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(54) **Title:** PORTABLE SMOKING CESSATION DEVICE CHARGING KIT

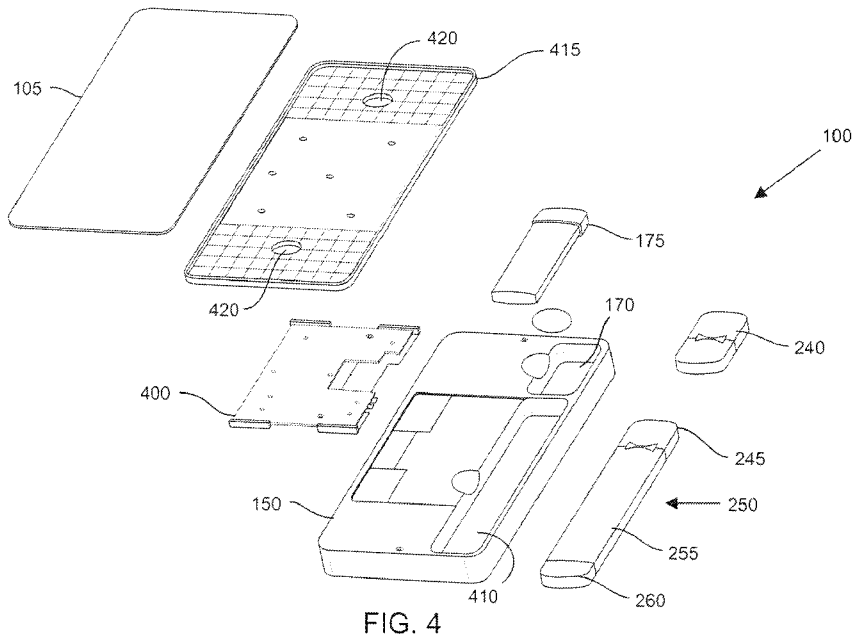

FIG. 4

(57) **Abstract:** A kit supporting a portable smoking cessation (PSC) device having a device battery and an e-liquid pod, including a front cover, a rear cover having a first well, a second well, and a third well. The first well holds the PSC device, The second well receives an e-liquid pod. The third well receives a spare device battery. A sliding rail couples the front and rear covers, and facilitates the front cover to slide laterally relative to the rear cover. An internal battery housed in the rear cover provides charging power to the PSC device. A wireless charger in the rear cover is coupled to the internal battery. A USB controller is coupled to a charging portal, between a power source and the internal battery. A first status light identifies a charging state and a battery capacity of the internal battery, and a second status light identifies charging state and battery capacity of the internal battery charged by the USB charger.

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[Continued on next page]

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Published:

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PORTABLE SMOKING CESSATION DEVICE CHARGING KIT

BACKGROUND

1. Field of the Invention

[0001] The present application pertains to portable smoking cessation devices, in general, and to a charging kit for portable smoking cessation devices,

2. Background Art

[0002] Countless smokers have adopted some form of portable smoking cessation (PSC) device to promote cessation of tobacco product smoking. Typically, battery-operated portable smoking cessation (PSC) devices include a device body, a battery attached to the device body, and a reservoir of liquid, often flavored, that contains an active ingredient, such as nicotine. The reservoir also can be called a "pod" and the liquid can be known as "e-liquid" or "juice." By inhaling through the PSC device, the e-liquid can be wicked into an electric firing chamber that produces a smoke-like vapor for inhalation. This activity can be called "vaping." In many PSC device designs, the battery is rechargeable but not removable from the device body, necessitating taking the PSC device out of service when the battery is exhausted. These PSC devices, while charging, cannot be used for their intended purpose – to provide a source of vaporized inhalant, leading to disappointment and dissatisfaction of the user. Other PSC device designs can have a "juice" pod, which is leaky, unreliable, and difficult to handle for refills. This also can leave a user disappointed and dissatisfied with the PSC device experience. One PSC device includes a removable and replaceable battery coupled to the device body along with a cartridge-based pod of juice. This PSC device body may include a cavity to hold the rechargeable battery and a cavity to receive a pod. Even though this PSC device is more convenient to a user, the user may consume all the usable power in the rechargeable battery or run out of "juice" in the middle of a vaping session, often at mid-day. If the user is out and about,

recharging the battery or obtaining a fresh pod of "juice" are impracticable. What is needed is a PSC device kit which overcomes these inconveniences.

SUMMARY

[0003] The present disclosure provides embodiments of a kit to support the use of a portable smoking cessation (PSC) device having a device battery and an e-liquid pod, including a front cover, a rear cover having a first well therein, the first well being configured to hold the portable cessation smoking device, a sliding rail coupled to the front cover and to the rear cover, the sliding rail configured to facilitate the front cover to slide laterally relative to the rear cover, and an internal battery configured to provide charging power to the portable smoking cessation device, the internal battery being housed in the rear cover. In embodiments, the rear cover has a second well therein, wherein the second well is configured to receive an e-liquid pod. The kit can include a wireless charger disposed in the rear cover, the wireless charger being coupled to the internal battery. In the kit, the rear cover further includes a third well configured to receive a spare device battery. In certain embodiments, the portable smoking cessation device is disposed in the first well and the e-liquid pod in the second well. In embodiments, the spare device battery is disposed in the third well. In some embodiments, a USB controller is coupled to a charging portal, where the USB controller in coupled between a power source and the internal battery. The kit can further include a first status light configured to identify a charging state and a battery capacity of the internal battery charged by the wireless charger, and a second status light configured to identify a charging state and a battery capacity of the internal battery charged by the USB charger.

