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(54) **AEROSOL GENERATION DEVICE WITH EJECTION MECHANISM**

(57) The present invention relates to an aerosol generation device with an ejection mechanism. More specifically, an aerosol generation device (1), comprises: an aerosol generation chamber (107) configured to receive and heat a substrate (103) to generate aerosol, a cover (104) having a closed position covering the aerosol generation chamber (107), and an open position exposing the aerosol generation chamber (107), and an ejection mechanism (101) configured to be at least indirectly connected with the aerosol generation chamber (107) and the cover (104), and having an ejected state, a holding-locked state, and a holding-unlocked state.

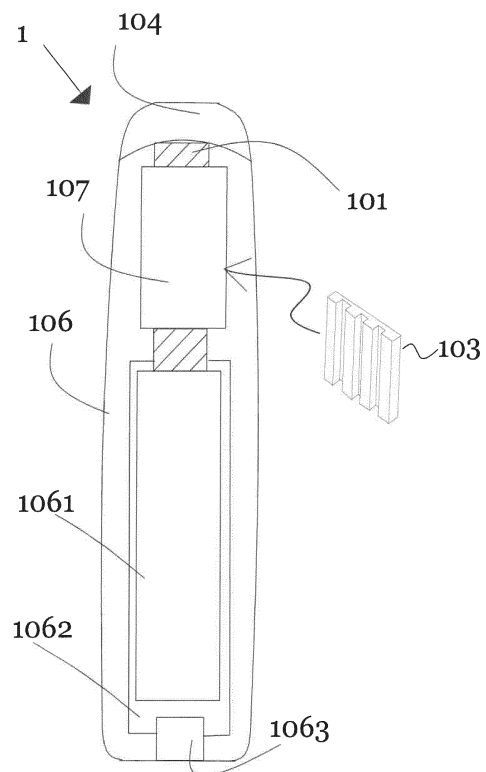


Fig. 1

Description**TECHNICAL FIELD**

5 **[0001]** The present disclosure relates to an aerosol generation device in which an aerosol generating substrate is heated to form an aerosol; more specifically, to an aerosol generation device with an ejection mechanism.

BACKGROUND

10 **[0002]** The popularity and use of aerosol generation devices (also known as heat-not-burn products or E-cigarette) has grown rapidly in the past few years. Various devices and systems are available that heat or warm aerosolisable substances as opposed to burning tobacco in conventional tobacco products.

[0003] A commonly available reduced-risk or modified-risk device is the heated substrate aerosol generation device or heat-not-burn device. Devices of this type generate an aerosol or vapor by heating an aerosol substrate that typically
 15 comprises moist leaf tobacco or other suitable solid aerosolisable material to a temperature typically in the range 150 °C to 350 °C. Heating such an aerosol substrate, but not combusting or burning it, releases an aerosol that comprises the components sought by the user, but not the toxic and carcinogenic by-products of combustion and burning. Furthermore, the aerosol produced by heating the tobacco or other aerosolisable material does not typically comprise the burnt or bitter taste resulting from combustion and burning that can be unpleasant for the user, and so the substrate does not
 20 require the sugars and other additives that are typically added to such materials to make the smoke and/or vapor more palatable for the user.

[0004] In such devices, the substrate is usually contained substantially in a heating chamber, and the user usually needs to push a button to eject the substrate out of the heating chamber after consuming for changing to a new substrate. However, arranging buttons on the device may create gaps on the housing of the aerosol generation device, which
 25 reduces the ingress of the aerosol generation device, and may complicate the operation of the device for the user.

SUMMARY OF THE INVENTION

[0005] The present invention provides a smoking article for an aerosol generation device, which solves some of or all
 30 of the above-mentioned problems.

[0006] A 1st embodiment of the invention is directed to an aerosol generation device, comprising:

- a heating chamber configured to receive and heat a substrate to generate aerosol,
- a cover having a closed position covering the heating chamber, and an open position exposing the heating chamber,
 35 and
- an ejection mechanism configured to be at least indirectly connected with the heating chamber and the cover, and having an ejected state, a holding-locked state, and a holding-unlocked state;

wherein

- in the ejected state, the cover is in the open position, and the ejection mechanism is configured to receive the substrate or make the received substrate at least partially protrude out of the heating chamber, and the ejection mechanism can be translated into the holding-locked state,
- in the holding-locked state, the cover is in the open position, and the ejection mechanism is configured to hold the
 45 substrate in a predetermined position where the substrate is fully inserted in the heating chamber, and the ejection mechanism can be translated into the holding-unlocked state by moving the cover from the open position to the closed position, and
- in the holding-unlocked state, the cover is in the closed position, and the ejection mechanism is configured to exert an ejection force on the substrate, which is held in the predetermined position by the cover, and the ejection mechanism can be translated into the ejected state by moving the cover from the closed position to the open position.
 50

[0007] The ejection mechanism improves the convenience of using and replacing of the aerosol substrate for the user. The substrate can be automatically ejected by just opening the cover. This provides an intuitive and robust way to replace the substrate, and also a simple inner structure of the aerosol generation device.

