body and connected via a conduit to an outlet in the treatment surface so that treatment material may be delivered to the treatment surface.

[0016] The means for dispensing treatment material to the treatment surface may be operated manually, for example by depressing a button on the surface of the skin treatment device, to deliver a quantity of skin treatment material to the treatment surface of the device via an outlet in the treatment surface. The manual dispensing arrangement is preferably structured so that skin treatment material may be dispensed while the user is holding the device in one hand, by relative movement of fingers or parts of the hand to operate a dispense button, wheel or other actuator.

[0017] Alternatively, the means for dispensing treatment material to the treatment surface may operate automatically to dispense treatment material to an outlet on the treatment surface of the device when the device is in operation. The skin treatment device may include a control unit coupled to a driver and to the dispensing means, the control unit being operable to control the driver to operate the treatment member to deliver a treatment effect, and also to control the dispensing of treatment material. The dispensing of treatment material may be simultaneous with the operation of the treatment member, or alternatively treatment material may be dispensed onto the treatment surface prior to the commencement of the operation of the treatment member. In a further alternative, the treatment member may be intermittently operated and skin treatment material may be dispensed during periods of operation and/or non- operation of the treatment member.

[0018] The means for containing and dispensing treatment material may comprise a removable and replaceable dispenser cartridge. The cartridge may be disposable, or may be re-usable after refilling. The cartridge may be refilled by the user, or may be returned to a manufacturer or supplier for refilling. The dispenser cartridge may provide a plurality of compartments or sub-dispensers adapted to contain treatment materials, the sub-dispensers being selectable so that one or more treatment materials may be delivered sequentially or simultaneously to the treatment surface.

[0019] The means for containing and dispensing treatment material may further comprise a data storage means for storing operational data. The control means may be operable to retrieve data from the data storage device, and to control the operation of the treatment member and/or the operation of the treatment material dispenser on the basis of that retrieved data.

[0020] The control unit may have its own data storage device for storing operational information, such as combinations of treatment intensity and timing, for controlling the driver to operate the skin treatment member and/or for controlling the dispensing of skin treatment material. The control unit may contain stored data and embedded software programs that are used to control the operation of the treatment member and the means for containing and dispensing treatment material. The stored data and the embedded programs may be retrieved or updated through a data interface within the said device. The interface may be a wireless transmitter/receiver within the said control unit, a data communication component that utilizes the wireless charging circuitry to transmit digital data, or one or more electrical contacts that connect to the said control unit.

[0021] The skin treatment member may apply physical motion to a target skin area, or may be configured to treat the skin by means of galvanic effects or radiation, for example light illumination. The physical motions applied to the skin may be by vibrating, pulsating, rotating, tap-

ping, scrubbing, or by expanding or contracting the skin treatment member.

[0022] The skin treatment member may be an ultrasound vibration plate, a brush head, a skin massaging tip with a treatment surface, or a movable treatment surface having protruding structures.

BRIEF DESCRIPTION OF THE DRAWINGS

[0023] Embodiments of the invention will now be described in detail with reference to the accompanying drawings, in which:

Figure 1 is a schematic diagram illustrating a typical ultrasound skin care design according to the prior art;

Figure 2A is a schematic diagram illustrating a front view of an ultrasonic skin treatment device with an integrated material dispenser according to a first embodiment of the present invention;

Figure 2B is a schematic diagram illustrating a cross-sectional view of the skin treatment device of Figure 2A;

Figure 3A is a schematic diagram illustrating a front view of an ultrasonic device with an integrated material dispenser according to a second embodiment of the present invention;

Figure 3B is a schematic diagram illustrating a cross-sectional view of the material dispenser according to Figure 3A;

Figure 3C is a schematic diagram illustrating a perspective view of the material cartridge according to Figure 3A and Figure 3B;

Figure 4A is a schematic diagram illustrating a first implementation of a material cartridge according to the present invention;

Figure 4B is a schematic diagram illustrating a second implementation of a material cartridge according to the present invention;

Figure 4C is a schematic diagram illustrating a third implementation of a material cartridge according to the present invention;

Figure 4D is a schematic diagram illustrating a fourth implementation of a material cartridge according to the present invention;

Figure 5A is a schematic diagram illustrating a rotating design for cartridge selection and positioning in a multiple-cartridge implementation according to the present invention; and

Figure 5B is a schematic diagram illustrating a rotating design for selection and positioning of cartridge compartment in a one-cartridge with multiple compartment implementation according to the present invention.

Figure 6A is a schematic diagram illustrating the front view of a device according to a third embodiment of the present invention;

Figure 6B is a schematic diagram illustrating a cross-sectional view of the device according to the third embodiment of the present invention;

Figure 7A is a schematic diagram illustrating the front view of the device according to a fourth embodiment of the present invention;

Figure 7B is a schematic diagram illustrating a cross-sectional view of the device according to the fourth embodiment of the present invention;

Figure 8A is a schematic diagram illustrating the front view of the device according to a fifth embodiment of the present invention;

Figure 8B is a schematic diagram illustrating a cross-sectional view of the device according to the fifth embodiment of the present invention;

Figure 9A is a schematic diagram illustrating the front view of the device according to a sixth embodiment of the present invention;

Figure 9B is a schematic diagram illustrating a cross-sectional view of the device according to the sixth embodiment of the present invention;

Figure 10A is a schematic diagram illustrating the front view of the device according to a seventh embodiment of the present invention;

Figure 10B is a schematic diagram illustrating a cross-sectional view of the device according to the seventh embodiment of the present invention; and

Figure 11 is a schematic diagram illustrating a typical exterior shape of the device according to the present invention;

Figure 12 is a schematic diagram in perspective view of the device placed in a wireless recharging cradle; and

Figure 13 is a schematic diagram illustrating a side view of Figure 12.

DETAILED DESCRIPTION OF THE INVENTION

[0024] Referring now to the drawings, Figure 2A illustrates a front view of a device according to a first embodiment of the invention, and Figure 2B illustrates a cross-sectional view along the center line 30 of Figure 2A.

[0025] The device according to the first embodiment comprises an enclosure body 11, which can be in any three dimensional shape, such as cube, cuboid, globe, ellipsoid, cylinder or irregular shape. The enclosure body has an ultrasound transmission plate 12 for contacting the skin and transmitting ultrasonic vibration generated by an ultrasound generator 13 to a target skin area in contact with the plate 12. Within the enclosure 11 there is mounted a skin treatment material container and dispenser, i.e. the material cartridge 14. The cartridge 14 has a material outlet 15 opening on the same continuous surface of the device as the transmission plate 12, through which outlet 15 skin treatment material is dispensed close to or, preferably, directly on to the surface 121 of transmission plate 12 that is to be in contact with the skin during skin treatment.

[0026] The enclosure body 11 may have an oval shape adapted for easy gripping by the hand, and includes two continuous pieces - front and back pieces - which are mechanically coupled together. The material outlet 15 is on the front piece immediately coupled to the ultrasonic transmission plate 12. In use, the back piece engages the user's palm when the device is held in the hand. The device includes a battery to provide power, and charging circuitry preferably in the form of a wireless charging circuit so that the battery can be recharged after use.

[0027] In this embodiment, dispensing of treatment material by the cartridge 14 is controlled by a manually operated dispensing device including an operating button 14a, which extends out of the enclosure 11 on the back of the device, i.e. on the side opposite to the skin treatment surface 121. By pushing the button 14 a with the index finger, a user of the device causes a quantity of skin treatment material to be dispensed through the outlet 15 onto the skin treatment surface 121.

[0028] In an alternative embodiment (not illustrated), the control unit 16 may omitted entirely, and the ultrasound generator 13 may be controlled by a simple switch or other control arrangement, for example by detecting contact between the treatment surface 121 and the skin to be treated. In this embodiment, the cartridge 14 is provided with a manually-operable dispensing device so that the user can dispense skin treatment material onto the treatment surface 121.

[0029] The skin treatment material contained in the cartridge 14 can be, but is not limited to, liquid, gel, serum, cream, lotion, paste and powder.

[0030] In any of the above embodiments, the cartridge 14 may be removable and replaceable, i.e. it may be taken out of and installed back into the enclosure body 11, for example by the user. The cartridge 14 may be reusable, i.e., the skincare material may be replenished within the cartridge 14 after depletion during a skin treatment process. The cartridge 14 may be returned to the manufacturer or supplier for refilling, or may be refilled by the user. Alternatively, the cartridge may be disposable and for one-time use only, where material is pre-filled within the cartridge before usage.

[0031] The cartridge 14 may be configured as an integrated cartridge assembly with multiple cartridges containing the same or different skincare materials, and the cartridges may be individually selectable to dispense their respective materials. In another embodiment, the cartridge may be configured as an integrated cartridge assembly having multiple material compartments that may contain the same or different materials and each compartment within the cartridge may be individually selectable to dispense its material. In further alternative embodiments, it is foreseen that more than one cartridge or compartment may be selected simultaneously, so that two or more treatment materials may be delivered to the treatment surface of the device either simultaneously or sequentially, during a skin treatment session.

[0032] Figure 3A illustrates a front view of the device according to the second preferred embodiment of this invention. Figure 3B illustrates a cross-sectional view along the center line 40 of Figure 3A. Figure 3C illustrates a perspective view of the material cartridge 24.