[0004] Also provided are embodiments of a portable smoking cessation kit, including a front cover, a rear cover having a first well, a second well, and a third well therein, the first well being configured to hold a portable cessation smoking

device. Also, a sliding rail is coupled to the front cover and to the rear cover, and the sliding rail is configured to facilitate the front cover to slide laterally relative to the rear cover. An internal battery is included and is configured to provide charging power to the portable smoking cessation device, the internal battery being disposed in the rear cover. In the kit, a wireless charger receiver is coupled between a power source and the internal battery, with the wireless charger power receiver being disposed in the rear cover, and a USB controller is coupled between the power source and the internal battery, wherein one of the wireless charger power receiver or the USB controller provides power to the internal battery. In selected embodiments, the portable smoking cessation kit includes a portable smoking cessation device disposed in the first well; and an e-liquid pod disposed in the second well. In some selected embodiments, the kit includes a spare battery in the third well. The spare battery is charged by the internal battery. Embodiments of the kit also includes a wireless charger power transmitter inductively coupled to the wireless charger power receiver, the wireless charger power transmitter receives electrical power from the power source and inductively transfers a portion of the electrical power to the internal battery. In embodiments of the portable smoking cessation kit, the portable smoking cessation device includes an e-liquid pod, a device battery, and a device body coupled to the e-liquid pod and the device battery.

BRIEF DESCRIPTION OF THE DRAWINGS

[0005] Preferred embodiments of the invention will now be described, by way of example, with reference to the accompanying drawings, in which:

[0006] FIG. 1A is a front view of a portable smoking cessation (PSC) device kit, in accordance with the teachings of the present invention;

[0007] FIG. 1B is a rear view of the PSC device kit of FIG. 1A, in accordance with the teachings of the present invention;

[0008] FIG. 2A is a left side view of the PSC device kit, in accordance with the teachings of the present invention;

[0009] FIG. 2B is a right side view of the PSC device kit, in accordance with the teachings of the present invention;

[0010] FIG. 2C is a top side view of the PSC device kit, in accordance with the teachings of the present invention;

[0011] FIG. 2D is a bottom view of the PSC device kit, in accordance with the teachings of the present invention;

[0012] FIG. 3A is a front view of the PSC device kit with kit shown closed, in accordance with the teachings of the present invention;

[0013] FIG. 3B is a front view of the PSC device kit with kit shown open, in accordance with the teachings of the present invention;

[0014] FIG. 4 is a front exploded view of the PSC device kit showing kit elements therein, in accordance with the teachings of the present invention;

[0015] FIG. 5 is an illustration of the rear side of the PSC device kit, showing the relative locations of a wireless charging coil and an internal battery, in accordance with the teachings of the present invention; and

[0016] FIG. 6 is a block diagram of kit wireless and USB charging circuits, in accordance with the teachings of the present invention.

[0017] Some embodiments are described in detail with reference to the related drawings. Additional embodiments, features and/or advantages will become apparent from the ensuing description or may be learned by practicing the invention. In the FIGURES, which are not drawn to scale, like numerals refer to like features throughout the description. The following description is not to be taken in a limiting sense but is made merely for describing the general principles of the invention.

DETAILED DESCRIPTION OF THE EMBODIMENTS

[0018] The following detailed description, taken in conjunction with the accompanying drawings, is merely exemplary in nature and is not intended to limit the described embodiments or the application and uses of the described embodiments. Any implementation described herein as "exemplary" or "illustrative" is not necessarily to be construed as preferred or advantageous over other implementations.

[0019] To overcome shortcomings of existing PSC devices, one type of device has been developed with a rechargeable, removable battery and replaceable cartridge-based e-liquid pod. The kit of the present invention is directed to portable smoking cessation (PSC) devices such that a single carry case can hold a PSC device, a spare battery, a spare e-liquid pod, and a charging element which can recharge the batteries for additional PSC device use.