55 **[0008]** According to a 2nd embodiment, in the 1st embodiment, the heating chamber has an opening for receiving the substrate, and the ejection mechanism comprises a surface at least partially defining the bottom surface of the heating chamber and protruding into the heating chamber in the ejected state.

[0009] With this arrangement, the substrates can automatically stick out of the heating chamber, which allows it to

conveniently be grabbed by the user.

[0010] According to a 3rd embodiment, in any one of the preceding embodiments, the ejection mechanism is configured to receive the substrate by the user pushing it in the chamber, and the bottom surface is pushed down with the substrate along a first axis while the ejection mechanism is translating from the ejected state to the holding-locked state.

[0011] According to a 4th embodiment, in any one of the preceding embodiments, the ejection mechanism comprises a snap member, which is configured to remain the ejection mechanism in the holding-locked state.

[0012] With this arrangement, it can be ensured that the substrate remains in the heating chamber for the later heating process.

[0013] According to a 5th embodiment, in any one of the preceding embodiments, the ejection mechanism comprises a first spring configured to exert the ejection force.

[0014] According to a 6th embodiment, in any one of embodiments 2 to 5, the ejection mechanism comprises a support member having an arm which supports or forms the bottom surface of the ejection mechanism and is supported by the first spring of the ejection mechanism.

[0015] According to a 7th embodiment, in the preceding embodiment, the arm has a protrusion which corresponds to a protrusion comprised by the snap member; the protrusion of the snap member being capable of keeping the ejection mechanism in the holding-locked state by snapping the protrusion of the arm or releasing the protrusion of the arm so as to exert the ejection force.

[0016] According to an 8th embodiment, in any one of embodiments 4 to 7, the snap member protrudes above the receiving opening when the cover is in the open position, and can be pressed down by the cover when in the closed position so as to release the support member.

[0017] According to a 9th embodiment, in any one of embodiments 4 to 8, the snap member comprises an upper portion and a lower portion mechanically engaged with a second spring; and the upper portion is able to protrude above the receiving opening when the cover is in the open position, the lower portion comprising the protrusion of the snap member.

[0018] According to a 10th embodiment, in the preceding embodiment, the upper portion and the lower portion are slidingly engaged; the upper portion is configured to press the lower portion along a second axis through a sliding force until the protrusion of the arm is released from the protrusion of the support member when the upper portion is pressed down by the cover from the open position to the closed position; and the protrusion of the arm is partially engaged with the protrusion of the snap member in a sliding manner, so that the protrusion of the snap member can be slidingly pressed by the protrusion of the arm along the second axis, when the user pushes the substrate into the chamber, until the protrusion of the support member is snapped by the protrusion of the snap member so as to keep the ejection mechanism in the holding-locked state.

[0019] According to an 11th embodiment, in any one of embodiments 9 or 10, the lower portion and the arm are made of metal.

[0020] With this arrangement, the life of the ejection mechanism and the device can be prolonged.

[0021] According to a 12th embodiment, in any one of the preceding embodiments, the aerosol generation device comprises a fixing mechanism configured to maintain the cover in the closed position against the ejection force when the ejection mechanism is in the holding-unlocked state, and the fixing mechanism comprises magnets or snap fasteners.

[0022] With this arrangement, the cover is able to press the substrate inside the heating chamber against the ejection force of the second spring.

[0023] According to a 13th embodiment, in any one of the preceding embodiments, the cover is rotationally hinged on the main body of the aerosol generation device.

[0024] According to a 14th embodiment, in the any one of the preceding embodiments, the heating chamber has a flat cuboid shape corresponding to the shape of the substrate.

[0025] Preferred embodiments are now described, by way of example only, with reference to the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0026]

Figure 1: is a schematic illustration of an aerosol generation device and a substrate according to an exemplary embodiment of the present invention;

Figure 2: is a flow chart of a process of an operation of the device according to an exemplary embodiment of the present invention;

Figures 3a to 3c: show schematic views of the aerosol generation device in different states according to exemplary

embodiments of the present invention;

Figures 4a to 4d: show schematic cut-away views of parts of the aerosol generation device with the ejection mechanism therein according to exemplary embodiments of the present invention;

Figures 5: show schematic views of parts of the ejection mechanism of the aerosol generation device according to the exemplary embodiment of the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0027] Preferred embodiments of the present invention are described hereinafter and in conjunction with the accompanying drawings. In the description of the drawings, the same or similar reference numerals denote the same or similar parts. It should be noted that the drawings are schematic, and the ratios of dimensions and the like may be different from the actual ones.