[0033] The device according to the second embodiment comprises an enclosure body 21' a skin treatment surface 22 for treating a target skin area with a physical means, and a material cartridge 24, which contains skin treatment material such as, for example, liquid, gel, serum, cream, lotion, paste and powder. An outlet 25 is positioned on the skin treatment surface 22, through which outlet skin treatment material is dispensed close to or, preferably, directly on the area of the skin treatment surface 22 that is to be in contact with the skin during skin treatment. The cartridge further includes one or more electrical contacts 27 that can be electrically accessed by an electrical interface 28 that electrically connects or couples the cartridge 24 to a control unit 26. The control unit 26 contains electrical circuits and semiconductor components, which control the operational sequences of the device and provide user interface, power supply and charging functions, and sends electrical signals to the cartridge 24 or receives electrical signals from the material cartridge 24 to achieve the required operational sequence of vibration and dispensing of material.

[0034] The treatment surface 22 can be, for example, a vibrating surface, a rotating brush, a moving or stationary surface with macro (size>1 mm) or micro (size<1mm) protruding structures, or one or more radiation emitting elements such as LEDs. The physical action of the treatment surface 22 can be any of: vibration, brushing, abrasion, piercing, and radiation. The radiation may be, for example light illumination using visible, infrared or ultraviolet light. In the illustrated embodiment, the drive means for operating the treatment surface 22 may be an ultrasound generator or other motion-generating device, elec-

trically connected to the control unit 26 to be controlled thereby.

[0035] The electrical interface 28 electrically couples the cartridge 24 to the control unit 26 that contains electrical circuits and various semiconductor components. The control unit 26 sends electrical signals to the material cartridge 24, to control dispensing of the skin treatment material from the outlet 25 in order to achieve a required skin treatment procedure. The control unit 26 may also receive electrical signals from the material cartridge 24, transferring data for example identifying the contents of the dispenser or detailing the amount of skincare material remaining in the dispenser, which data may be used by the control unit to control the delivery of skincare material to the outlet 25. Additionally, the control unit 26 provides user interface, power supply and charging functions, and controls the operation of the skin treatment surface 22, for example by controlling an ultrasonic vibration generator (not shown) linked to the skin treatment surface 22. In this embodiment, dispensing of skin treatment material from the cartridge 24 is effected automatically, under control of the control unit 26. Thus, it is not necessary to provide any manual dispenser arrangement extending through the enclosure body 11. Thus, in this embodiment, the body 11 of the device does not have any openings other than the treatment material dispenser outlet 25. This absence of surface irregularities in the device improves its hygiene as it makes the device simple to clean, and provides no sites for the build-up of dirt or used treatment products.

[0036] As with the first embodiment, the cartridge 24 may be removable and replaceable, i.e. it may be taken out and installed back into the enclosure body 21 by the user. The cartridge may be reusable, i.e., the material may be replenished within the cartridge 24 by the user after depletion of the material during use, or alternatively the cartridge may be disposable and for one-time use only, where material is pre-filled within the cartridge before usage. The cartridge may be configured as an integrated cartridge assembly with multiple cartridges containing the same or different materials and the cartridges can be individually selected to dispense contained material, or the cartridge may have multiple compartments that may contain the same or different materials and each compartment within the cartridge can be individually selected and dispense its material. Alternatively, the cartridges or compartments may be selectable in combinations, and controlled to deliver their respective treatment materials simultaneously or sequentially

[0037] The electrical contacts 27 of the cartridge can be a single contact point or an array of contacts. The cartridge may further comprise an integral dispensing or releasing mechanism within the cartridge 24 for dispensing the skincare material, and this dispensing or releasing mechanism may be controlled by the control unit 26 through the electrical interface 28 and the contact or contacts 27. The cartridge 24 may further comprise a memory or data storage device for storing operation data. Via the electrical contacts 27, the control unit 26 may receive data stored in the cartridge 24 to display information to the user through visual, skin contact or sound effects. Alternatively, the control unit 26 may receive data stored in the memory of the cartridge 24 to operate the treatment surface 22 in a specific manner determined by the information stored in the memory of the cartridge 24.

[0038] In the case of a pre-filled cartridge, data stored in the memory of the cartridge 24 at the time the cartridge was filled may be used by the control unit 26 to control the operation of the treatment surface 22 in one of a number of pre-defined modes of operation, depending on the particular treatment material contained within the cartridge 24.

[0039] The control unit 26 may comprise a memory or data storage device for storing information such as, but not limited to, operation data, user skin condition data, user personal information, and/or cartridge identification data. The memory of the control unit 16 may thus store a number of pre-defined operational modes for the treatment surface, and may select and apply one of these operational modes on the basis of data retrieved from the memory of the cartridge 24. The control unit 26 may send data to be stored in the memory of the cartridge 24. The cartridge 24 may be recovered by the manufacturer or supplier, for example for refilling or for safe disposal or recycling, and the data stored within the memory of the cartridge 24 may be retrieved by the manufacturer or supplier, either as part of the refilling process or as part of a data collection process.

[0040] The data stored in the memories or data storage devices may be in digital format and may include information relating to the material contained within the cartridge, such as its brand, name, type, origin, composition, production date and expiration date, the amount of material within the cartridge and ordering information. The data may further comprise information relating to an optimal or pre-set operational mode of operating the treatment surface 22 by the control unit 26 when the particular material contained in the cartridge 24 is to be used. Such an operational mode can be, for example, timing of operation, intensity of operation (for example ultrasonic vibration strength and location of the vibration) to be generated on treatment surface 22. The memory may contain information relating to optimal or pre-set operational modes corresponding to the different cartridges 24 or different skincare material compartments within a single cartridge, and such operational mode can be, for example, timing of application of material from each different cartridge or each different compartment, or an amount of material to be dispensed from each different cartridge or each different compartment. The memory may optionally also store information relating to historic usage data of the device, the cartridge and material used; or information created or input by the user; including personal information relating to the user.

[0041] Figures. 4A to Figure 4D are schematic diagrams illustrating alternative structures for the cartridge

14.

[0042] Figure 4A shows a first embodiment of the cartridge 14 having an outside housing 17, an outlet 152 and a piston 18 that moves in the direction towards or away from the interior wall of the housing 17 where the outlet 152 is located. Skin care material is stored in the space 20 enclosed by the interior wall and the piston 18. When the piston 18 moves towards the interior wall where the outlet 152 is located and reduces the volume within the space 20, material is dispensed through outlet 152 to outside the cartridge 14 due to pressure. Movement of the piston 18 is mechanical, which can be realized through pushing and pulling force from a button-type or a roller-type leverage structures accessable externally on the enclosure body 11 of Figure 2A and Figure 2B, and thus the material dispensing can be manually controlled by the user. Alternatively, the pushing and pulling force can be applied through a drive such as an electric motor mounted within the enclosure body 11 of Figure 2A and Figure 2B, so that dispensing of the material can be operated and controlled by an electrical-switch-type or a touch-sensor-type electronic interface located externally on the enclosure body 11 of Figure 2A and Figure 2B.

[0043] Figure 4B shows a second embodiment of the cartridge 14 structure. It is similar to Figure 4A, but the pushing force is applied by an integral biasing element, as exampled by the spring like structure 19 in Figure 4B. The biasing force can be applied from either side of the piston 18, where Figure 4B is only one of many variations. In addition, the biasing force can be generated by, for example, a spring, a rubber cushion, rubber band, memory metal or compressed air. The biasing force preferably applies a constant pressure on the material within the space 20, and the material can be dispensed through outlet 152 automatically as soon as the outlet 152 is set to an open mode. To control and limit flow of material, a switch structure such as a valve 21 is coupled to the outlet 152, which is able to close and open the flow path of material through outlet 152. The valve 21 can be a slit valve, a one-way valve, or a double-way valve. Operation of the valve 21 can be realized through a button-type or a roller-type leverage structures existing externally on the enclosure body 11 of Figure 2A and Figure 2B, and the material dispensing can be operated manually. Alternatively, valve 21 can be operated by an actuator such as a solenoid or electric motor mounted within the enclosure body 11 of Figure 2A and Figure 2B, and thus the dispensing of the material can be controlled by an electrical-switch-type or a touch-sensor-type electronic interface accessable externally on the enclosure body 11 of Figure 2A and Figure 2B.

[0044] Figure 4C shows a third embodiment of the cartridge 14 structure. It is similar to Figure 4B, but the skin care material is contained within an elastic balloon or bladder rather than contained by a piston cylinder. The resilience of the balloon 22 pressurises the material in the space 20 within the balloon, and when a valve 21 mounted at the outlet 152 is opened, material is expelled through the outlet 152.

[0045] Figure 4D shows a fourth embodiment of the cartridge 14 structure. It is a variation of Figure 3A with a valve 21 coupled to the outlet 152. The valve 21 can be operated simultaneously with the piston 18 to produce more precise material flow through the outlet 152. Operation of valve 21 can be achieved through the same mechanical or electronic interface that user uses to operate piston 18.

[0046] Dispensing of the treatment material can be controlled by a mechanical device or an electronic interface. The mechanical device can be a button, a roller, a wheel or a lever. The electronic interface can be a switch, touch sensor, pressure sensor, or proximity sensor.

[0047] The cartridge 14 may be reusable, or maybe a single-use device. It is also foreseen that the device may operate without the cartridge 14 installed, and that two or more cartridges 14 containing the same or different materials may be installed in the enclosure body 11, such that cartridges can be individually selected, positioned and with the cartridge outlet 152 aligned with the outlet 15 of the device body, operated to dispense their respective materials. It is further foreseen that two or more individual cartridges may be installed within the device, each cartridge having its own respective outlet 15 on the treatment surface of the device, and each cartridge being individually controllable so that its contents may be dispensed either separately or in combination with the contents of one or more other cartridge.

