



(51) International Patent Classification:

A24F 40/40 (2020.01) A24F 40/85 (2020.01)

A24F 40/10 (2020.01)

(21) International Application Number:

PCT/EP2024/065589

(22) International Filing Date:

06 June 2024 (06.06.2024)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

23178377.0 09 June 2023 (09.06.2023) EP

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(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM,

AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CV, CZ, DE, DJ, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IQ, IR, IS, IT, JM, JO, JP, KE, KG, KH, KN, KP, KR, KW, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, MG, MK, MN, MU, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC, SD, SE, SG, SK, SL, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, WS, ZA, ZM, ZW.

(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, CV, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SC, SD, SL, ST, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, ME, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG).

Published:

— with international search report (Art. 21(3))

(54) Title: AEROSOL-GENERATING DEVICE WITH MAGNETIC LOCK

(57) Abstract: An aerosol-generating device (100) for heating an aerosol-forming substrate of a consumable (13) comprises a frame (20) for carrying at least a battery (12), a consumable (13) and/or a heater, a component (30) of an outer housing of the device for at least partially receiving the frame, and a movable element (21) movable between a first position and a second position; wherein the device is configured to be in an assembled state in which the frame and the component are fixed to each other and the frame is at least partially received in the component, and an unassembled state in which the frame and the component are not fixed to each other. A device holder (200) for holding, assembling or disassembling the aerosol-generating device (100) comprises a repulsive magnet or electromagnet (210) which triggers the movement of the movable element (21).

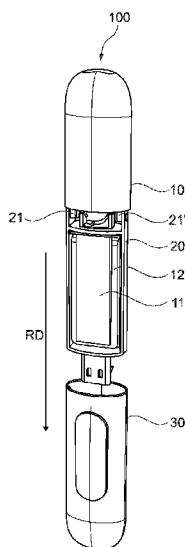


Fig. 1B

Aerosol-generating device with magnetic lock

Technical field

5 The present invention relates to an aerosol-generating device for heating an aerosol-forming substrate of a consumable. The device is configured to be in an assembled state, and to be in an unassembled state, wherein transitioning from the assembled state to the unassembled state is achieved by a movable element being moved from a first position to a second position, the movement of the movable element being
10 triggerable by magnetic force. The present invention further relates to a device holder for holding, assembling and/or disassembling such an aerosol-generating device, and to a method for transitioning such an aerosol-generating device from the assembled state to the unassembled state.

15 Technical background

Aerosol-generating devices, in particular Electronic Nicotine Delivery Systems (known as ENDS) have become popular worldwide over the last decades. These devices are alternatives to traditional combustible tobacco products such as cigarettes.

20 Different types of aerosol-generating devices are currently available on the market, based on various aerosol-generating technologies and aerosol-generating substrates.

One example of a subset of aerosol-generating devices employ heated tobacco products, also known as “heat-not-burn” products and/or systems (HNB). These HNB systems
25 can generate an inhalable aerosol from heating a tobacco containing substrate, usually in solid or pulverulent form. Such HNB systems require an electronic device comprising a heating chamber to heat up a tobacco containing substrate instead of burning tobacco as performed in conventional cigarettes. A further subset of aerosol-generating devices evaporate or vaporize a liquid (known as e-liquid) contained in a
30 pod, wherein the liquid may or may not comprises nicotine to generate an aerosol to be

inhaled by a user. These liquid-based aerosol-generating devices are convenient for users seeking an instant generation of an inhalable aerosol.

5 The above-mentioned aerosol-generating devices are usually provided with multiple components, in particular electronic components that need to be replaced during their lifetime. One example of such a component may be a battery, a pod, a printed circuit board (PCB), and/or a heater. These multiple components are usually housed within the aerosol-generating device.

10 In present aerosol-generating devices such a replacement of a component is usually cumbersome and cannot be easily performed. In other devices, there are visible connection means and/or the replacement can be performed by the user itself. Such a self-service may not always be desirable.

15 In view of these disadvantages, the present aerosol-generating devices may not always lead to optimum results, and there is a need to improve the present aerosol-generating devices. In particular, it is desirable that the replacement of a component can be performed easily and fast. At the same time, such a replacement should only be performed by authorized personnel, which may increase safety. In addition, a locking
20 mechanism of the aerosol-generating devices should not deteriorate their visual appearances.

Thus, an object of the present invention is to address the disadvantages of the present devices and to provide an improved aerosol-generating device for consumables. It is a
25 further object to provide a respective device holder for holding, assembling and/or disassembling an aerosol-generating device and to provide a respective method.

Summary of the invention

30 The above-mentioned objects and other objects, which become apparent from the following description, are solved by the subject-matter of the independent claims. Preferred embodiments are subject of the dependent claims.

A 1st embodiment of the invention is directed to an aerosol-generating device for heating an aerosol-forming substrate of a consumable, the device comprising: a frame for carrying at least a battery, a consumable and/or a heater; a component of an outer housing of the device for at least partially receiving the frame; and a movable element
5 movable between a first position and a second position; wherein the device is configured to be in an assembled state, in which the frame and the component are substantially fixed to each other and the frame is at least partially received in the component, and to be in an unassembled state, in which the frame and the component are substantially not fixed to each other; wherein transitioning from the assembled
10 state to the unassembled state is achieved by the movable element being moved from the first position to the second position, the movement of the movable element is triggerable by magnetic forces, and the movable element is covered by the component in the assembled state.

15 In this manner, the present disclosure provides for an improved aerosol-generating device. In particular, the disassembling of the aerosol-generating device can be done easily and quickly, without having multiple moving parts and/or elements. Hence the construction for disassembling is less complex, which reduces costs in terms of maintenance, service, or the like. In addition, the aerosol-generating device according
20 to the present disclosure facilitates that merely authorized personnel may disassemble the device. This can be achieved without damaging the aerosol-generating device.

Further, since the movement of the movable element, which may trigger that the aerosol-generating device transitions from the assembled state to the unassembled
25 state, is triggerable by magnetic forces, it can be dispensed with any further means for connection or the like. In particular, no means such as adhesives, glues, mechanical connections such as press fittings, form fittings, screws, bayonet locks, bayonet catches, bayonet couplings, hinged catches, hinged locks, hinged couplings, or the like are necessary. In one example, it may be dispensed with such of the afore mentioned
30 means. Further, the consumer may not need his or her fingers and/or the overall hands in order to move the movable element. Overall this additionally provides for an optically attractive aerosol-generating device. For example, there are fewer parts or the like for the consumer to see. This meets the aesthetic requirements of the consumer, but also ensures less distraction or the like.

Further, the magnetic forces as described herein also have the advantage that the disassembly the aerosol-generating device is not obvious to any consumer and may require particular knowledge. For instance, such knowledge may comprise the location
5 of the magnet in the aerosol-generating device and/or the strength of a respective counter magnet needed for moving the movable element. This may only be known to authorized and/or skilled personnel.

Moreover, since the movable element is covered by the component in the assembled
10 state, this has the advantage that mechanical locking is done substantially from the inside of the device and can thus not be seen from the outside. This ensures a neat product, with less parts on the outside. This increases convenience and reduces interference when inhaling aerosols formed by the aerosol-forming substrate.

Such disassembling may be useful for instance for replacing parts of the aerosol-
15 generating device, such as a battery, a pod and/or a heater.

The frame may be understood as a structure for carrying at least a battery, a consumable and/or a heater. In one example, the frame may be a carrying structure
20 such that it provides for sufficient mechanic integrity.

The component of the outer housing of the aerosol-generating device may be understood as a part that can engage with the frame. In one example, the component may be a handle or the like, such as a handle that can be grabbed by a consumer.
25

The movable element may be understood such that it can be an element of any shape. However, as it is moved by way of magnetic forces, it may comprise magnet or the like. The movable element may be one single piece, which is responsible for transitioning the device from the assembled state to the unassembled state.
30

The first and second position may be spaced distantly apart at least partially.

The aerosol-generating device may be most of its lifetime in the assembled state. In such an assembled state, the frame and the component may not be moved apart from

one another without substantially damaging one or more parts of the aerosol-generating device. This ensures integrity during most of the aerosol-generating device's lifetime.

5 The unassembled state means that the frame and the component can be moved apart from one another without substantially damaging one or more parts of the aerosol-generating device. The unassembled state does not necessarily mean that the frame and the component are moved apart from one another.

10 The movable element being covered by the component in the assembled state means that substantially no part of the aerosol-generating device, which is responsible for disassembling the aerosol-generating device, can be seen from outside the device. For instance, there are no holes and/or openings or the like in the component, which would allow the movable element to be seen from the outside. The existence of such holes
15 and/or openings may impair that merely authorized personnel can see and/or disassemble the aerosol-generating device. Further, some prior art documents may provide for movable elements being moved by a hand of a consumer, which is cumbersome and requires that the movable element is not covered. The present disclosure provides for the advantage that the movable element does not need to be
20 moved by one or fingers and/or hands of a consumer.

According to a 2nd embodiment, in the aerosol-generating device according to the preceding embodiment, in the assembled state, the movable element is not accessible from outside the device, such that the movable element cannot be moved by touching.