[0020] Turning now to FIG. 1A, a front view of PSC device kit 100 is provided and the kit changeable front faceplate 105 is shown. Front faceplate 105 can be configured to slide side-to-side (laterally), so that a user may access the items stored within. In FIG. 1B, a rear view of PSC device kit 100 is provided and the rear face of rear cover 150 is shown. FIG. 1B also illustrates a power button 160 and a spare device battery 175 which can fit securely in spare battery well 170. While in this well, spare device battery 175 can be charged using an internal battery (not shown). Button 160 turns on the wireless charging element (not shown), which can charge the internal battery (not shown). PSC device kit 100 can solve the problem of running out of battery power by mid-day, by having spare battery 175 charged and ready to be used. This solution can dissuade a user from seeking less desirable sources of, for example, nicotine including cigarettes. Referring to FIGS. 2A-2D, the left, right, top, and bottom lateral views, respectively, of PSC device kit 100 are shown. FIG. 2A depicts the left side view

of PSC device kit 100, illustrating sliding front cover 105 and rear cover 150. Spare battery 175 is disposed in spare battery well 170. First indicator light 225 can provide charging status and battery capacity level of the internal battery (not shown). FIG. 2B depicts the right side view of PSC device kit 100, showing a reversed orientation of front changeable faceplate 105 and rear cover 150 relative to FIG. 2A. For exposition, a cutaway gives a glimpse of the placement of e-liquid pod 240 in pod well 235, and PSC device 245 in PSC device well 250. FIG. 2C illustrates a top view of PSC device kit 100. In kit 100, spare battery 175 can be disposed in spare battery well 170. Battery well 170 can include an electrical connection configured to receive and to charge battery 175. Spare battery 175 can be configured to receive charging power from the internal battery (not shown). Also shown is a charging portal 210, here configured as a USB-type port, with a second battery charging status light 205. Charging portal 210 can be configured, for example, as a Micro USB charging port. Charging portal 210 can be used to charge the internal battery (not shown). While charging is proceeding, second status light 205 can be red; upon acquiring a full charge, second status light 205 can turn green. FIG. 2D shows the bottom view of PSC device kit, with sliding front cover 105 and rear cover 150. Spare battery 175 and the internal battery also can be charged by an integrated wireless charger (not shown).

[0021] Turning to FIG. 3A, sliding front cover 105 of PSC device kit 100 is shown in its stowed position. The physical profile of kit 100 can be minimized so that a stowed kit 100 can be easy to fit in a pocket or small compartment, making kit 100 easy to carry and to use. In FIG. 3B, front cover 105 has been slid from right-to-left, revealing rear cover 150. By sliding front cover 105 from left-to-right, rear cover 150 is hidden again within PSC device kit 100. Within rear cover 150 are well 235 for storing a spare "juice" pod 240 and well 265 for storing PSC

device 250. PSC device 250 may include a "juice" pod 245, PSC body 255, and PSC battery 260. An example of a PSC device, such as PSC device 250, can be the ZEAL PSC device provided by VO TECHNOLOGY, Riverside, CA USA. However, PSC device kit 100 may be configured to support other brands of PSC device 250.

[0022] FIG. 4 is an exploded view of PSC device kit 100. Kit 100 box can include removable faceplate 105, front cover 415, sliding rail 400, and rear cover 150. Front cover 415 may be magnetic, as may changeable faceplate 105, such that different changeable faceplates 105 may be removably attached to front cover 415, thus allowing for the customized appearance of kit 100. Sliding rail 400 can be coupled to front cover 415 and to rear cover 150, providing for side-to-side movement of front cover 415 with respect to rear cover 150. Rear cover 150 can be a molded case with two wells 235, 265, which may be used for a spare "juice" pod 240 and for PSC device 250, respectively. Extra battery 175 can also be held in well 170. Extra battery 175 can be charged by internal battery (not shown) so that the user of PSC device 250 can swap the current battery 260 with spare battery 175, and not be inconvenienced by waiting for device battery 260 to charge.

[0023] FIG. 5 depicts the front face of rear cover 150 of kit 100. The positions of wireless charging loop 500 and internal battery 510 are shown relative to rear cover 150. Charging loop 500 can be a plurality of loops, which can inductively generate power for internal battery 510.

[0024] FIG. 6 is a block illustration of power transfer system 600, which may be used to provide power to PSC device kit 100. Internal battery 510 may have dual charging modes – wireless charging and USB charging. In general, internal battery 510 can be a Type 703450 Lithium polymer battery, which can source 1350 mAh power at about 5 Wh, although other battery configurations may be used. Power transfer system 600 may include a wireless charging system, such as a Qi

wireless charging system specified by the Wireless Power Consortium (WPC), Piscataway, NJ, USA. Typically, received power from the wireless charging system can be about 5W with a power conversion efficiency of 80%. A full charge of internal battery 510 may be obtained in about 100 minutes. Power transfer system 600 also may include power portal 210, which may be a Micro USB power connection as specified by USB Implementers Forum, Inc., Beaverton, OR, USA. Power transfer system 600 can include a charger 605, which may be a wireless charger employing the Qi standard, and which employs one or more coil(s) 500 to effect an inductive power transfer from charger 605 to PSC device kit 100.