[0048] In one embodiment, a cartridge having multiple compartments may have each compartment connected to the outlet, or to a respective outlet, through a dedicated conduit within the cartridge, which conduit is not shared between compartments. Thus, when two or more materials are dispensed, there is no mixing of materials until the materials reach the outlet. With a dispensing mechanism acting on all compartments, all compartments may dispense material together. The dispensing mechanism acting on each compartment may be arranged such that different compartments may dispense material at different rates, enabling the user, or the control circuitry, to control the composition of any dispensed mixture of materials. With a dispensing mechanism acting on each compartment individually, the material may be dispensed from individual compartment separately.

[0049] The selection, positioning and alignment can be realized by means such as, a rotation through different cartridges. Different cartridges may have their own built-in dispensing mechanism but share the same user interface for dispensing the material when the cartridge is selected and aligned with the outlet 15. Figure 5A is a schematic diagram illustrating a rotating design for cartridge selection and positioning in a multiple cartridge implementation. In the implementation, there are four cartridges with identical size, body shape and other structural properties. When the user rotates a cartridge to a selection position, the outlet 152 is coupled to the outlet

15 on the transmission plate 12 so that the contents of the selected cartridge may be dispensed to the outlet 15.

[0050] The selection, positioning and alignment can be realized by means of, such as but not limited to, a rotation through different compartments or a built-in valve system that defines or designates a compartment from which the material is dispensed. Figure 5B is a schematic diagram illustrating a rotating design for selection and positioning of the cartridge compartment 142 in an implementation of a single cartridge with four compartments. In the implementation, the cartridge 14 has four material compartments that contain same or different materials, such that each compartment within the cartridge can be individually selected, positioned and aligned with the cartridge outlet 152 to dispense material. Different compartments may share the same material dispensing mechanism as discussed in Figure 4A through Figure 4D, or each compartment may have its own dispensing mechanism but share the same user interface for dispensing the material when the compartment is selected and aligned with the outlet 152.

[0051] Fig. 6A and Fig. 6B illustrate a further embodiment of the present invention, where a treatment material dispenser is integrated within an ultrasound skin treatment device. Fig. 6A shows the front view of the proposed device. Fig. 6B shows the cross-section view along the center line 101 of Fig 6A.

[0052] The device comprises an enclosure body 11 which is preferably made of metal, alloy or plastics, an ultrasound transmission plate 12 for contacting the skin with a smooth treatment surface 113 and transmitting ultrasonic vibration generated by an ultrasound generator 116 to the target skin area. The device further comprises a skin treatment material container and a dispenser, collectively referred to as dispenser 114 that contains skin treatment material 19 which can be, for example, liquid, gel, cream, paste or powder. The device has a material outlet 15 positioned on the same continuous surface 113 of the ultrasound transmission plate 12, through which outlet 15 the skin treatment material 19 is dispensed close to or, preferably, directly on top of the surface 113 that is to be in contact with the skin during skin treatment. Within the housing the device includes an electronic control unit 117 containing electrical circuits, electronic components and necessary memory to store software within the enclosure body 11. An electrical interface 118 between the ultrasound generator 16 and the electronic control unit 117 enables the control unit 117 to control the ultrasound generator 116. The electronic control unit 117 controls ultrasonic generation from generator 116, and may also provide user interface, power supply and charging functions. Additionally, the electronic control unit 117 sends and receives electrical signals to and from the material dispenser 114 to achieve required control of material dispensing through another electrical interface 140 that connects to the electrical contacts 141 on dispenser 114.

[0053] As before, the enclosure body is in an easy-holding oval shape and includes two continuous pieces - front and back pieces - which are mechanically coupled together. The material outlet 15 is on the front piece immediately coupled to the ultrasonic transmission plate 12. The outlet may be a small hole or an array of small holes from which the skincare material is dispensed. In use, the back piece is held in contact with the palm of the hand. The device includes a power supply such as a battery, and wireless charging circuitry so that the battery can be charged wirelessly, for example by placing the device in a charging holder or cradle. Preferably, except for the material outlet 15, the device does not have any other outlet or connectors.

[0054] As an example, Figure 11 to Figure 13 illustrate a typical exterior shape of the device 60 according to the present invention, wherein it contains a skin treatment surface 62 as a front piece and a material outlet 65 on the treatment surface 62. The device 60 can be wirelessly charged when it is placed in the recharging cradle 61 as shown in Figure 12 and Figure 13. The device 60 and the recharging cradle 61 include co-operating circuitry to transfer electrical charge from the recharging cradle 61 to a power supply such as a battery in the device 60. When battery power in the device 60 is exhausted, the device 60 is placed in the cradle 61, and power connected to the cradle 61. By this means, the battery of the device is recharged to enable re-use of the device. The recharging cradle 61 may be configured to co-operate with the form of the body of the device, so that the device is securely held in the correct position in the cradle for the recharging circuitry to operate effectively.

[0055] The dispenser 114 may, as before, be removable so that the user may remove the cartridge, refill it, and reinstall it. Alternatively, the cartridge may be pre-filled and be disposable after use. The pre-filled cartridge may include a data storage device or memory, into which the cartridge manufacturer or filler can store details of the amount and type of material contained in the cartridge. The dispenser may be an assembly comprising multiple cartridges, or may be a cartridge comprising multiple compartments which contain either the same or different skin treatment materials. The dispenser assembly may include a data storage device, into which the manufacturer or filler of the cartridge can record details of the amounts and types of material contained in the respective compartments of the assembly. Where multiple cartridges or compartments are provided, each compartment within the dispenser can be individually selected and dispense its respective material.

[0056] Dispensing of the material 19 may be achieved by a manually exerted force transmitted to the dispenser, the force acting on a pressure generation component that is part of the dispenser, for example a lead, a lever, a gauge, a cap, a piston, or a stretched pouch, to urge the material 19 to flow out of the dispenser through the outlet 15. Alternatively, the dispensing of the material 19 may be achieved by an electrically powered driving or pumping mechanism that is part of the dispenser and operated

by the electrical interface 140 located within the enclosure 11 body. In a further alternative, the dispensing of the material 19 may be achieved by an electrically powered driving or pumping mechanism that is part of the device and is electrically controlled by the control unit 117. The driving or pumping mechanism forces the material 19 to flow out of the dispenser through the outlet 15.

[0057] In other words, the dispenser can be any of:

a removable and replaceable dispenser;
a refillable dispenser;
a disposable and for one-time use only dispenser;
an integrated dispenser having multiple sub-dispensers containing the same or different materials, the sub-dispensers being individually selectable to dispense material therein, or selectable in combination to dispense two or more skin treatment materials; and
an integrated dispenser with multiple compartments containing the same or different materials, the compartments being individually selectable to dispense the material therein, or selectable in combination to dispense two or more materials.

[0058] The dispenser 114 may also have one or more electrical contacts 141.

[0059] The dispenser 114 may include a material dispensing or releasing mechanism that is controlled by the electronic control unit 117 through the electrical interface 140 and the contacts 141.

[0060] The dispenser 114 may include a memory or data storage device for storing information such as, but not limited to:

(1) information relating to the material contained within the dispenser 114, which can be, for example, a brand, name, type, original composition, production date and expiration date, material level within the dispenser and ordering information;

(2) information relating to an optimal or pre-set operational mode of the ultrasonic generator 116 through the electronic control unit 117 when the material 19 contained in dispenser 114 is to be used, where the operational mode information may be, for example, timing, ultrasonic vibration strength and location of the operation to be generated on transmission surface 113;

(3) information relating to an optimal or pre-set operational mode of the different dispensers 114 or different material compartments within a single dispenser, where the operational mode can be, for example, timing or sequencing of material application from each different dispenser or each different compartment, amount of material to be dispensed from each different dispenser or each different compartment;

(4) information relating to historic usage data of the device, the dispenser and material;

(5) information that is created or input by the user; and

(6) biographic or other personal or medical information of the user.

[0061] The electronic control unit 117 may retrieve and use data stored in the dispenser 114 through the electrical interface 140 and the contacts 141 to output information to the user through visual, skin contact or sound effects.

[0062] Alternatively, the electronic control unit 117 may retrieve and use data stored in the dispenser 114 through the electrical interface 140 and the contacts 141 to operate the ultrasonic generator 16 in a specific manner determined by the information stored in the dispenser.

[0063] The control unit 117 may also comprise another memory or data storage device for storing information such as, but not limited to, device operation data, user skin information data, user personal and biometrics information, or dispenser identification data. Such stored information may be updated as needed, preferably using a wireless input device to communicate with the control unit 117. Control unit 117 may also contain embedded programs that utilize all the information stored in the control unit 117 and dispenser 114 to operate and control the dispensing of skin care treatment materials from dispenser 14, as well as to operate and control the ultrasound generator 116. Such embedded programs may also be updated from time to time, preferably using a wireless input interface such as a wireless link to a personal computer so that information entered via the computer keyboard can be transmitted to the control unit 117.

[0064] Alternatively, the electronic control unit 117 may send data to be stored in the dispenser 114 through the electrical interface 140 and the contacts 141.

[0065] The dispenser 114 may be recovered by the manufacturer or supplier, and data stored within the dispenser 114 may be retrieved.

[0066] Although Fig. 6A and 6B show dispenser 114 residing within the enclosure body 11, in practice the dispenser 114 may also be externally attached to the enclosure body 11. However, when attached, the material 19 is still dispensed through a conduit that connects from the inside to the outside of the enclosure body 11 and finally through the outlet 15. Thus, the attached dispenser 114 still functions as an integral part of the device.

[0067] Fig. 7A and Fig. 7B illustrate a further embodiment of the present invention, where a material dispenser is integrated within an electrically powered brush device for skin treatment. Fig. 7A shows the front view of the device and Fig. 7B shows the cross-section view along the center line 101 of Fig 7A.