25 This has the advantage that the consumer may not easily disassemble the aerosol-generating device. This also increases safety, as unintended and/or accidental disassembling of the aerosol-generating device can thus be substantially prevented.

30 In addition, this embodiment increases the mechanical integrity and longevity of the aerosol-generating device, as the movable element is not altered and/or adversely affected by touching.

According to a 3rd embodiment, in the aerosol-generating device according to any one of the preceding embodiments, the movable element is one integral cylindrically shaped element, optionally wherein the movable element has an axis of extension substantially orthogonal to the receiving direction of the frame.

5

Thereby, merely one integral element needs to be moved for transitioning from the assembled state to the unassembled state. This simplifies the movement. Further, the cylindrically shaped element has the advantage that the element may be better fitted into surrounding parts of the aerosol-generating device, as there are substantially no sharp edges or the like.

10

The axis of extension may be understood as the main axis that defines a relatively large dimension of the movable element. In case the movable element is a cylindrically shaped element, the axis of extension may be the axis that passes through the front and rear faces of the cylindrically shaped element.

15

In one example, the axis of extension may be substantially parallel to the movement direction from the first to the second position and/or vice versa. This has the advantage that the extension of the movable element can be correlated easier to surrounding parts of the aerosol-generating device to establish the transitioning from the assembled to the unassembled state.

20

The term substantially as used in the present disclosure may include manufacturing tolerances as understood by the skilled person.

25

According to a 4th embodiment, in the aerosol-generating device according to any one of the preceding embodiments, in the first position, the movable element overlaps the frame and the component at least partially on one axis, and wherein, in the second position, the movable element does not overlap the component on that axis.

30

Overlapping the frame and the component at least partially on one axis means that the movable element extends over the frame and the component at least partially on the one axis. For instance, the one axis may be the axis of extension of the movable element

as described in the 3rd embodiment. Further, the one axis may alternatively or additionally be substantially orthogonal to the receiving direction of the frame.

5 When the movable element does not overlap the component on that axis in the second position, the movable element does not extend over the component on the one axis. This may allow for the frame and the component to be pulled apart from one another easily.

10 Further, attributable to the 4th embodiment, the movable element may be part of the frame and not part of the component. Typically, the component may at least partially enclose the frame in the assembled state. Hence, the component may be regarded as an outer part of the aerosol-generating device as seen from the frame. Thereby, when the movable element is part of and/or is stored in the frame, more space can be provided and used inside the aerosol-generating device. In contrast, if the movable element was
15 part of and/or was stored in the component, more complex means must be provided in the frame. For instance, a greater cutout for the movable element would need to be provided in the frame such.

20 According to a 5th embodiment, in the aerosol-generating device according to any one of the preceding embodiments, the frame comprises a biasing element, preferably a spring, providing a biasing force to the movable element from the second position to the first position.

25 The biasing force is directed from the second position to the first position. This has the advantage that the movable element adopts a resting position in the first position by way of the biasing element without requiring any further interaction. Thereby, the assembled state may be safely maintained as long as it is desired.

30 The biasing force may be directed in one straight line, for instance from the inside of the aerosol-generating device to its outside. The biasing element may be provided such that it adopts a small space, for instance, the space encompassed by it may be smaller than the one of the movable element.

According to a 6th embodiment, in the aerosol-generating device according to any one of the preceding embodiments, the biasing element is arranged substantially orthogonally to the receiving direction of the frame, optionally wherein the biasing element is arranged at an inner side of the movable element, wherein the inner side of the movable element is direct to the inside of the aerosol-generating device.

The biasing element being arranged substantially orthogonally to the receiving direction of the frame means that the biasing element has a main axis of extension, which is arranged substantially orthogonally to the receiving direction of the frame. The biasing element may deform under a force, e.g., when a counter magnet (e.g., the repulsive magnet and/or electromagnet described elsewhere herein) provides for a magnetic force pushing the movable element against the biasing element. Such a deformation of the biasing element may occur substantially orthogonally to the receiving direction of the frame. This simplifies the construction and the mechanism of movement.

The biasing element being arranged at an inner side of the movable element has the advantage that the biasing element is even less accessible and, thereby, more protected from any mechanical impacts of the environment. This reduces any needs for maintenance or the like. As understood, the inner side of the movable element is substantially opposite to the outer side of the movable element, wherein the outer side is directed from the inside to the outside of the aerosol-generating device.

According to a 7th embodiment, in the aerosol-generating device according to any one of the preceding embodiments, the direction of the movement of the movable element from the first to the second position is substantially orthogonal to the receiving direction of the frame. Preferably, also the direction of the movement of the movable element from the second to the first position is substantially orthogonal to the receiving direction of the frame.

This direction of movement has the advantage that a reduced way of movement of the movable element is necessary to ensure that the movable element overlaps the component and the frame in the first position and that it does not overlap the

component in the second position. Hence, the movement can be reduced, which provides for a more efficient disassembling and assembling.

5 According to an 8th embodiment, in the aerosol-generating device according to any one of the preceding embodiments, the movable element comprises a magnet or substantially consists of a magnet, preferably a neodymium magnet, wherein the magnetic forces are providable by means of a repulsive magnet and/or an electromagnet, which is/are preferably not comprised by the device.

10 A magnet as used herein may be a body that generates a magnetic field in its environment. In this magnetic field, certain other bodies may be magnetically attracted or repelled. By such an attraction or repulsion magnetic forces occur, as used and referred to herein.

15 The movable element comprising a magnet means that about at least 10%, preferably at least 20%, preferably at least 30%, preferably at least 40%, preferably at least 50%, preferably at least 60%, preferably at least 70%, preferably at least 80%, preferably at least 90%, preferably at least 95%, preferably at least 99% of the volume of the movable element may be a magnet.

20 The neodymium magnet has the advantage that it is a rather strong magnet, also known as a super magnet. Thereby, already a rather small size magnet may be sufficient to provide for a strong force.

25 A repulsive magnet may be for instance provided by way of a magnet with a magnetic pole pointing to an equal magnetic pole of another magnet. The magnet/repulsive magnet may be provided by means of a permanent magnet.

30 An electromagnet may be a magnet in which the magnetic field is produced by means of electric current. Electromagnets usually comprise a wire wound into a coil. A current through the wire may create a magnetic field which may be concentrated in a hole in the center of the coil.

The magnetic forces provided by the repulsive magnet and/or the electromagnet may be stronger than the biasing force so as to overcome the biasing force to move the movable element from the first position to the second position.

5 According to a 9th embodiment, in the aerosol-generating device according to any one of the preceding embodiments, the component comprises a locking recess for receiving the movable element at least partially, wherein, in the first position and in the assembled state, the movable element is at least partially received in the locking recess.

10 The locking recess may be understood as a latch configured for housing the movable element. In the first position and when the aerosol-generating device is in the assembled state, the movable element may be housed at least partially in the locking recess.

15 As understood by the skilled person, the movable element may also be in the first position but not received at least partially in the locking recess. This may be the case, for instance, in the assembled state of the aerosol-generating device.

20 According to a 10th embodiment, in the aerosol-generating device according to any one of the preceding embodiments, the locking recess is arranged substantially orthogonally to the receiving direction of the frame, and wherein the locking recess has a chamfer on an outer side facing the frame at first during receiving of the frame.

25 The chamfer may also be regarded as a beveled edge or the like. The chamfer has the advantage that the frame can be received more easily and faster in the component. This improves the assembly. For instance, when the component and the frame need to be assembled, the frame may simply be pushed into the component. By way of the chamfer, the movable element may simply slide into the locking recess for establishing the assembled state.

30 In this manner, the skilled person also understands that the chamfer is provided on an outer side of the locking recess. This outer side should face the frame at first during receiving of the frame. This means that after further pushing the frame into the component there may be an opposing side of the recess, which then faces the frame.

However, said opposing side may be a side that does not face the frame at first during receiving of the frame.

5 According to an 11th embodiment, the aerosol-generating device according to any one of the preceding embodiments is further comprising a tamper protection means, preferably being a holographic label, configured to be attached to the component and to the frame in the assembled state and to be detached from the component and/or the frame and/or to tear when transitioning from the assembled state to the unassembled state of the device and when moving the frame and the component apart from one
10 another.

Tamper protection means may be understood as means to hinder, deter and/or detect unauthorized access to the aerosol-generating device.

15 The holographic label may be understood as comprising a hologram, and/or as a memory image referring to a photographic image, which may be produced using holographic techniques. For instance, when illuminated with coherent light, the hologram may reproduce a different three-dimensional image of the original object. The holographic label makes it more difficult to duplicate the same. The holographic
20 label may be provided only to authorized services.

This increase safety and allows authorized personnel to determine whether the aerosol-generating device has been disassembled by a consumer or the like.

25 According to a 12th embodiment, in the aerosol-generating device according to the preceding embodiment, the tamper protection means comprises two adhesive portions configured to be attached to the component and to the frame in the assembled state, and a narrow portion arranged between the two adhesive portions, wherein the narrow portion is configured to tear when transitioning from the assembled state to the
30 unassembled state of the device and when moving the frame and the component apart from one another.

This simplifies provision of the tamper protection means. As the tamper protection means is configured to break on its narrow portion, this allows to determine faster

whether the aerosol-generating device has been disassembled by potentially unauthorized personnel.