[0025] In operation, charger 605 can receive electrical power from power source 610, such as an AC mains power source. Power source 610 can deliver electrical power to wireless charger power transmitter 620, which is under the influence of wireless charger control and communication modules 615. Power transmitter 620 can be configured to inductively transfer power via coils 500 to wireless charger power receiver 625 disposed in rear cover 150 of kit 100. Receiver 625 also is under the influence of control and communication modules 630. Modules 615 and 630 are capable of communication therebetween to regulate the flow of power to internal battery 510. First indicator 225 can be used to identify the charging state and battery capacity of internal battery 510. Micro USB charger can produce a 5V input voltage with about 1A of input current to internal battery 510. This may result in a maximum charging time of about 80 minutes for internal battery 510. Alternatively, USB controller 635 can take electrical power from power source 610 and regulate it so that internal battery 510 can be charged. When USB controller 635 is receiving power from power source 610, and charging spare battery 175, USB status light 205 illuminates. USB status light 205 can be configured to glow red while USB charging is underway, and to glow green when USB charging is complete. The charging system for PSC device spare battery 175

can produce a maximum output voltage of about 4.25V with a 600 mA current, which can charge spare battery 175 in about 40 minutes. Conveniently, kit 100 allows a user to swap batteries when battery 260 becomes exhausted, replacing it with charged spare battery 175, and allowing extended use of PSC device 250.

[0026] As variations, combinations and modifications may be made in the construction and methods herein described and illustrated without departing from the scope of the invention, it is intended that all matter contained in the foregoing description or shown in the accompanying drawings shall be interpreted as illustrative rather than limiting. Thus, the breadth and scope of the present invention should not be limited by any of the above-described exemplary embodiments but defined in accordance with the foregoing claims appended hereto and their equivalents.

CLAIMS

What is claimed is:

1. A kit to support the use of a portable smoking cessation (PSC) device having a device battery and an e-liquid pod, comprising:

a front cover;

a rear cover having a first well therein, the first well being configured to hold the portable cessation smoking device;

a sliding rail coupled to the front cover and to the rear cover, the sliding rail configured to facilitate the front cover to slide laterally relative to the rear cover; and

an internal battery configured to provide charging power to the portable smoking cessation device, the internal battery being housed in the rear cover.

2. The kit of claim 1, wherein the rear cover has a second well therein, and wherein the second well is configured to receive an e-liquid pod.

3. The kit of claim 2, further comprising:

a wireless charger disposed in the rear cover, the wireless charger being coupled to the internal battery.

4. The kit of claim 3, wherein the rear cover further comprises:

a third well configured to receive a spare device battery.

5. The kit of claim 4, further comprising:

the portable smoking cessation device disposed in the first well; and

the e-liquid pod in the second well.

6. The kit of claim 5, further comprising:

the spare device battery disposed in the third well.

7. The kit of claim 2, further comprising:

a USB controller coupled to a charging portal, the USB controller coupled between a power source and the internal battery.

8. The kit of claim 7, further comprising:

a first status light configured to identify a charging state and a battery capacity of the internal battery charged by the wireless charger; and

a second status light configured to identify a charging state and a battery capacity of the internal battery charged by the USB charger.

9. A portable smoking cessation kit, comprising:

a front cover;

a rear cover having a first well, a second well, and a third well therein, the first well being configured to hold a portable cessation smoking device;

a sliding rail coupled to the front cover and to the rear cover, the sliding rail configured to facilitate the front cover to slide laterally relative to the rear cover;

an internal battery configured to provide charging power to the portable smoking cessation device, the internal battery being disposed in the rear cover;

a wireless charger receiver being coupled between a power source and the internal battery, the wireless charger power receiver disposed in the rear cover; and

a USB controller coupled between the power source and the internal battery, wherein one of the wireless charger power receiver or the USB controller provides power to the internal battery.

10. The portable smoking cessation kit of claim 9, further comprising:
a portable smoking cessation device disposed in the first well; and
an e-liquid pod disposed in the second well.

11. The portable smoking cessation kit of claim 9, further comprising:
a spare battery in the third well.

12. The portable smoking cessation kit of Claim 10, wherein the spare battery is charged by the internal battery.

13. The portable smoking cessation kit of claim 9, further comprising:
a wireless charger power transmitter inductively coupled to the wireless charger power receiver, the wireless charger power transmitter receiving electrical power from the power source and inductively transferring a portion of the electrical power to the internal battery.

14. The portable smoking cessation kit of claim 10, wherein the portable smoking cessation device comprises:
an e-liquid pod;
a device battery; and
a device body coupled to the e-liquid pod and the device battery.