[0068] The device according to this embodiment comprises an enclosure body 21 preferably made of metal,

alloy or plastics, and a brush head 222, which can have any of rotational, tapping, pulsating and vibration movements during skin treatment that are powered and controlled by a brush head driver 26. Brush fibers 23 for skin treatment are attached to the brush head 222, and a skin treatment material container and dispenser 224 is provided to deliver a skin treatment material 29, which may be, for example, liquid, gel, cream, paste and powder. The material 29 is delivered through an outlet 25 that is either in the form of a clearance into the brush head surface where brush fiber(s) 23 are disposed, or in the form of a tube extruding from the brush head surface to a height slightly shorter than the maximum length of the brush fibers. The material 29 is dispensed through the outlet 25 to the surface of the brush head 222 and, preferably, to the brush fibers 23 that are to be in contact with the skin during skin treatment. The device further comprises an electronic control unit 227 containing electrical circuits, electronic components and memory to store operating software within the enclosure body 21. An electrical interface 228 between the brush head driver 26 and an electronic control unit 227 enables the brush head driver 26 to be controlled by the electronic control unit 227. The electronic control unit 227 controls the motion of the brush head 222 via the brush head driver 26 and may, optionally, also provide user interface, power supply and charging functions. Additionally, the electronic control unit 227 may send electrical signals to the dispenser 224 or receive electrical signals from the dispenser 224 to control and monitor the dispensing of material through another electrical interface 240 that connects to the electrical contacts 241 on dispenser 224.

[0069] The dispenser 224 may be removable, i.e., it may be taken out and installed back into the enclosure body 21 by the user. The treatment material 29 may be replenished within dispenser 224 by the user after use, i.e. dispenser 224 may be re-used. The dispenser 224 may alternatively be disposable and for one-time use only, where material 29 is pre-filled within the dispenser before usage. The dispenser 224 can be configured as multiple dispensers containing the same or different materials, such that dispensers can be individually selected to dispense the respective material contained therein. Alternatively the dispenser 224 can be configured as a single dispenser with multiple compartments that may contain the same or different materials, such that each compartment within the dispenser can be individually selected and dispense its material. One or more of the compartments may also be selected simultaneously and dispense material at same time.

[0070] The dispensing of the material 29 may be caused by a manually exerted force to the dispenser, upon which a pressure generation component that is part of the dispenser, for example a lead, a lever, a gauge, a cap, a piston, or a stretched pouch, forces the material 29 to flow out of the dispenser through the outlet 25. Alternatively the dispensing of the material 29 may be achieved by an electrically powered driving mechanism that is part of the dispenser and operated by the electrical interface 240 located within the enclosure 21 body. In a yet further alternative, the dispensing of the material 29 may be achieved by an electrically powered driving mechanism that is part of the device and electrically controlled by the control unit 227. The driving mechanism forces the material 29 to flow out of the dispenser through the outlet 25, under control of the control unit 227.

[0071] The dispenser 224 may also include a dispensing or releasing mechanism within the dispenser 224 that is controllable by the electronic control unit 227 through the electrical interface 240 and one or more electrical contacts 241 on the dispenser 224 to selectively dispenser or release skin treatment material through the outlet.

[0072] The dispenser 224 may also include a memory or data storage device for storing information such as, but not limited to, that described above in relation to the earlier embodiments.

[0073] The electronic control unit 227 may, as before, receive data stored in the memory of the dispenser 224 and may output information to the user through visual, skin contact or sound effects.

[0074] The electronic control unit 227 may receive data stored in the memory of the dispenser 224 to operate the brush head 222 in a specific manner determined by the information stored in the dispenser.

[0075] The control unit 227 may also comprise another memory or data storage device for storing information such as, but not limited to, device operation data, user skin information data, user personal and biometrics information, dispenser identification data. Such stored information may be updated as needed. Control unit 227 may also contain embedded programs that utilize information stored in the control unit 227 and dispenser 224 to operate and control the dispensing of material from dispenser 224, as well as the brush head driver 26. Such embedded programs may also be updated from time to time for better functioning of the device, such as by the use of a wireless interface to input data into the device from a personal computer, similarly to the above-described data transfer methods. Alternatively, the electronic control unit 227 may send data to be stored in the memory of the dispenser 224.

[0076] The dispenser 224 may be recovered by the manufacturer or supplier, and data stored within the memory of the dispenser 224 may be retrieved.

[0077] Although Fig. 7A and 7B show dispenser 224 residing within the enclosure body 21, in practice the dispenser 224 may also be externally attached to the enclosure body 21. However, when attached, the lotion 29 is still dispensed through a conduit that connects from the inside to the outside of the enclosure body 21 and finally through the outlet 25. Thus, the attached dispenser 224 still functions as an integral part of the device.

[0078] Fig. 8A and Fig. 8B illustrate another embodiment of the invention, where a treatment material dispenser is integrated within an electrically powered skin massaging device for skin treatment. Fig. 8A shows the

front view of the proposed device, and Fig. 8B shows the cross-section view along the center line 101 of Fig 8A.

[0079] The device in this embodiment comprises an enclosure body 31 preferably made of metal, alloy or plastics or a combination thereof and a skin massaging tip 32 for contacting the skin with a treatment surface 33 and transmitting the mechanical massaging motion to the target skin area, where the massaging motion of the massaging tip can be, but not limited to, vibration, pulsating, rotation, tapping, expansion and contraction. The device further comprises a motion generator 36 which generates the massaging motions, and a skin treatment material container and dispenser, which will be referred to as dispenser 34, that contains treatment material 39 which can be, for example, liquid, gel, cream, paste or powder. A material outlet 35 is positioned on the same continuous surface 33 of the massaging tip 32, through which outlet skin treatment material 39 is dispensed close to or, preferably, directly on top of the massaging tip 32 surface 33 that is to be in contact with the skin during skin treatment. An electronic control unit 37 containing electrical circuits, electronic components and necessary embedded software is provided within the enclosure body 31; and an electrical interface 38 between the motion generator 36 and the electronic control unit 37 enables the massaging tip 32 to be controlled by the electronic control unit.

[0080] The electronic control unit 37 controls the motions of the massaging tip 32 and it may, alternatively, also provide user interface, power supply and charging functions. Additionally, the electronic control unit 37 may send electrical signals to the material dispenser 34 or receives electrical signals from the material dispenser 34 to achieve the required skin treatment procedure through another electrical interface 340 that connects to the electrical contacts 341 on dispenser 34.

[0081] The dispenser 34 may correspond in structure and function to the dispenser 224 of Fig. 7, and the control unit 37, electrical interface 340 and motion generator 36 have corresponding capabilities and functions to the control unit 227, the interface 240 and the driver 26 as described in relation to the embodiment of Fig. 7.

[0082] Fig. 9A and Fig. 9B illustrate a further alternative embodiment of the current invention, where a material dispenser is integrated within an electrically powered galvanic skin treatment device that produces electric current flowing along skin surface and/or through skin cells. Fig. 9A shows the front view of the proposed device. Fig. 9B shows the cross-section view along the center line 101 of Fig 9A.

[0083] This embodiment corresponds to the embodiment shown in Figs 7 and 8, in so far as it includes a dispenser 44, a driver 46, a control circuit 47, and electrical interfaces 48 and 440 to connect the control circuit 47 to the driver and to the cartridge, respectively. The structure and function of these components corresponds to those of the dispenser 224, the driver 26, the control circuit 227 and the electrical interfaces 228 and 240 as described in relation to the embodiment of Fig. 7. The embodiment differs from Figures 7 and 8 in that the treatment is delivered by a galvanic skin treatment head 42 which is adapted to contact the skin with one or more electrodes 43 and produce an electric voltage and current on the target skin area. The head 42 is driven by a voltage or current driver 46 which generates the electric voltage or current under control of the electronic control unit 47, via the electrical interface 48 located between the voltage or current driver 46 and the electronic control unit 47 so that the voltage or current applied by the electrodes 43 to the skin can be controlled by the electronic control unit.

[0084] The electronic control unit 47 controls the electrode 43 by the voltage or current driver 46, and as before may also provide user interface, power supply and charging functions. Additionally, the electronic control unit 47 may send or receive electrical signals from the dispenser 44 to effect required operating procedures through another electrical interface 440 that connects to the electrical contacts 441 on dispenser 44..

[0085] The dispenser 44 may have any of the features described above in relation to the dispensers of the embodiments of Figs. 7 and 8 and 9.

[0086] The dispenser 44 may also include a material dispensing or releasing mechanism, and/or a memory or data storage device, structured and operable as described in relation to the previous embodiments.

[0087] The electronic control unit 47 may retrieve and process data stored in the memory of the dispenser 44 to display information to the user through visual, skin contact or sound effects, or to operate the electrodes 43 in a specific manner determined by the information stored in the dispenser.

[0088] The control unit 47 may as before comprise a memory or data storage device for storing and using data as described in relation to the above embodiments.

[0089] The electronic control unit 47 may send data to be stored in the memory of the dispenser 44.

[0090] The dispenser 44 may be recovered by the manufacture or supplier and data stored within the memory of the dispenser 44 may be retrieved.

[0091] Although Fig. 9A and 9B show dispenser 44 mounted within the enclosure body 41, in practice the dispenser 44 may also be externally attached to the enclosure body 41. However, when attached, the lotion 49 is still dispensed through a conduit that connects from the inside to the outside of the enclosure body 41 and finally through the outlet 45. Thus, the attached dispenser 44 still functions as an integral part of the device.