5 According to a further embodiment of the aerosol-generating device as described herein, the frame comprises plastic and/or aluminum, wherein the frame is preferably injection molded; and/or wherein the component comprises plastic and/or aluminum, wherein the component is preferably injection molded.

10 It is advantageous that the component is not made of ferromagnetic metals, otherwise the movable element would be attracted to the component. Thereby, the repulsive magnet and/or the electromagnet not comprised by the aerosol-generating device may not generate the required magnetic force to move the movable element to the second position.

15 According to a further embodiment of the aerosol-generating device as described herein, the consumable comprises or consists of a liquid aerosol-forming substrate.

20 According to a further embodiment of the aerosol-generating device as described herein, in the assembled state of the device, the movable element is in the first position, wherein, in the transition from the assembled state to the unassembled state, the movable element is in the second position, wherein, in the unassembled state, the movable element is in the second position or in the first position and not received in the locking recess and does not overlap the component.

25 According to a further embodiment of the aerosol-generating device as described herein, the movable element is a first movable element and the device is further comprising a second movable element substantially on an opposing side to the first movable element, wherein the first and/or the second movable element is/are pin shaped.

30 A 13th embodiment of the invention is directed to a device holder for holding, assembling and/or disassembling an aerosol-generating device according to any one of the preceding embodiments, the device holder comprising: a repulsive magnet and/or

an electromagnet for providing the magnetic forces which trigger the movement of the movable element.

Since aerosol-generating device for heating an aerosol-forming substrate of a consumable and the device holder for holding, assembling and/or disassembling an aerosol-generating device both relate to the aerosol-forming substrate, it will be understood that advantages and/or features of the aerosol-generating device may also apply to the device holder and vice versa. Thereby, the advantages and features described elsewhere herein apply analogously.

According to a 14th embodiment, the device holder according to the preceding embodiment is further comprising a tube, preferably with an elliptical cross-section and a cup spaced distantly apart from the tube, the tube and the cup configured to receive the aerosol-generating device, wherein, preferably, the holder is further comprising one or more supporting legs for supporting the tube and the cup.

The tube has the advantage that it is shaped in correspondence to the aerosol-generating device, so as to improve a form fit of these parts and to ensure a firm holding. The supporting legs facilitate that the holder can stand on a ground during ordinary use, which simplifies assembling and disassembling.

According to a 15th embodiment, the device holder according to any one of the preceding embodiments 13 or 14 is comprising clamping means for clamping the aerosol-generating device at least partially.

The clamping means has the advantage that the fit between the device holder and the aerosol-generating device is increased. The clamping means may be provided by way of a screw or the like.

The device holder as described herein may comprise or substantially consist of thermoplastic material, preferably Polylactic Acid (PLA) and/or Acrylonitrile Butadiene Styrene (ABS), wherein the device holder is preferably 3D printed or injection molded.

A 16th embodiment of the invention is directed to a method for transitioning an aerosol-generating device according to any one of the preceding embodiments 1 to 12 from the assembled state to the unassembled state, comprising: moving the movable element from the first position to the second position, wherein the movement of the movable element is triggered by magnetic forces.

It is noted that the features, aspects, embodiments and/or advantages as described herein with reference to the method are likewise applicable to the aerosol-generating device and/or the device holder and vice versa.

According to a 17th embodiment, the method according to the preceding embodiment is further comprising using the device holder according to any one of the embodiments 13 to 15, for providing the magnetic forces triggering the movement of the movable element.

The features and advantages mentioned in the context of the device holder also apply to the method accordingly.

A further embodiment of the present invention is directed to an aerosol-generating system comprising the aerosol-generating device according to any one of the preceding claims and a consumable comprising an aerosol-forming substrate.

Brief description of the figures

In the following, preferred embodiments are described, by way of example only. Reference is made to the following accompanying figures:

- Fig. 1A illustrates an aerosol-generating device according to an embodiment of the present disclosure in an assembled state.
- Fig. 1B illustrates the aerosol-generating device of Fig. 1A in a disassembled state and parts being moved apart from one another.
- Fig. 2 illustrates the aerosol-generating device of Fig. 1A in a cross-sectional view.

- Fig. 3A illustrates the aerosol-generating device of Fig. 1A in a detailed view when the movable element is in the first position.
- Fig. 3B illustrates the aerosol-generating device of Fig. 1A in a detailed view when the movable element is in the second position.
- 5 Fig. 4A illustrates an aerosol-generating device according to a further embodiment of the present disclosure, when the aerosol-generating device is about to be assembled.
- Fig. 4B illustrates the aerosol-generating device of Fig. 4A when the device is assembled.
- 10 Fig. 5A illustrates a device holder according to an embodiment of the present disclosure when the aerosol-generating device is about to be received in the device holder, in a cross-sectional view.
- Fig. 5B illustrates the device holder of Fig. 5A when the aerosol-generating device is received in the device holder, in a cross-sectional view.
- 15 Fig. 5C illustrates the device holder of Fig. 5A when the aerosol-generating device is in a disassembled state, in a cross-sectional view.
- Fig. 6 illustrates the device holder of Fig. 5A when the aerosol-generating device is received in the device holder.

Detailed description of the figures

- 20 In the subsequent passages, the invention is described with reference to the accompanying figures in more detail. It is noted that further embodiments are certainly possible, and the below explanations are provided by way of example only, without limitation. Throughout the present figures and specification, the same reference numerals refer to the same elements. The figures may not be to scale, and the relative
- 25 size, proportions, and depiction of elements in the figures may be exaggerated for clarity, illustration, and convenience. For brevity, the parts, elements, components or the like are not provided with reference signs in each and every figure, however, the skilled person understands which parts, elements, components or the like are referred to by way of at least the overall disclosure.

While specific feature combinations are described in the following with respect to exemplary embodiments of the present disclosure, it is to be understood that not all features of the described aspects have to be present for realizing the technical
5 advantages provided by the present disclosure, which is defined by the subject matter of the claims. The disclosed aspects may be modified by combining certain features of one aspect with one or more features of another aspect. Specifically, the skilled person will understand that features, components and/or functional elements of one aspect can be combined with technically compatible features, components and/or functional
10 elements of any other aspect of the present disclosure given that the resulting combination falls within the definition of the present disclosure. The skilled person also understands that certain features may be omitted in so far as they appear dispensable.

The terms “upper”, “lower”, “outer side”, “inner side”, “under”, “below”, “horizontal”,
15 “vertical” etc., which indicate the orientation or positional relationship, are based on the orientation or positional relationship shown in the drawings.

The terms “upper”, “lower”, “outer”, “inner” and the like as used in the present invention to indicate a relative position in space are used for the purpose of facilitating
20 explanation to describe a unit, device, part, component and/or feature shown in the drawings relative to the relationship of another unit, device, part, component and/or feature.

The term of the relative position in space may be intended to include different
25 orientations of the unit, device, part, component and/or feature other than those shown in the figures.

The unit, device, part, component and/or feature can be oriented in other ways (rotated by 90 degrees or other orientations), and the space-related descriptors used herein are
30 explained accordingly.

Fig. 1A shows an aerosol-generating device 100 according to an embodiment of the present disclosure in an assembled state. Fig. 1B shows the aerosol-generating device 100 of Fig. 1A in a disassembled state and parts of the aerosol-generating device 100

being moved apart from one another. The aerosol-generating device 100 is configured for heating an aerosol-forming substrate of a consumable 13 (as best seen in Fig. 2). Further, the aerosol-generating device 100 comprises a frame 20 for carrying at least a battery 12, a consumable 13 and/or a heater. As can be seen, the frame 20 may be
5 attached to a further part 10 of the outer housing of the aerosol-generating device 100.

The aerosol-generating device 100 further comprises a component 30 of the outer housing of the aerosol-generating device 100 for at least partially receiving the frame 20. The component 30 may have an oval cross-section as seen in a plane substantially
10 horizontally in Figs. 1A and 1B. The receiving direction of the frame 20 to the component 30 is indicated as RD in Figs. 1A and 1B. Moreover, the aerosol-generating device 100 comprises a movable element 21, which is movable between a first position and a second position. In the embodiment shown in Figs. 1A and 1B, a further optional movable element 21' is indicated, which is, however not mandatory. The further
15 movable element 21' is arranged substantially opposite to the movable element 21. Substantially all features of the movable element 21 may also be applicable to the further movable element 21'.

The aerosol-generating device 100 is configured to be in an assembled state (as can be
20 seen in Fig. 1A), in which the frame 20 and the component 30 are substantially fixed to each other and the frame 20 is at least partially received in the component 30. In this Fig., the frame 20 is fully received in the component 30. The aerosol-generating device 100 is also configured to be in an unassembled state (as can be seen in Fig. 1B), in which the frame 20 and the component 30 are substantially not fixed to each other.

25

Transitioning from the assembled state to the unassembled state is achieved by the movable element 21 being moved from the first position to the second position.

Further, the movement of the movable element 21 is triggerable by magnetic forces, and the movable element 21 is covered by the component 30 in the assembled state (as
30 best seen in Fig. 1A). Further, there may be no holes and/or openings in the outer shell of the component 30. Such holes and/or openings would disturb the outer appearance. Moreover, there may be no air inlets in proximity of the movable element 21 provided in the component 30.