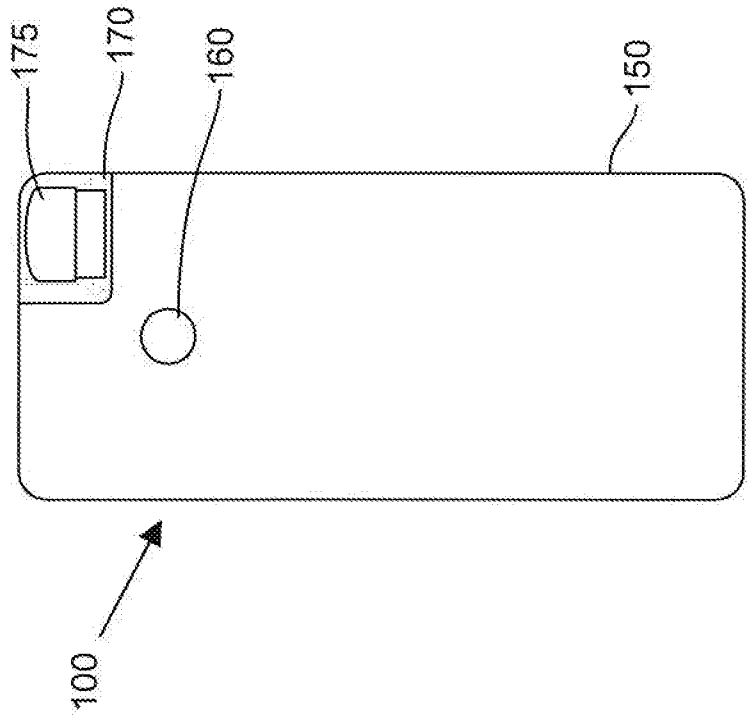

FIG. 1B

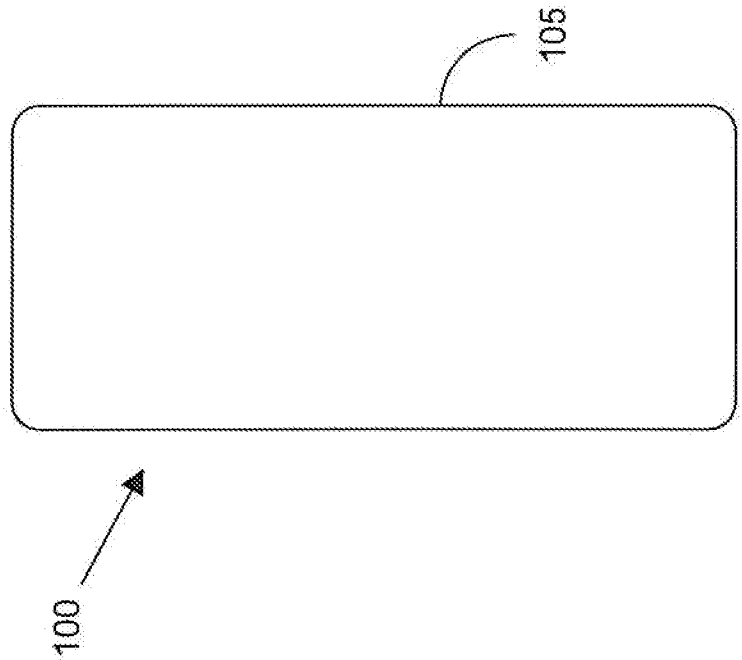

FIG. 1A

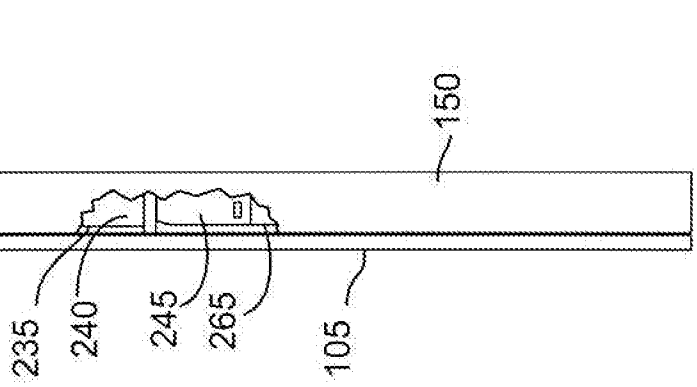

FIG. 2B

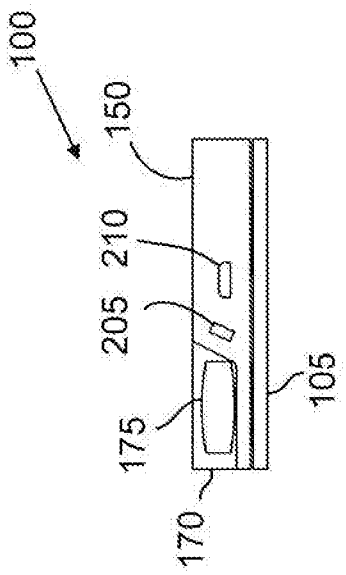

FIG. 2C

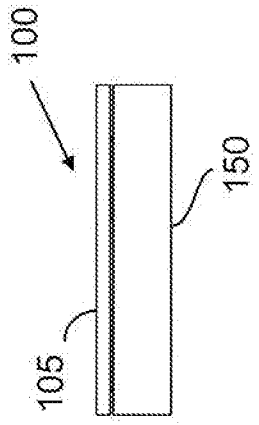

FIG. 2D

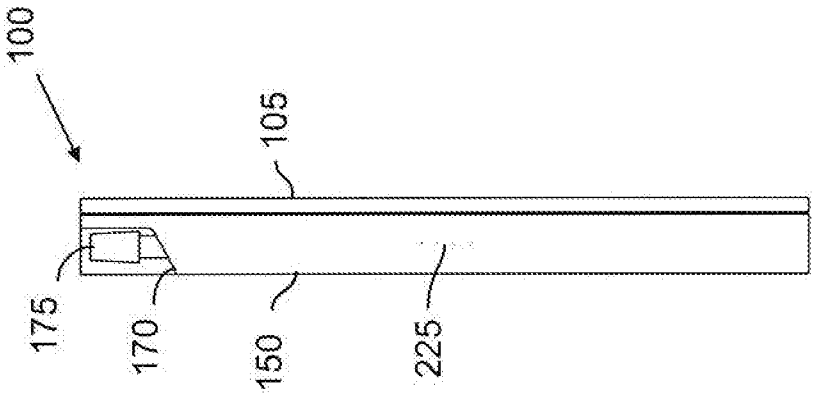

FIG. 2A

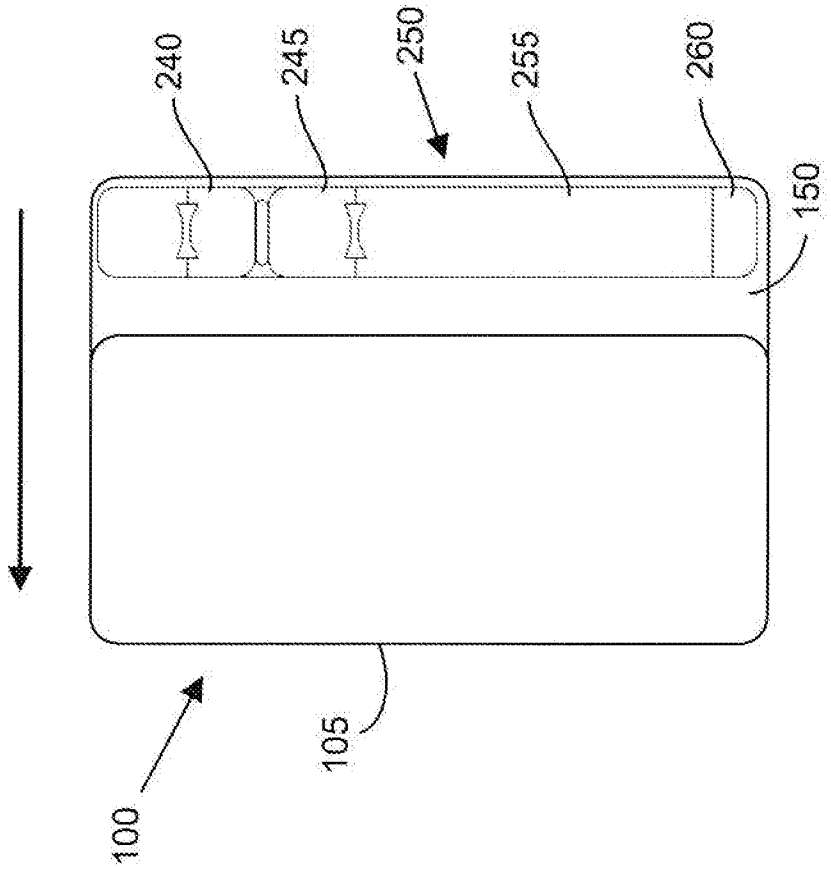

FIG. 3B

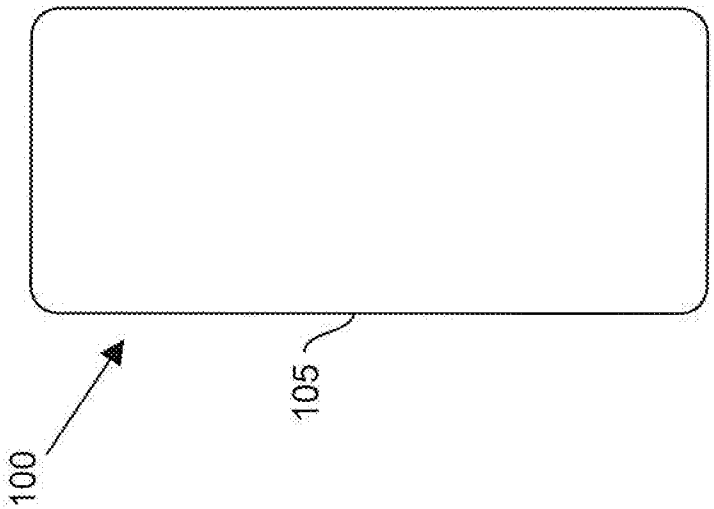

FIG. 3A

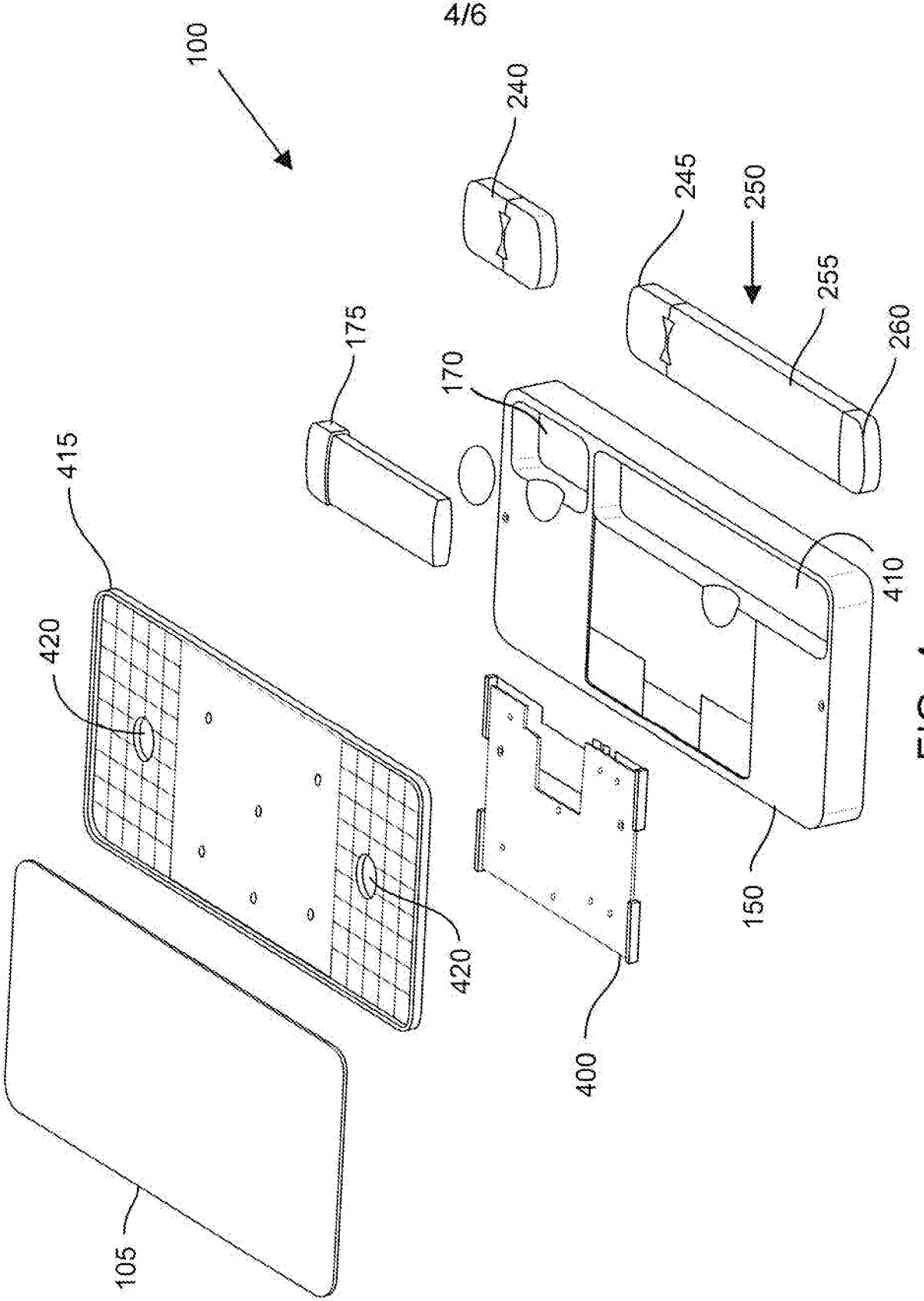

FIG. 4

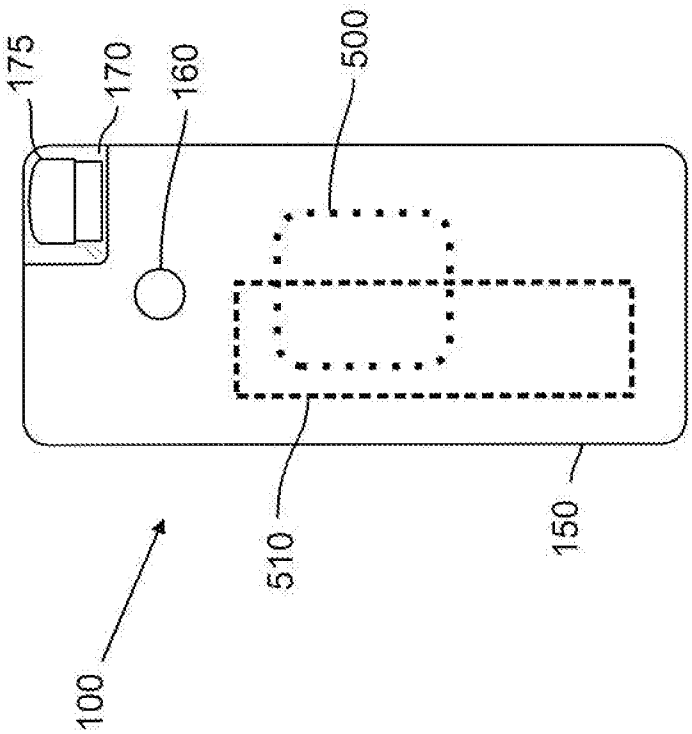

FIG. 5

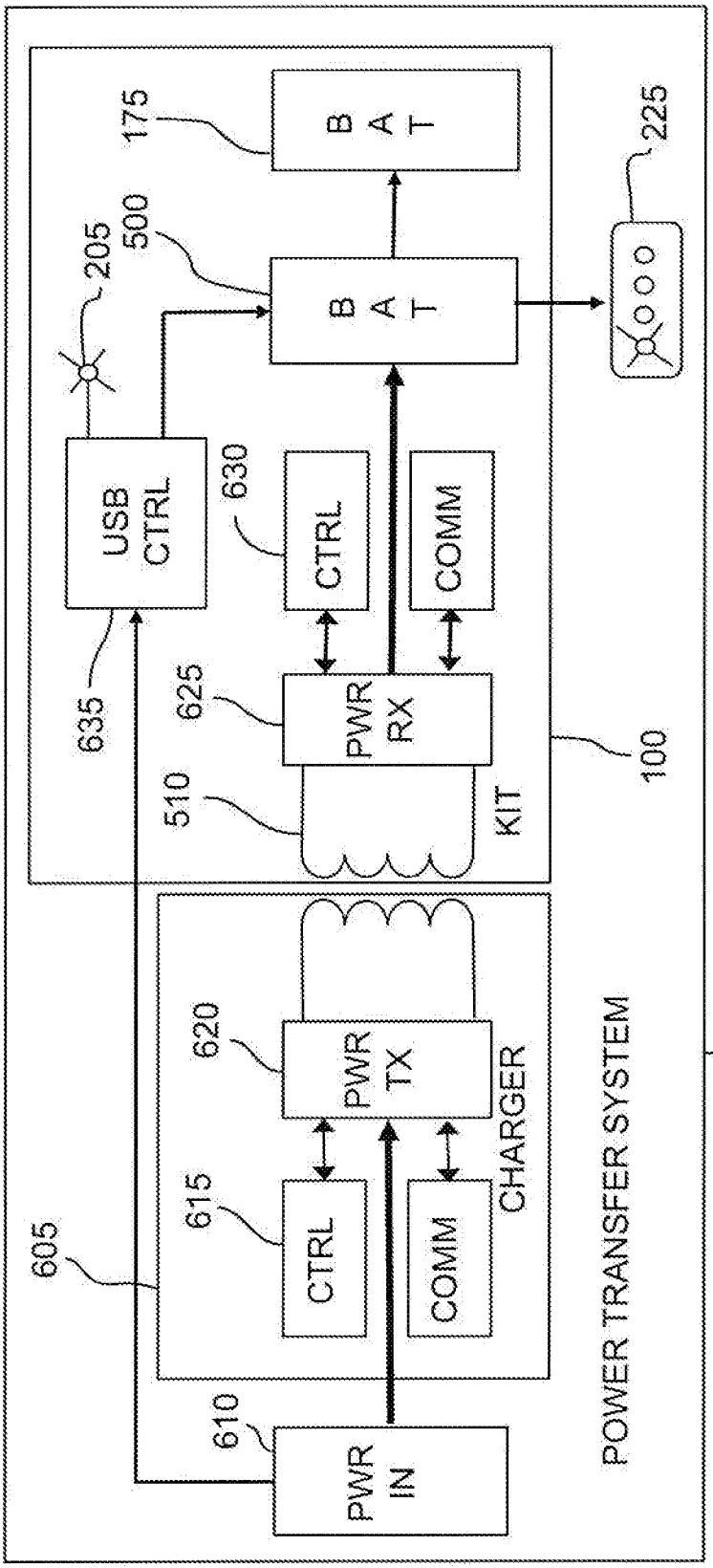
POWER TRANSFER SYSTEM
600
KIT
100
CHARGER
PWR IN