[0092] Fig. 10A and Fig. 10B illustrate a yet further embodiment of the invention, where a material dispenser is integrated within an electrically powered radiation device for skin treatment. Fig. 10A shows the front view of the proposed device. Fig. 10B shows the cross-section view along the center line 101 of Fig. 10A.

[0093] The embodiment substantially corresponds in structure and function to the embodiments of Figures 7 to 9, save that the skin treatment head in this embodiment

comprises an illumination housing 52 for treating skin with light illumination generated by one or more light units 53 which are controlled by a light controller 56. The device comprises a treatment material container and dispenser, collectively referred to as dispenser 54 that contains material 59, corresponding to the dispenser 24 and material 29 of Figure 7. A material outlet 55 positioned on the surface of the light housing 52 delivers the skin treatment material 59 either on the surface of the housing unit, or directly onto the skin area to be treated. An electronic control unit 57 corresponding to the control unit 27 of Figure 7 controls the light controller 56 by means of an electrical interface 58 located between the light controller 56 and the electronic control unit 57 so that the light emission from the light unit 53 can be controlled by the electronic control unit 57.

[0094] The electronic control unit 57 controls the light unit 53 via the light controller 56. It may also provide user interface, power supply and charging functions as described in relation to the previous embodiments. Additionally, the electronic control unit 57 may send or receive electrical signals to or from the material dispenser 54 as described in relation to the previous embodiments. While the radiation described in this embodiment is light illumination, it is to be understood that the radiation from the light units 53 may be infrared, visible light, or ultraviolet light radiation.

[0095] The dispenser 54 may correspond in structure and function to the previously-described dispensers 24, 34 and 44.

[0096] The dispenser 54 may also include a material dispensing or releasing mechanism which is controlled by the electronic control unit 57 through the electrical interface 540 and various electrical contacts 541 embedded in the dispenser 54.

[0097] The dispenser 54 may also include a memory or data storage device corresponding in structure and function to that of the previously-described dispensers 24, 34 and 44.

[0098] The electronic control 57 may receive data stored in the dispenser 54 to display information to the user through visual, skin contact or sound effects, or to operate the light units 53 to emit radiation in a specific manner determined by the information stored in the dispenser.

[0099] The electronic control 57 may also send data to be stored in the memory of the dispenser 54.

[0100] The control unit 57 may also comprise another memory or data storage device for storing information such as described in relation to the embodiments of Figures 7, 8 and 9.

[0101] Although Fig. 10A and 10B show dispenser 54 residing within the enclosure body 51, in practice the dispenser 54 may also be externally attached to the enclosure body 51 as described in relation to the previous embodiments.

[0102] The present invention has numerous advantages over the prior art. For example: (1) the integrated material dispenser with various electronic skin treatment devices enhances the portability and flexibility of the skin treatment process; (2) the integrated material dispenser with electrical interface, together with the embedded memory within the dispenser or the control unit, enables customizability of the various electronic devices to provide treatment methods that are specific for each individual's own skin care need, including personalized skin care product synthesized at the spot of treatment; and (3) with the integrated dispenser containing product information, best mode of operation, pre-set beautification process and usage data, the device greatly increases the positive effect of the skin beautification process, reduces the complexity of the user's operation and provides means of feedback from user to manufacture for further improvement on the skin care products.

[0103] While one or more embodiments of the present invention have been illustrated above, the skilled artisan will appreciate that modifications and adoptions to those embodiments may be made without departing from the scope of the present invention, as defined in the claims.

[0104] Important aspects of the present invention are set out in the following numbered clauses:

1. A device with an enclosure body used for skin treatment by applying a series of ultrasound vibrations and by dispensing specimen to a target skin area, comprising:

    a skin treatment member for treating the target skin area with ultrasound vibrations which are generated by an ultrasound generator; and
    a specimen outlet embedded in said skin treatment member, said outlet being coupled to a container containing specimen to be dispensed to the target skin area through said outlet;
    wherein said specimen is dispensed through said outlet with passing through a conduit that terminates at one end at said treatment member's surface facing the target skin and terminates at other end within said enclosure body;
    wherein said container is electrically connected to an electronic control unit through an electrical interface and one or more electrical contacts;
    wherein said control unit comprises a user interface and a number of electrical circuits and semiconductor components which collectively control said skin treatment member's ultrasound vibrations and said container's dispense of specimen; and
    wherein said ultrasound generator, said control unit, said electrical contacts, said electrical circuits and said semiconductor components are all integrated within said device's enclosure body.

2. The device of Clause 1, wherein said specimen is any of: liquid, gel, serum, cream, lotion, paste and

powder.

3. The device of Clause 1, wherein said container is any of:

a removable and replaceable dispenser;
a refillable dispenser; a disposable and for one-time use only dispenser;
an integrated dispenser having multiple sub-dispensers containing same or different specimens, said sub-dispensers being individually selected to dispense specimen therein;
an integrated dispenser with multiple specimen compartments containing same or different specimens, each of said compartments being individually selected to dispense specimen therein;
an integrated dispenser that resides within said enclosure body; and
an integrated dispenser that is externally attached to said enclosure body.

4. The device of Clause 1, wherein said container comprises an embedded data storage device for storing operational data;
wherein said control unit is capable of receiving data stored in said container for displaying information to a user through visual, skin contact or sound effects and is capable of receiving data stored in said container for operating said skin treatment member in a specific manner determined by data stored in said storage device;
wherein said control unit is capable of sending data to be stored in said container; and
wherein data stored in said container is retrievable.

5. The device of Clause 1, wherein said control unit comprises an embedded data storage device to store operational information for defining said skin treatment member's operation manner;
wherein said operational information is any of: operation data; user skin condition data; user personal information; and container identification data; and
wherein said control unit is capable of displaying said information to a user through visual, skin contact or sound effects.

6. A device with an enclosure body used for skin treatment by applying a series of physical motions and by dispensing specimen to a target skin area, comprising:

a skin treatment member for treating the target skin area with a series of motions which are generated by an electrically powered generator; and
a specimen outlet embedded in said skin treatment member, said outlet being coupled to a container containing specimen to be dispensed to said target skin area through said outlet;
wherein said specimen is dispensed through said outlet with passing through a conduit that terminates at one end at said treatment member's surface facing said target skin and terminates at other end within said enclosure body ;
wherein said container is electrically coupled to an electronic control unit through an electrical interface and one or more electrical contacts;
wherein said control unit comprises a user interface and a number of electrical circuits and semiconductor components which collectively control said skin treatment member's motions and said container's dispense of specimen;
wherein said generator, said control unit, said electrical contacts, said electrical circuits and said semiconductor components are all integrated within said device's enclosure body; and
wherein said specimen is any of: liquid, gel, serum, cream, lotion, paste and powder.

7. The device of Clause 6, wherein said container is any of:

a removable and replaceable dispenser;
a refillable dispenser; a disposable and for one-time use only dispenser;
an integrated dispenser having multiple sub-dispensers containing same or different specimens, said sub-dispensers being individually selected to dispense specimen therein;
an integrated dispenser with multiple specimen compartments containing same or different specimens, each of said compartments being individually selected to dispense specimen therein;
an integrated dispenser that resides within said enclosure body; and
an integrated dispenser that is externally attached to said enclosure body.

8. The device of Clause 6, wherein said container comprises an embedded data storage device for storing operational data;
wherein said control unit is capable of receiving data stored in said container for displaying information to a user through visual, skin contact or sound effects and is capable of receiving data stored in said container for operating said skin treatment member in a specific manner determined by data stored in said storage device;
wherein said control unit is capable of sending data to be stored in said container; and
wherein data stored in said container is retrievable.

9. The device of Clause 6, wherein said control unit comprises an embedded data storage device to store operational information for defining said skin

treatment member's operation manner;
wherein said operational information is any of: operation data; user skin condition data; user personal information; and container identification data; and
wherein said control unit is capable of displaying said information to a user through visual, skin contact or sound effects.

10. The device of Clause 6, wherein said skin treatment member can be any of:

a brush head;
a skin massaging tip with a treatment surface;
a moving surface with protruding structures for contacting the target skin area; and
a stationary surface with protruding structures for contacting the target skin area.

11. The device of Clause 6, where said motions can be any of: vibrating, pulsating, rotating, tapping, scrubbing, expanding and contracting.

12. A device with an enclosure body used for skin treatment by applying a series of galvanic stimulations and by dispensing specimen to a target skin area, comprising:

a skin treatment member with one or more electrodes for treating said target skin area with galvanic stimulations which are generated by a generator; and
a specimen outlet embedded in said skin treatment member, said outlet being coupled to a container containing specimen to be dispensed to said target skin area through the said outlet;
wherein said specimen is dispensed through said outlet with passing through a conduit that terminates at one end at said treatment member's surface facing said target skin and terminates at other end within said enclosure body;
wherein said container is electrically coupled to an electronic control unit through an electrical interface and one or more electrical contacts;
wherein said control unit comprises a user interface and a number of electrical circuits and semiconductor components which collectively control said skin treatment member's galvanic stimulations and said container's dispense of specimen;
wherein said generator, said control unit, said electrical contacts, said electrical circuits and said semiconductor components are all integrated within said device's enclosure body;
wherein said specimen is any of: liquid, gel, serum, cream, lotion, paste and powder.

13. The device of Clause 12, wherein said container is any of:

a removable and replaceable dispenser;
a refillable dispenser; a disposable and for one-time use only dispenser;
an integrated dispenser having multiple sub-dispensers containing same or different specimens, said sub-dispensers being individually selected to dispense specimen therein;
an integrated dispenser with multiple specimen compartments containing same or different specimens, each of said compartments being individually selected to dispense specimen therein;
an integrated dispenser that resides within said enclosure body; and
an integrated dispenser that is externally attached to said enclosure body.