As can be seen in Fig. 1A, in the assembled state, the movable element 21 is not accessible from outside the aerosol-generating device 100, such that the movable element 21 cannot be moved by touching. This prevents that a consumer accidentally triggers the movable element 21. Further, the outward appearance and optical
5 attractiveness is increased thereby.

Fig. 2 shows the aerosol-generating device 100 of Fig. 1A in a cross-sectional view. As can be seen, the aerosol-generating device 100 comprises a consumable 13. The consumable 13 may comprises a liquid, which can be evaporated or vaporized by means
10 of a heater comprised by the aerosol-generating device 100. The liquid may or may not comprises nicotine to generate an aerosol to be inhaled by a consumer. This provides for convenience for the consumer. In an upper portion of Fig. 2, the mouth end of the aerosol-generating device 100 may be located. On the opposing lower portion of Fig. 2, a USB plug of the aerosol-generating device 100 may be provided.

As can be further gathered, the frame 20 comprises a biasing element 22, which could be a spring in one example. The biasing element 22 provides a biasing force to the movable element 21 from the second position to the first position. In the embodiment
15 shown in Fig. 2, a further optional biasing element 22' is indicated, which is, however not mandatory. The further biasing element 22' is arranged substantially opposite to the biasing element 22. Substantially all features of the biasing element 22 may also be
20 applicable to the further biasing element 22'.

Fig. 3A shows the aerosol-generating device 100 of Fig. 1A in a detailed view when the
25 movable element 21 is in the first position. Fig. 3B shows the aerosol-generating device 100 of Fig. 1A in a detailed view when the movable element 21 is in the second position.

The movable element 21 is depicted as one integral cylindrically shaped element 21. Further, the cylindrically shaped movable element 21 has an axis of extension that is
30 substantially orthogonal to the receiving direction RD of the frame 20. In Figs. 3A and 3B, the axis of extension may be horizontal, where the receiving direction RD is vertical, e.g., from the top to the bottom.

As can be seen, in the first position, the movable element 21 overlaps the frame 30 and the component 20 at least partially on the axis of extension of the movable element 21. In the second position, the movable element 21 does not overlap the component 30 on that axis. This allows that in the second position, the frame 20 and the component 30
5 may be moved apart from one another easily without damaging any parts of the aerosol-generating device 100.

The biasing element 22 has a main axis of extension, which is arranged substantially orthogonally to the receiving direction RD of the frame 20. Further, the biasing element
10 22 is arranged at an inner side 21a of the movable element 21. As can be seen, the inner side 21a of the movable element 21 is directed to the inside of the aerosol-generating device 100. On the opposing side of the biasing element 22, i.e., the side directed to the inside of the aerosol-generating device 100, the biasing element 22 may be supported by an internal wall, which is connected to the frame 20.

15 By comparison of Figs. 3A and 3B, the direction of the movement of the movable element 21 from the first to the second position can be understood, which is namely substantially orthogonal to the receiving direction RD of the frame 20. Also the direction of the movement of the movable element 21 from the second to the first
20 position is substantially orthogonal to the receiving direction RD of the frame 20.

The movable element 21 comprises a magnet or substantially consists of a magnet, preferably a neodymium magnet. This may allow that magnetic forces can be established so as to move the movable element 21. The magnetic forces are provided by
25 means of a repulsive magnet and/or an electromagnet 210, which is not comprised by the aerosol-generating device 100 (as best seen in Figs. 5A, 5B and 5C).

The component 30 has a locking recess 31 (as best seen in Fig. 3B) on an inner side of the component 30 for receiving the movable element 21 in the first position and in the
30 assembled state. This may ensure that the frame 20 and the component 30 are substantially locked. The locking recess 31 is arranged substantially orthogonally to the receiving direction RD of the frame 20 (e.g., the locking recess 31 has a main axis which is arranged substantially orthogonally to the receiving direction RD of the frame 20).

The locking recess 31 has a chamfer 32 on an outer side facing the frame 20 at first during receiving of the frame 20.

Fig. 4A shows an aerosol-generating device 100 according to a further embodiment of the present disclosure, when the aerosol-generating device 100 is about to be assembled. Fig. 4B shows the aerosol-generating device of Fig. 4A when the aerosol-generating device 100 is assembled. The aerosol-generating device 100 of this embodiment corresponds to the one described in the foregoing embodiment and merely the differences are described for brevity.

The aerosol-generating device 100 comprises a tamper protection means 40, being a holographic label. The tamper protection means 40 comprises two adhesive portions 41 configured to be attached to the component 30 and to the frame 20 in the assembled state, and a narrow portion 42 arranged between the two adhesive portions 41. The narrow portion 42 is configured to tear when transitioning from the assembled state to the unassembled state and when moving the frame 20 and the component 30 apart from one another.

Fig. 5A shows a device holder 200 according to an embodiment of the present disclosure and an aerosol-generating device 100, which is about to be received in the device holder 200. Fig. 5B shows the device holder 200 of Fig. 5A and an aerosol-generating device 100, which is received in the device holder 200. Fig. 5C shows the device holder 200 of Fig. 5A and an aerosol-generating device 100, which is in a disassembled state.

The device holder 200 comprises a repulsive magnet and/or an electromagnet 210 for providing the magnetic forces which trigger the movement of the movable element 21. A repulsive magnet may be advantageous, since the device holder 200 then does not need to be provided with active charging and with a PCB, which may increase the costs of the device holder 200.

The repulsive magnet and/or an electromagnet 210 may be press fit and/or glued into the device holder 200 to be sufficiently held and supported by the device holder 200 and for providing respective magnetic forces against the magnet comprised by the

movable element 21. As understood, the device holder 200 may comprise a further repulsive magnet and/or an electromagnet 210', which may be capable of providing magnetic forces in combination with the further magnet 21' of the aerosol-generating device 100. Same features and advantages as regards the repulsive magnet and/or an
5 electromagnet 210 also apply to the further repulsive magnet and/or an electromagnet 210'. The repulsive magnet and/or an electromagnet 210 may have the shape of a cylinder, such as a pin. The cross section of the repulsive magnet and/or an electromagnet 210 may substantially correspond to the one of the magnet 21.

10 The device holder 200 has a tube 220, preferably with an elliptical cross-section and a cup 230 spaced distantly apart from the tube 200 along the receiving direction RD. The tube 220 and the cup 230 are configured to receive the aerosol-generating device 100. The device holder 200 further has one or more supporting legs 240. In particular, the device holder 200 has two supporting legs 240, which are connected via a rounded
15 bottom leg substantially contacting the ground during ordinary use of the device holder 200. This provides for sufficient stability to the device holder 200. The supporting legs 240 support the tube 220 and the cup 230.

The device holder 200 has clamping means 250, comprising one or more at least
20 section wise elliptically shaped structural elements and one or more screws for clamping the aerosol-generating device 100 at least partially. The structural elements are configured to substantially surround the aerosol-generating device 100 when received in the device holder 200.

25 The clamping means 250 may be configured such that they can deform the component 30 of the aerosol-generating device 100 at least partially. This may substantially prevent that the aerosol-generating device 100 undergoes a transition from the assembled to the unassembled state. Such a rather tight fit may be beneficial if the device holder 200 is used as a stand only and no removal of internal parts of the
30 aerosol-generating device 100 is anticipated. This may be for instance the case, once maintenance or the like is done of the frame 20.

The cup 230 of the device holder 200 may be provided with plug opening 260, such as a USB plug opening 260. This ensures that the USB plug of the aerosol-generating

device 100 is easily accessible in case repairs are done whilst the aerosol-generating device 100 is received in the device holder 200.

Fig. 5C may illustrate a state, after the movable element 21 has been moved to the second position and after the frame 20 has been moved to the top (as seen in this Fig.) compared to the component 30, which is maintained in the device holder 200. As understood, the component 30 may be removed from the device holder 200 subsequently, if the need arises.

During assembly, the aerosol-generating device 100 may not be required to be placed inside the device holder 200. This is attributable to the chamfer provided on the locking recess of the component 30, which eases the assembly. Thereby, the frame 20 may simply be pushed into the component 30 and the movable element 21 (which can consist of a magnet, i.e., which is a magnet) is locked automatically.

Fig. 6 shows the device holder 200 of Fig. 5A when the aerosol-generating device 100 is received in the device holder 200. Unlike Figs. 5A, 5B, and 5B, Fig. 6 is not shown in a cross-sectional view.

In all of the above-mentioned embodiments, the frame 30 comprises plastic and/or aluminum. In particular, the frame 30 could be manufactured from rigid plastic or machined from aluminum. The frame 30 may be injection molded. The component 20 also comprises plastic and/or aluminum. The component 20 may also be injection molded.

The scope of protection is determined by the claims and is not limited by the embodiments disclosed in the above figures.