610
PWR TX
620
PWR RX
625
CTRL
615
COMM
CTRL
630
COMM
USB CTRL
635
205
500
BAT
175
225
605
510

FIG. 6

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US18/59903

A. CLASSIFICATION OF SUBJECT MATTER

IPC - A24F 15/00, 15/12, 15/14, 15/18, 47/00 (2018.01)

CPC - A24F 47/00, 47/002, 47/008; B65B 3/00, 3/04

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

See Search History document

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

See Search History document

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

See Search History document

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 9,668,522 B2 (BEYOND TWENTY LTD) 6 June 2017; abstract, figures 6A, 6B, 8, 11, column 8, lines 20-25, 45-60, column 15, lines 20-30, column 16, lines 20-45, column 19, lines 5-20, column 20, lines 63-67, column 24, lines 55-65, column 25, lines 50-65	1-7 & 9-14
Y	US 2009/0223841 A (MACK, A) 10 September 2009; figures 5, 11A, 13, paragraphs [0042]-[0043]	1-7 & 9-14
Y --- A	US 2015/0349578 A1 (CORNING INCORPORATED) 3 December 2015; figures 3a, 4a & 9a; paragraphs [0030], [0035] & [0037]	3-6 & 9-14 --- 1-2 & 7-8
Y	US 9,112,356 B2 (COVER, J) 18 August 2015; figures 2 & 3, column 3, lines 15-40 & 50-60	6 & 11-12

☐ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

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"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

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"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
26 December 2018 (26.12.2018)	17 JAN 2019
Name and mailing address of the ISA/ Mail Stop PCT, Attn: ISA/US, Commissioner for Patents P.O. Box 1450, Alexandria, Virginia 22313-1450 Facsimile No. 571-273-8300	Authorized officer Shane Thomas PCT Helpdesk: 571-272-4300 PCT OSP: 571-272-7774