14. The device of Clause 12, wherein said container comprises an embedded data storage device for storing operational data;
wherein said control unit is capable of receiving data stored in said container for displaying information to a user through visual, skin contact or sound effects and is capable of receiving data stored in said container for operating said skin treatment member in a specific manner determined by data stored in said storage device;
wherein said control unit is capable of sending data to be stored in said container; and
wherein data stored in said container is retrievable.

15. The device of Clause 12, wherein said control unit comprises an embedded data storage device to store operational information for defining said skin treatment member's operation manner;
wherein said operational information is any of: operation data; user skin condition data; user personal information; and container identification data; and
wherein said control unit is capable of displaying said information to a user through visual, skin contact or sound effects.

16. A device with an enclosure body used for skin treatment by applying radiation such as light illumination and by dispensing specimen to a target skin area, comprising:

a skin treatment member with a lighting house for treating the target skin area with light illumination generated by one or more lighting units powered by a light controller; and
a specimen outlet embedded in said skin treatment member, said outlet being coupled to a container containing specimen to be dispensed to the target skin area through the said outlet;
wherein said specimen is dispensed through said outlet with passing through a conduit that terminates at one end at said treatment mem-

ber's surface facing said target skin and terminates at other end within said enclosure body;
wherein said container is electrically coupled to an electronic control unit through an electrical interface and one or more electrical contacts;
wherein said control unit comprises a user interface and a number of electrical circuits and semiconductor components which collectively control said skin treatment member's light illumination and said container's dispense of specimen; and
wherein said control unit, said lighting units, said electrical contacts, said electrical circuits and said semiconductor components are all integrated within said device's enclosure body.

17. The device of Clause 16, wherein said specimen is any of: liquid, gel, serum, cream, lotion, paste and powder.

18. The device of Clause 16, wherein said container is any of:

a removable and replaceable dispenser;
a refillable dispenser; a disposable and for one-time use only dispenser;
an integrated dispenser having multiple sub-dispensers containing same or different specimens, said sub-dispensers being individually selected to dispense specimen therein;
an integrated dispenser with multiple specimen compartments containing same or different specimens, each of said compartments being individually selected to dispense specimen therein;
an integrated dispenser that resides within said enclosure body; and
an integrated dispenser that is externally attached to said enclosure body.

19. The device of Clause 16, wherein said container comprises an embedded data storage device for storing operational data;
wherein said control unit is capable of receiving data stored in said container for displaying information to a user through visual, skin contact or sound effects and is capable of receiving data stored in said container for operating said skin treatment member in a specific manner determined by data stored in said storage device;
wherein said control unit is capable of sending data to be stored in said container; and
wherein data stored in said container is retrievable.

20. The device of Clause 16, wherein said control unit comprises an embedded data storage device to store operational information for defining said skin treatment member's operation manner;
wherein said operational information is any of: operation data; user skin condition data; user personal information; and container identification data; and
wherein said control unit is capable of displaying said information to a user through visual, skin contact or sound effects.

Claims

1. A skin treatment device, comprising:

a body;
a skin treatment member coupled to the body, said skin treatment member having a treatment surface suitable for treating human skin;
a driver coupled to said treatment surface, said driver operable to produce the treatment effect at the treatment surface; and
means for containing and dispensing treatment material to said treatment surface via an outlet in said treatment surface.

2. A skin treatment device according to claim 1, wherein the means for dispensing treatment material is manually operated.

3. A skin treatment device according to claim 1, further comprising a control unit coupled to the driver and to the means for dispensing treatment material, the control unit being operable to control the driver and to control the dispensing of treatment material.

4. A skin treatment device according to claim 3, wherein the control unit includes:

means for storing data and programs for controlling the driver and the dispensing of material; and
a data interface for sending and receiving data and programs to and from the control unit from an external device.

5. A skin treatment device according to claim 4, wherein the data interface is:

(a) a wireless transmitter/receiver within the said control unit;
(b) a data communication component that utilizes the wireless charging circuitry to transmit digital data; or
(c) one or more electrical contacts that connect to the said control unit

6. A skin treatment device according to any of Claims 1 to 5, wherein said means for containing and dispensing treatment material comprises a removable and replaceable dispenser cartridge.

7. A skin treatment device according to any preceding Claim, wherein said means for containing and dispensing treatment material comprises a dispenser having multiple sub-dispensers, said sub-dispensers being individually selectable to dispense material contained therein.

8. A skin treatment device according to Claim 6, wherein said sub-dispensers are individually selectable in combination to dispense respective materials contained therein to said treatment surface sequentially or simultaneously in combination.

9. A skin treatment device according to Claim 3, wherein said means for containing and dispensing treatment material comprises a data storage device for storing operational data.

10. A skin treatment device according to Claim 3, wherein said means for containing and dispensing treatment material comprises a data storage device for storing operational data; and
wherein said control unit is capable of receiving data from said data storage device, and is operable to:

    a) display information to a user through visual, skin contact or sound effects;
    b) operate said skin treatment member in a manner determined by data retrieved from said data storage device; or
    c) send data to be stored in said data storage device.

11. A skin treatment device according to any preceding claim, in which skin treatment is delivered by applying a series of physical motions of the treatment member and by dispensing material to a target skin area, wherein:

    the driver is operable to generate movement of the skin treatment member for treating the target skin area.

12. A skin treatment device according to Claim 11, wherein said skin treatment member is any of:

    an ultrasound vibration surface
    a brush head;
    a skin massaging tip with a treatment surface;
    a movable surface with protruding structures for contacting the target skin area.

13. A skin treatment device according to Claim 10 or claim 11, where said motions can be any of: vibrating, pulsating, rotating, tapping, scrubbing, expanding and contracting.

14. A skin treatment device according to any of claims 1 to 10 in which skin treatment is delivered by applying a series of galvanic stimulations and by dispensing material to a target skin area, wherein:

    the skin treatment member has one or more electrodes on its treatment surface for treating said target skin area with galvanic stimulations; and
    the driver is operable to apply voltage to the electrodes.

15. A skin treatment device according to any of claims 1 to 10 in which skin treatment is delivered by applying radiation and by dispensing material to a target skin area, wherein:

    the skin treatment member comprises one or more radiation units on the treatment surface for treating the target skin area with radiation; and
    the driver is operable to control illumination of the radiation units.