List of reference signs

10	part of an outer housing
11	printed circuit board
12	battery
13	consumable

	20	frame
	21	movable element
	21a	inner side of the movable element
	21'	further movable element
5	21a'	inner side of the further movable element
	22	biasing element
	22'	further biasing element
	30	component of an outer housing
	31	locking recess
10	31'	further locking recess
	32	chamfer
	32'	further chamfer
	40	tamper protection means
	41	adhesive portions
15	42	narrow portion
	100	aerosol-generating device
	200	device holder
	210	repulsive magnet / electromagnet
	210'	further repulsive magnet / electromagnet
20	220	tube
	230	cup
	240	supporting legs
	250	clamping means
	260	plug opening
25	RD	receiving direction

Claims

1. An aerosol-generating device (100) for heating an aerosol-forming substrate of a consumable (13), the device comprising:
 - a frame (20) for carrying at least a battery (12), a consumable (13) and/or a heater;
 - a component (30) of an outer housing of the device for at least partially receiving the frame (20); and
 - a movable element (21) movable between a first position and a second position;wherein the device is configured to be in an assembled state, in which the frame (20) and the component (30) are substantially fixed to each other and the frame (20) is at least partially received in the component (30), and to be in an unassembled state, in which the frame (20) and the component (30) are substantially not fixed to each other;
 - wherein transitioning from the assembled state to the unassembled state is achieved by the movable element (21) being moved from the first position to the second position, the movement of the movable element (21) is triggerable by magnetic forces, and the movable element (21) is covered by the component (30) in the assembled state.
2. The aerosol-generating device (100) according to the preceding claim, wherein, in the assembled state, the movable element (21) is not accessible from outside the aerosol-generating device (100), such that the movable element (21) cannot be moved by touching.
3. The aerosol-generating device (100) according to any one of the preceding claims, wherein the movable element (21) is one integral cylindrically shaped element,
 - optionally wherein the movable element (21) has an axis of extension substantially orthogonal to the receiving direction of the frame (20).

4. The aerosol-generating device (100) according to any one of the preceding claims, wherein, in the first position, the movable element (21) overlaps the frame (20) and the component (30) at least partially on one axis, and wherein, in the second position, the movable element (21) does not overlap the component (30) on that axis.
5. The aerosol-generating device (100) according to any one of the preceding claims, wherein the frame (20) comprises a biasing element (22), preferably a spring, providing a biasing force to the movable element (21) from the second position to the first position.
6. The aerosol-generating device (100) according to the preceding claim, wherein the biasing element (22) is arranged substantially orthogonally to the receiving direction of the frame (20),
optionally wherein the biasing element (22) is arranged at an inner side (21a) of the movable element (21), wherein the inner side (21a) of the movable element (21) is direct to the inside of the aerosol-generating device (100).
7. The aerosol-generating device (100) according to any one of the preceding claims, wherein the direction of the movement of the movable element (21) from the first to the second position is substantially orthogonal to the receiving direction of the frame (20).
8. The aerosol-generating device (100) according to any one of the preceding claims, wherein the movable element (21) comprises a magnet, preferably a neodymium magnet, wherein the magnetic forces are providable by means of a repulsive magnet (210) and/or an electromagnet, which is/are preferably not comprised by the device.
9. The aerosol-generating device (100) according to any one of the preceding claims, wherein the component (30) comprises a locking recess (31) for receiving the movable element (21) at least partially, wherein, in the first position and in the assembled state, the movable element (21) is at least partially received in the locking recess (31).

10. The aerosol-generating device (100) according to the preceding claim, wherein the locking recess (31) is arranged substantially orthogonally to the receiving direction of the frame (20), and wherein the locking recess (31) has a chamfer (32) on an outer side facing the frame (20) at first during receiving of the frame (20).
11. The aerosol-generating device (100) according to any one of the preceding claims, further comprising a tamper protection means, preferably being a holographic label, configured to be attached to the component (30) and to the frame (20) in the assembled state and to be detached from the component (30) and/or the frame (20) and/or to tear when transitioning from the assembled state to the unassembled state of the device and when moving the frame (20) and the component apart from one another.
12. A device holder (200) for holding, assembling and/or disassembling an aerosol-generating device (100) according to any one of the preceding claims, the device holder (200) comprising:
 - a repulsive magnet (210) and/or an electromagnet for providing the magnetic forces which trigger the movement of the movable element (21).
13. The device holder (200) according to the preceding claim, further comprising a tube (220), preferably with an elliptical cross-section and a cup (230) spaced distantly apart from the tube (220), the tube (220) and the cup (230) configured to receive the aerosol-generating device (100),
 - wherein, preferably, the holder is further comprising one or more supporting legs (240) for supporting the tube (220) and the cup (230).
14. A method for transitioning an aerosol-generating device (100) according to any one of the preceding claims 1 to 11 from the assembled state to the unassembled state, comprising:
 - moving the movable element (21) from the first position to the second position, wherein the movement of the movable element (21) is triggered by magnetic forces.

15. The method according to the preceding claim, further comprising:
using the device holder (200) according to any one of the claims 12 or 13,
for providing the magnetic forces triggering the movement of the movable
element (21).

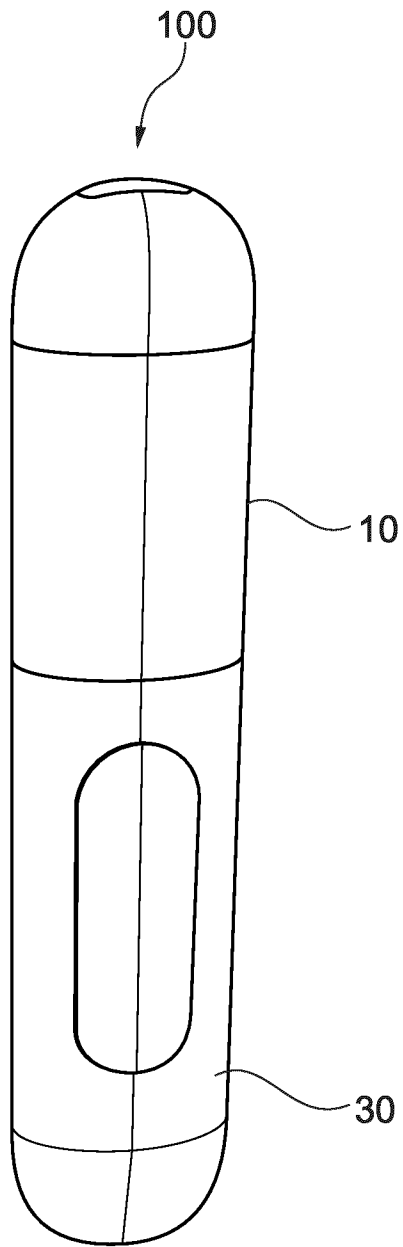


Fig. 1A

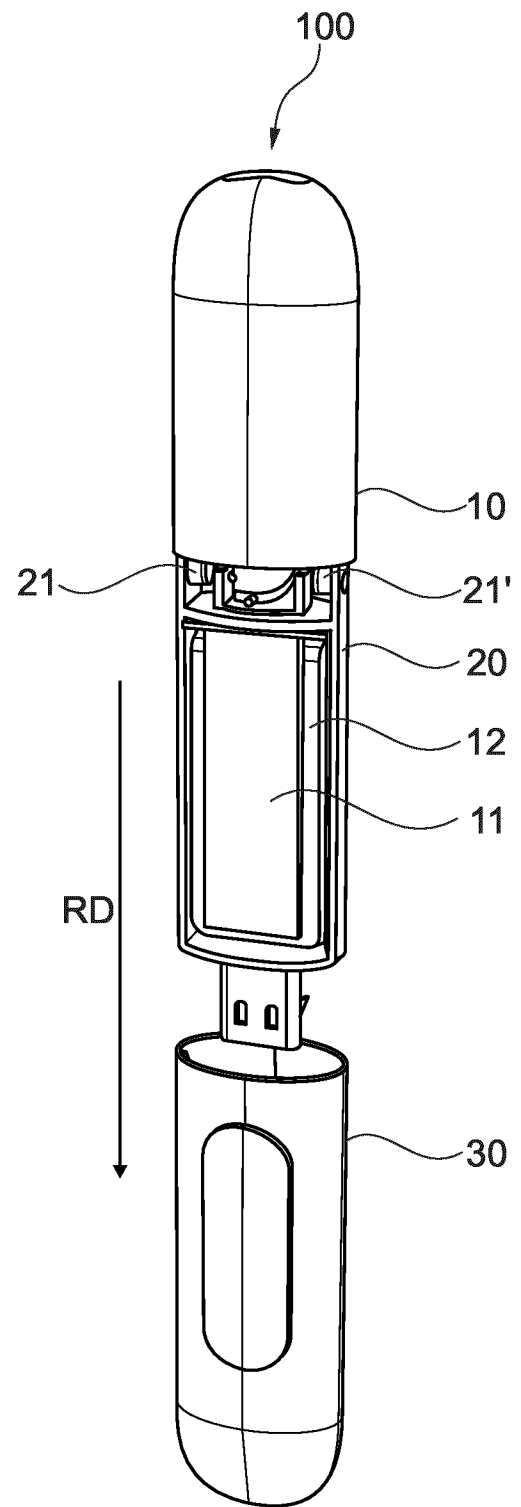


Fig. 1B

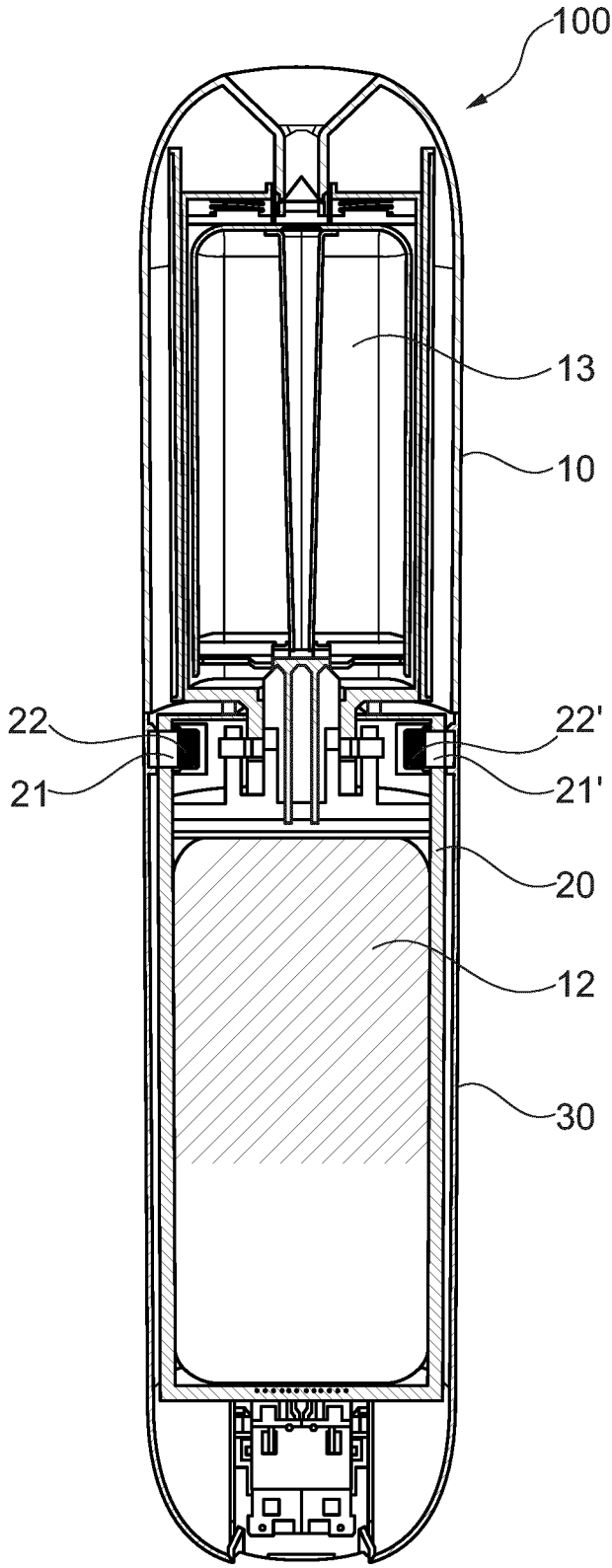


Fig. 2

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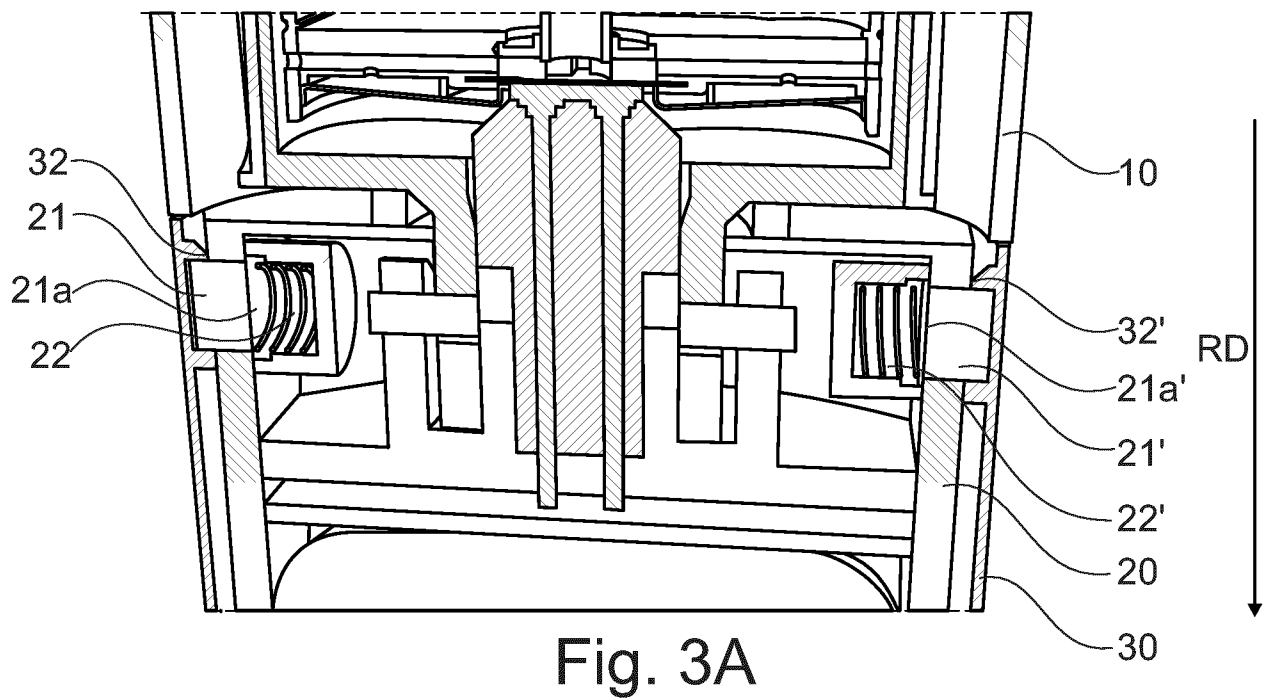