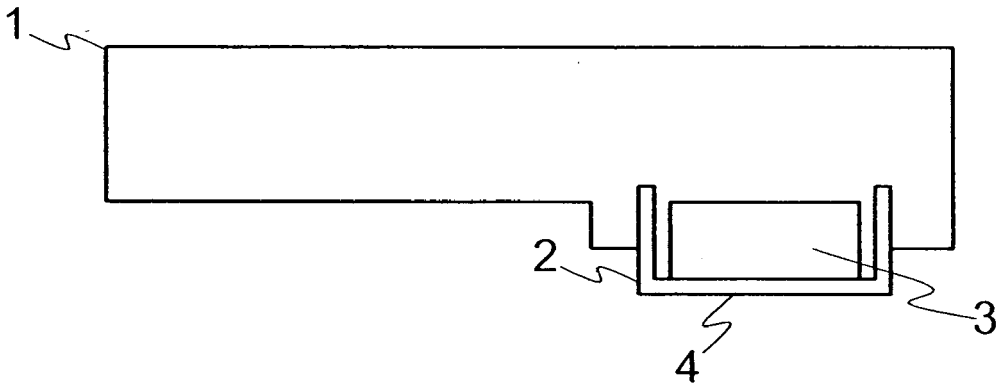

FIG. 1
Prior Art

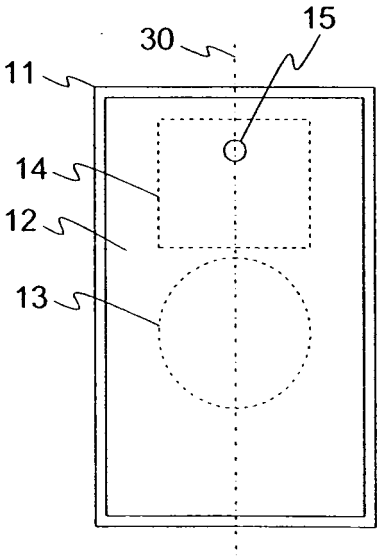

FIG. 2A

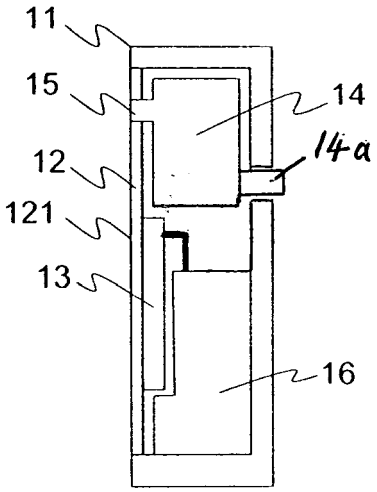

FIG. 2B

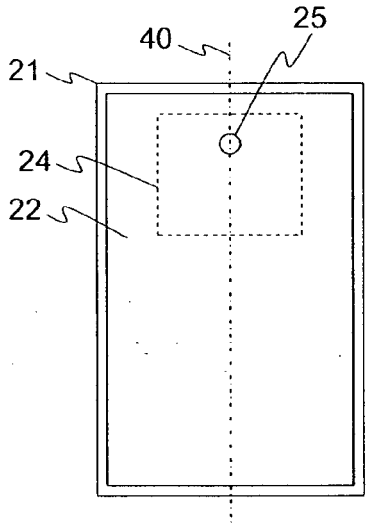

FIG. 3A

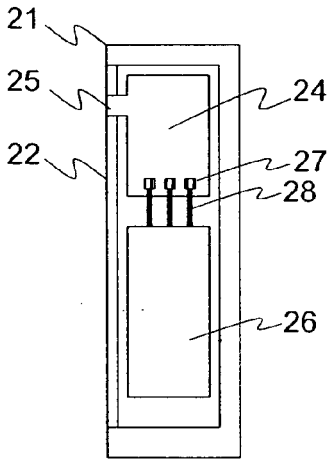

FIG. 3B

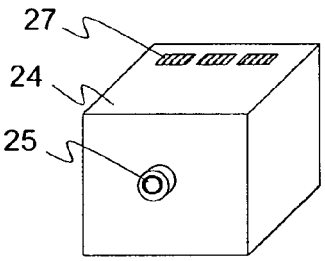

FIG. 3C

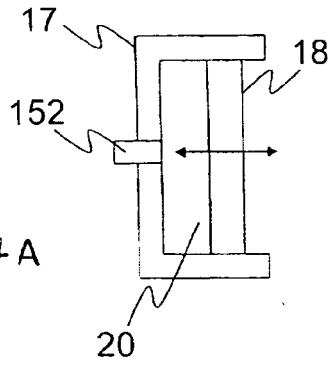

FIG.4A

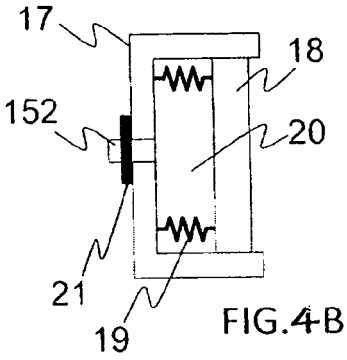

FIG.4B

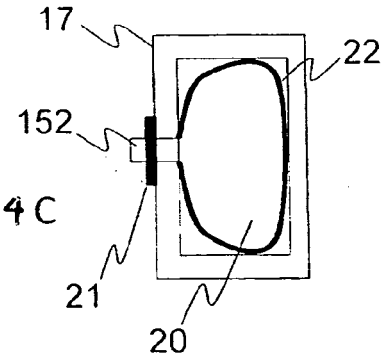

FIG.4C

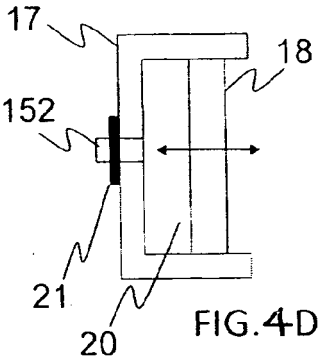

FIG.4D

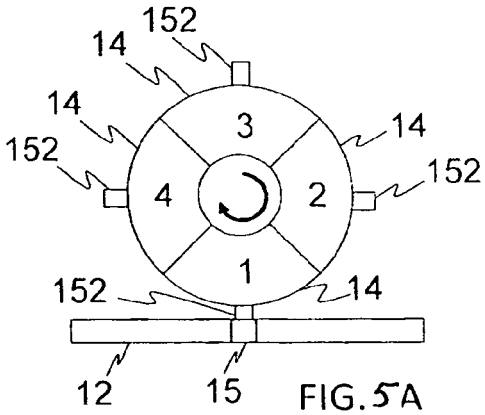

FIG.5A

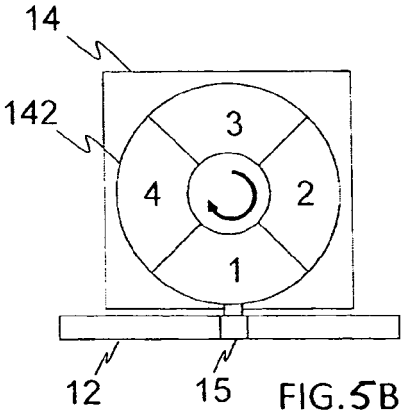

FIG.5B

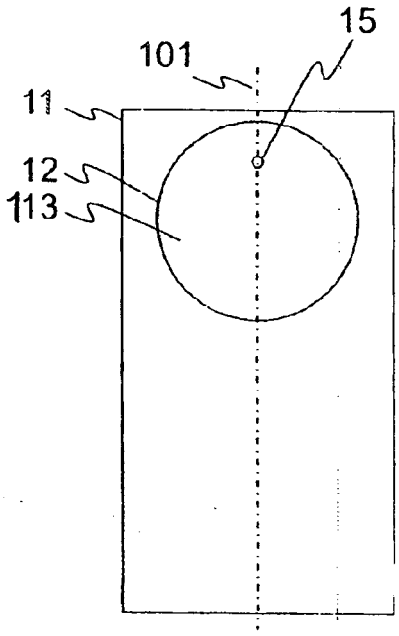

FIG. 6A

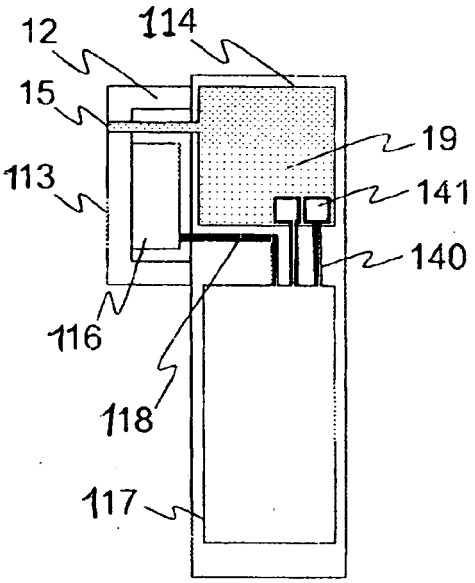

FIG. 6B

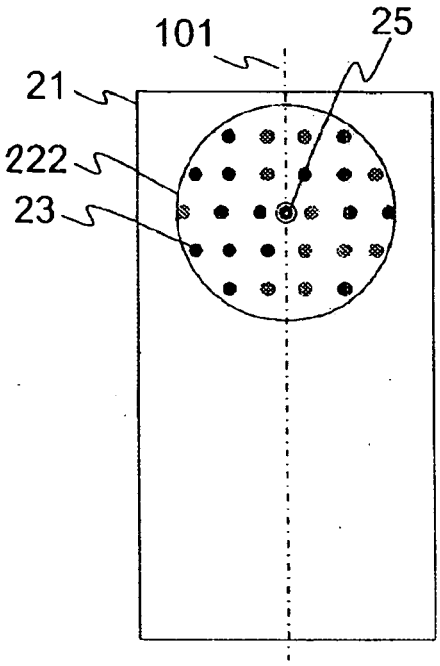

FIG. 7A

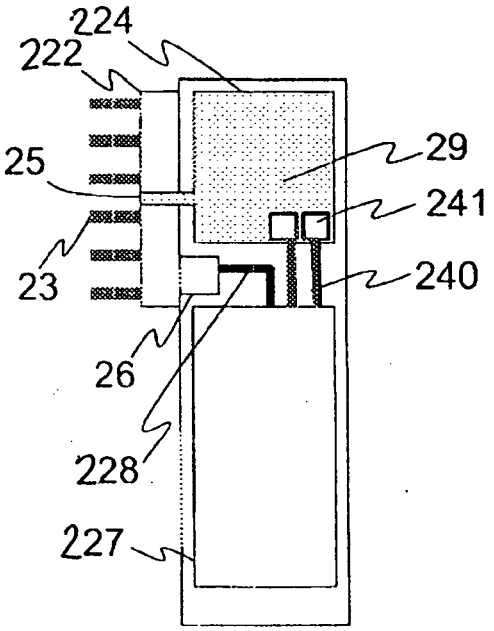

FIG. 7B

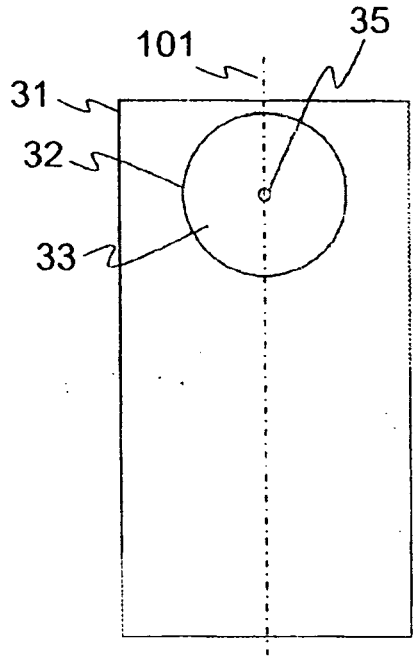

FIG. 8A

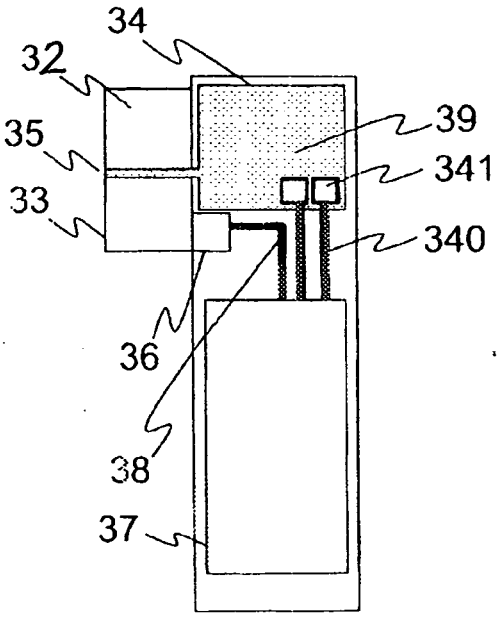

FIG. 8B

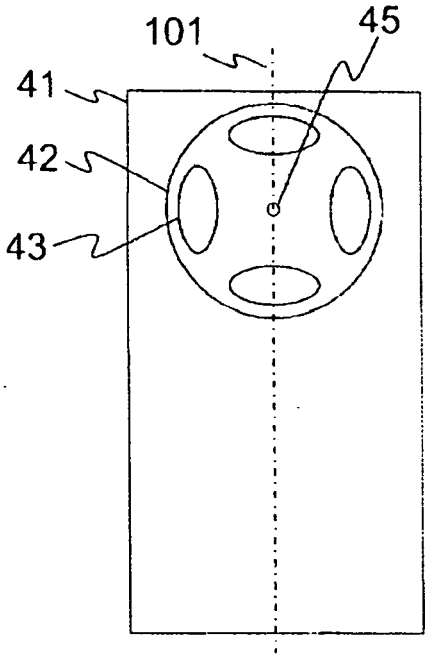

FIG. 9A

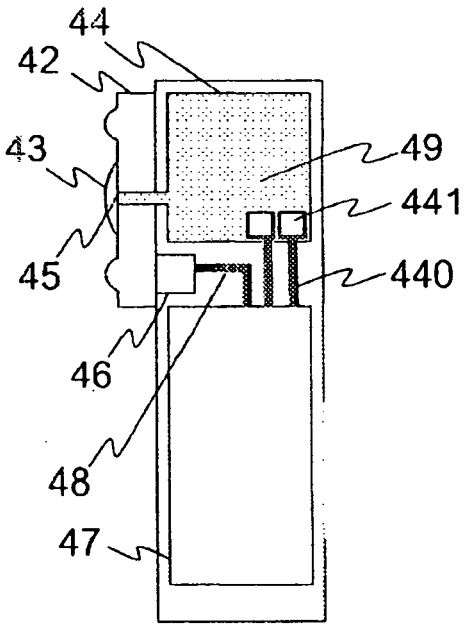

FIG. 9B

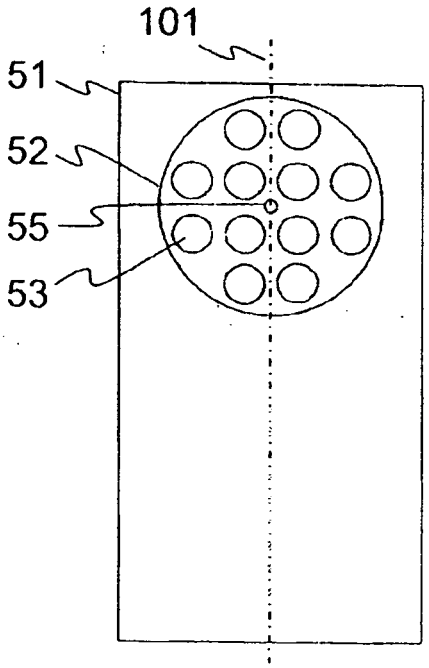

FIG. 10A