Fig. 3A

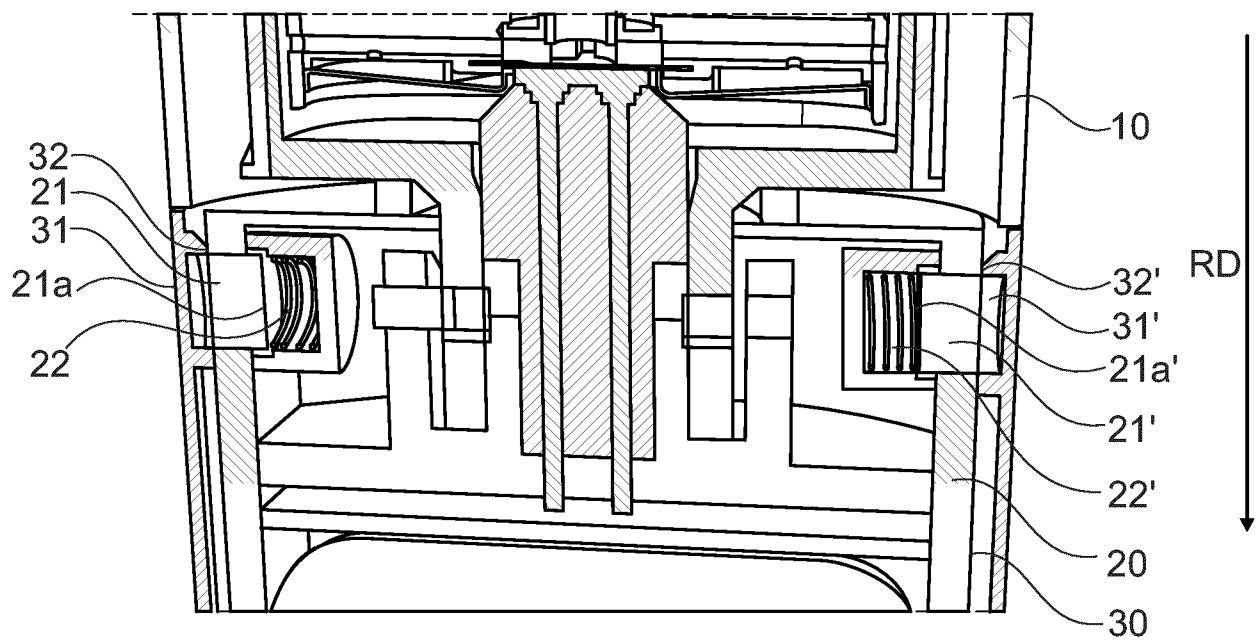


Fig. 3B

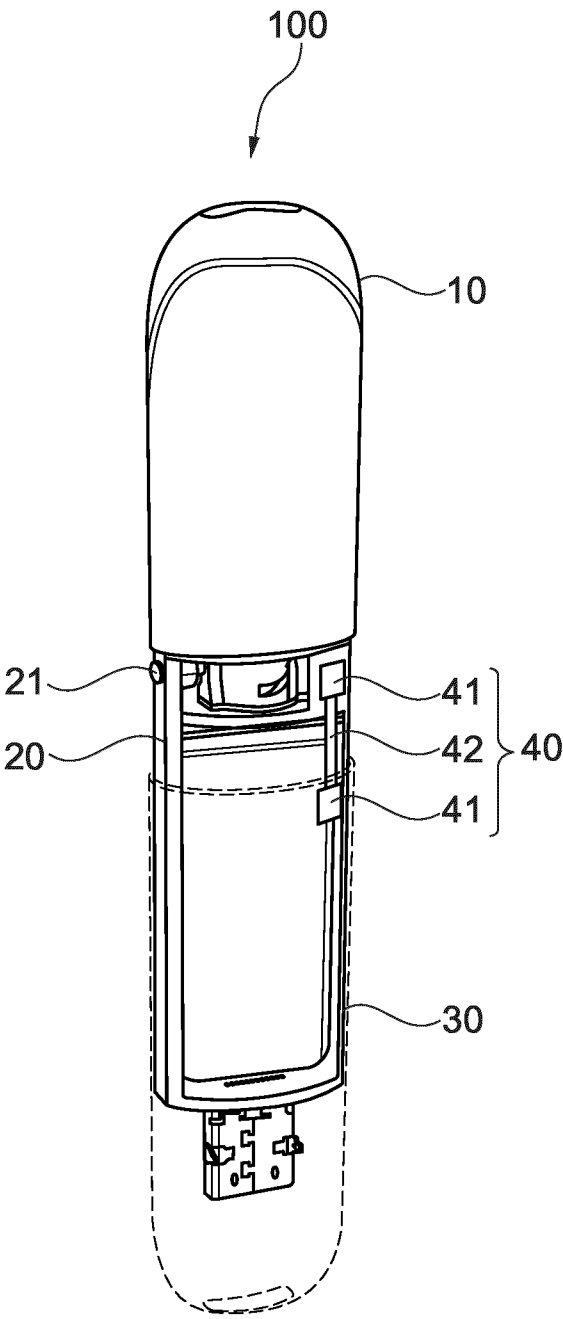


Fig. 4A

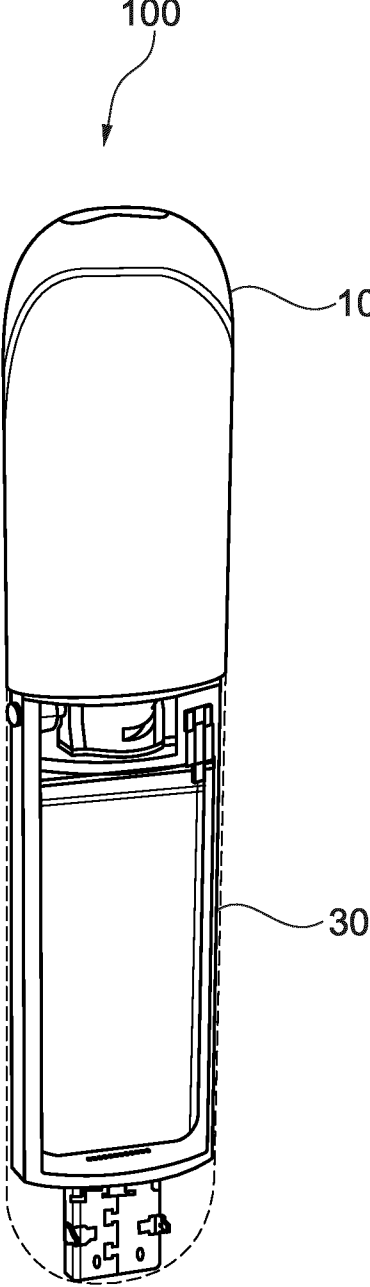


Fig. 4B

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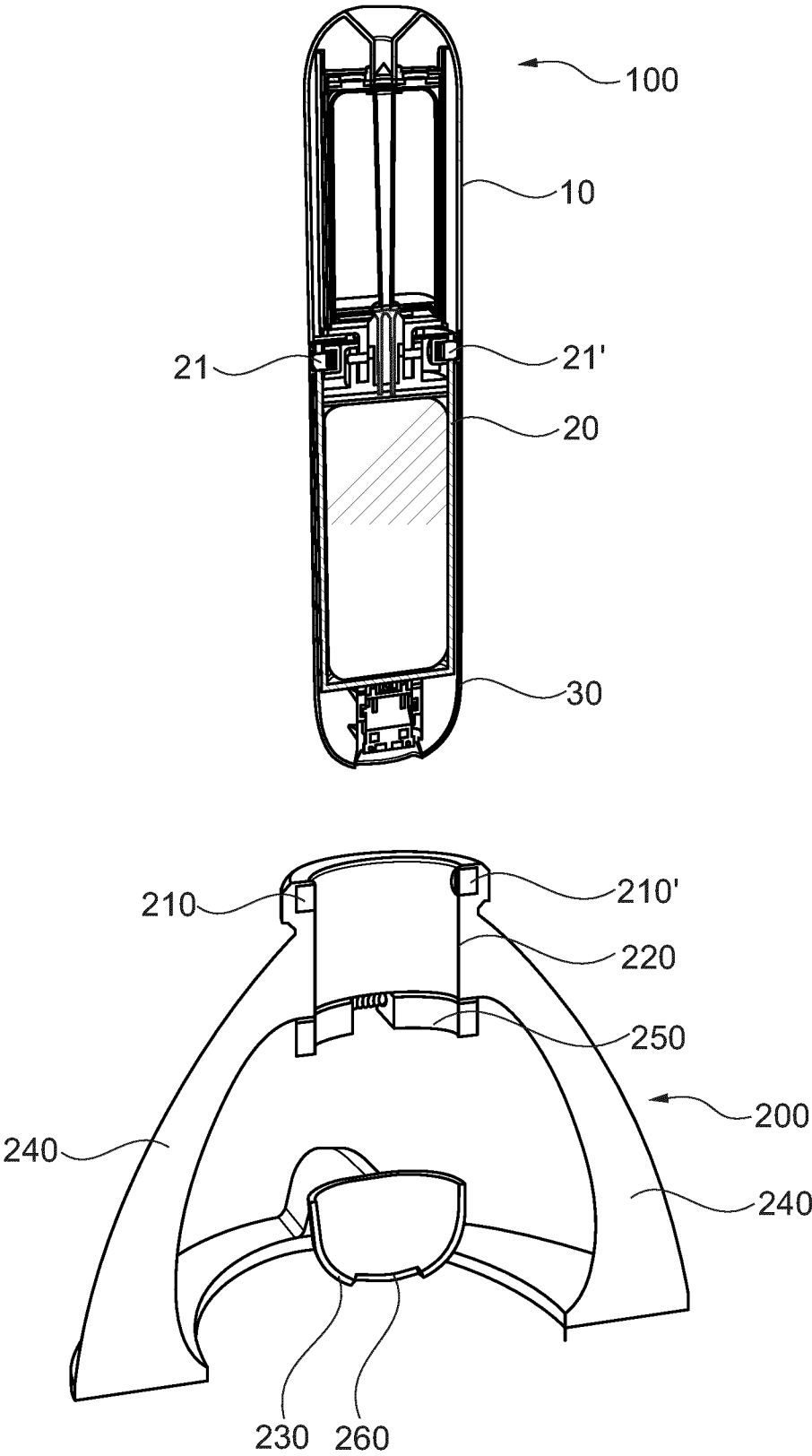