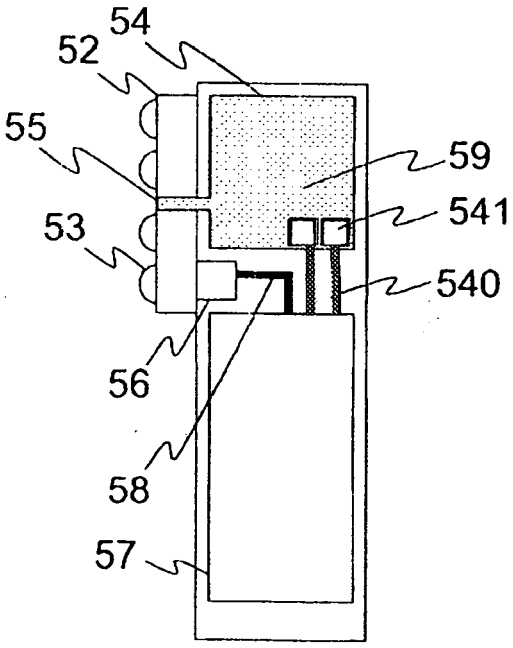

FIG. 10B

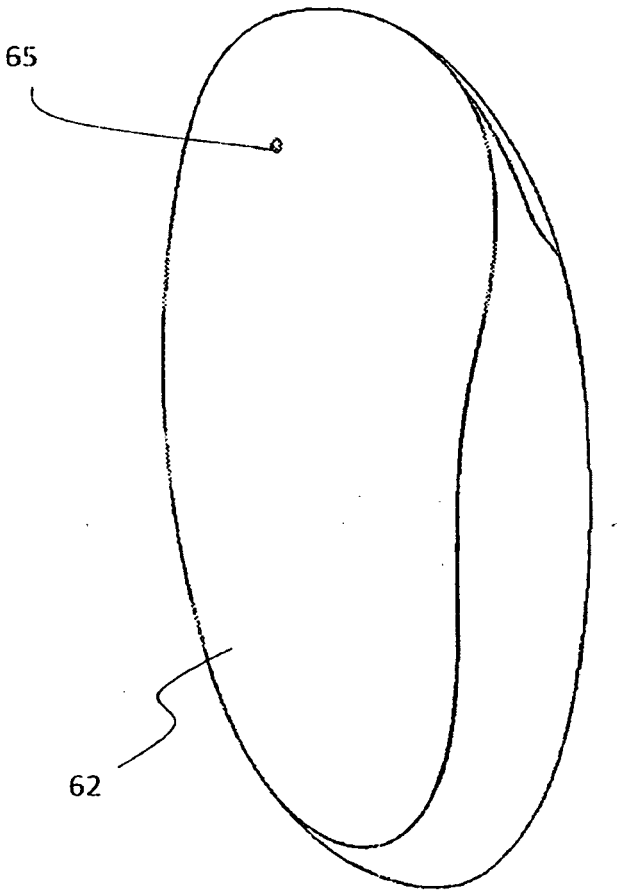

FIG. 11

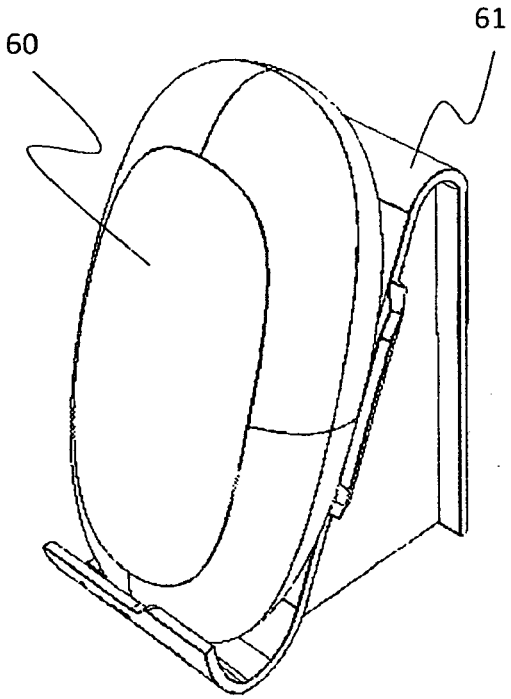

FIG. 12

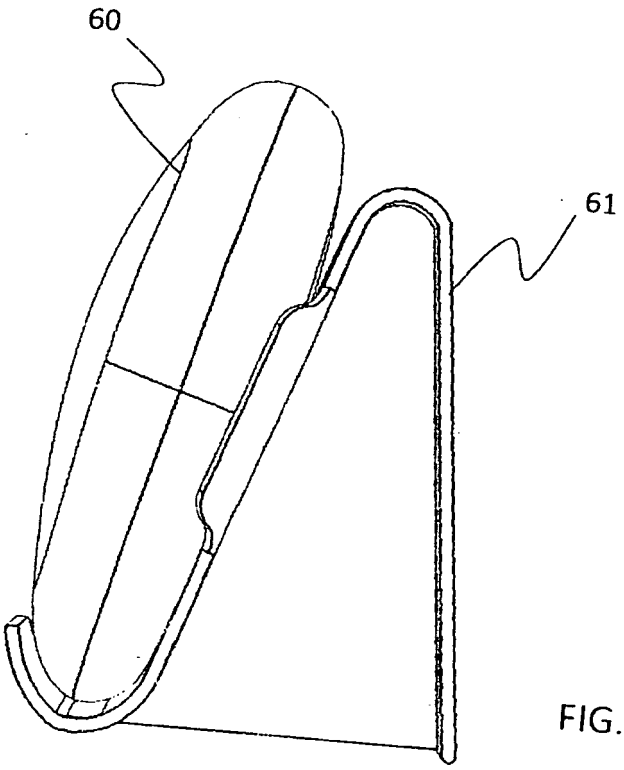

FIG. 13

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EUROPEAN SEARCH REPORT

Application Number
EP 12 25 0092

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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X	TW M 414 957 U (PIERRES INC [US]) 1 November 2011 (2011-11-01) * claims; figures *	1,6-8	
X	US 2011/251526 A1 (KIM HYUN JIN [KR]) 13 October 2011 (2011-10-13) * paragraphs [0066] - [0074]; claims; figures *	1,3, 11-15	
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X	US 2005/191252 A1 (MITSUI YUKIO [JP]) 1 September 2005 (2005-09-01) * paragraphs [0015] - [0058]; claims; figures 1,2 *	1,3, 11-15	TECHNICAL FIELDS SEARCHED (IPC) A61H

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	20 September 2012	Knoflacher, Nikolaus

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

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