Fig. 5A

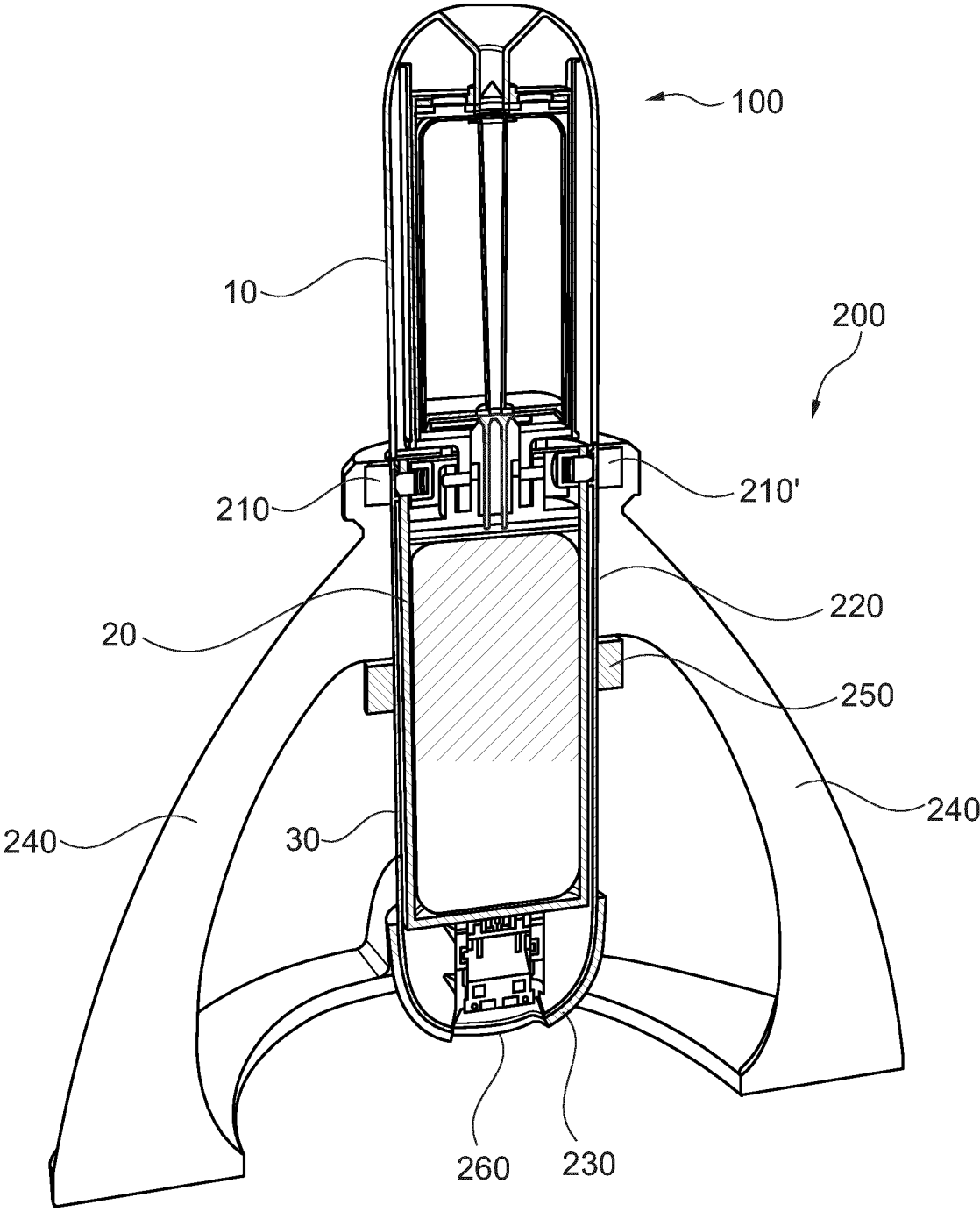


Fig. 5B

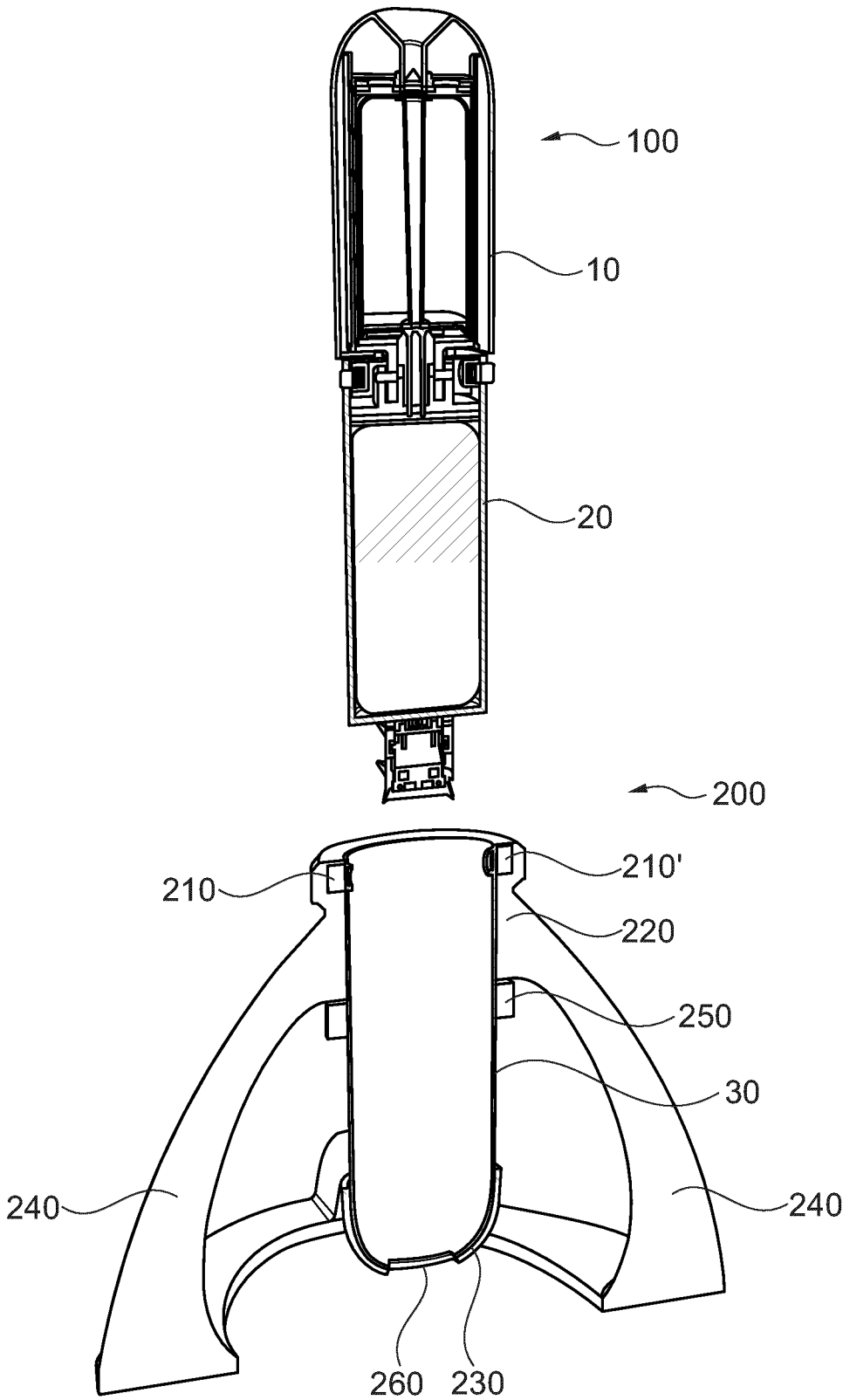


Fig. 5C

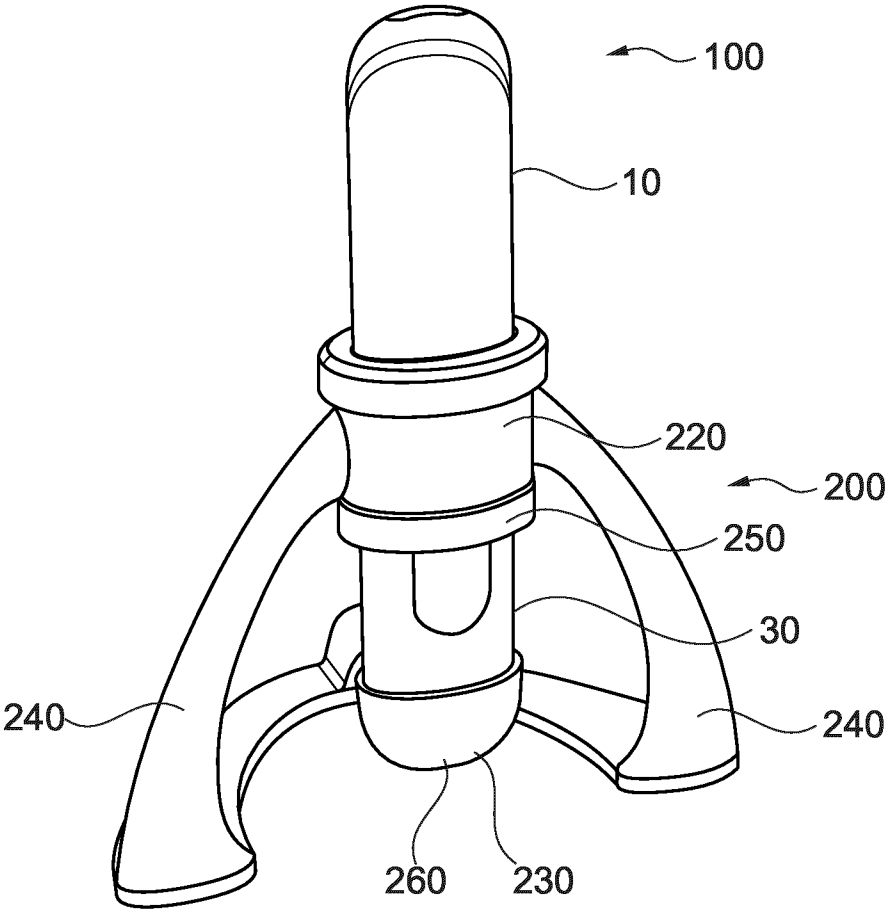


Fig. 6

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2024/065589

A. CLASSIFICATION OF SUBJECT MATTER INV. A24F40/40 ADD. A24F40/10 A24F40/85 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) A24F A61M E05B H05K Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) EPO-Internal		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	CN 218 605 068 U (SHENZHEN WOODY VAPES TECH CO LTD) 14 March 2023 (2023-03-14) See passages of translation relating to the magnetic part 6.; figures 1-4, 9,10, 13 -----	1 - 15
X	CN 112 523 621 A (NANJING RIJIE COMMUNICATION TECH CO LTD) 19 March 2021 (2021-03-19)	12, 13
A	abstract; figures 1, 2 -----	1 - 11, 14, 15
☐ 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 "E" earlier application or patent but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "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 "X" document of particular relevance;; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance;; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art "&" document member of the same patent family		
Date of the actual completion of the international search 19 August 2024		Date of mailing of the international search report 16/09/2024
Name and mailing address of the ISA/ European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016		Authorized officer Dobbs, Harvey

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/EP2024/065589

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
CN 218605068	U	14-03-2023	NONE	

CN 112523621	A	19-03-2021	NONE	