[0028] As used herein, the term "aerosol generation device" "vaporizer system", "inhaler" or "electronic cigarette" may include an electronic cigarette configured to deliver an aerosol to a user, including an aerosol for smoking. The illustrated embodiments of the aerosol generation system in this invention are schematic.

[0029] Referring to the drawings and in particular to figure 1, an electronic cigarette 1 for consuming a substrate is illustrated. The electronic cigarette 1 can be used as a substitute for a conventional cigarette. The electronic cigarette 1 has a substantially elongated shape comprising a cover 104 functioning as a device mouthpiece having an air inlet and/or outlet, and a main body 106. The cover 104 is rotationally hinged to the main body 106. During or after a time at which the substrate 130 is heated to generate the aerosol, air is driven towards the mouthpiece, namely the cover 104, to provide the aerosol to a user. In some embodiments, the air is driven by a user inhaling. In other embodiments, the aerosol generation device 1 may comprise a pump for pumping air towards the mouthpiece to provide the aerosol. The cover 104 has a closed position covering the heating chamber 107 and compressing and maintaining the substrate 103 in the heating chamber 107. The cover 104 also has an open position exposing the opening 105 of the heating chamber 107 for inserting or discarding the substrate 103. The main body 106 comprises an ejection mechanism 101 (shown with slashes), a heating chamber or an oven cavity 107 which is vertically orientated in the main body, a LiPo battery 1061, a PCBA 1062 having electronic elements such as a CPU or a controller, and a USB-C connector 1063 for charging the LiPo battery 1061 and/or transmitting data to the electronic cigarette 1. At least a portion of the aerosol generating substrate 103 is enclosed in the heating chamber 107 when the substrate 103 is consumed, preferably most of the substrate 103 is enclosed in the heating chamber 107 and most preferably the entire substrate 103 is enclosed in the heating chamber 107 in the manner that, when the cover 104 is closed, the substrate 103 is pressed by the cover 104 and maintained in the position where the substrate 103 can be substantially heated, while the ejection mechanism 101 is pressed till its locked or snapped state (discussed below). The aerosol is generated from the inserted portion of the substrate 103 in the heating chamber 107 while the cover 104 presses the substrate 103 in the closed position.

[0030] The housing of the main body and the cover may generally be made from any rigid material such as a thermoplastic or a metal (e.g. aluminium). The insulating enclosure comprised between the housing and the heating chamber may, for example, be made from a heat-resistant material such as polyethylene terephthalate (PET), polybutylene terephthalate (PBT), or polyamide (PA) in order to prevent thermal deformation or melting. The heat resistant material may be a super engineering plastic such as polyimide (PI), polyphenylenesulfide (PPS) or polyether ether ketone (PEEK). A part of the ejection mechanism is made of or the ejection mechanism may be coated with the insulation material.

[0031] A schematic perspective illustration of the aerosol generating substrate 103 is shown in figure 1. The substrate 103 may, for example, comprise nicotine, tobacco and/or an aerosol former. Tobacco may take the form of various materials such as shredded tobacco, granulated tobacco, tobacco leaf and/or reconstituted tobacco. Suitable aerosol formers include: a polyol such as sorbitol, glycerol, and glycols like propylene glycol or triethylene glycol; a non-polyol such as monohydric alcohols, acids such as lactic acid, glycerol derivatives, esters such as triacetin, triethylene glycol diacetate, triethyl citrate, glycerin or vegetable glycerin. In some embodiments, the aerosol generating agent may be glycerol, propylene glycol, or a mixture of glycerol and propylene glycol. The substrate 103 may also comprise at least one of a gelling agent, a binding agent, a stabilizing agent, and a humectant.

[0032] The substrate 103 is porous such that air can flow through the substrate 103 and collect aerosol as it does so. The substrate 103 may for example be a foam, or packed strands or fibres. The substrate 103 may be formed through an extrusion and/or rolling process into a stable shape. The aerosol generating substrate 103 may be shaped to provide one air flow channel or, in preferred embodiments, multiple air flow channels as shown in figure 1. These can be aligned with the air flow channels of the aerosol generating device 1 in order to increase air flow through the heating chamber 103. The substrate 103 is exposed with a bare external surface. Alternatively, the substrate 103 may comprise an air permeable wrapper covering at least part of a surface of the substrate 103. The wrapper may, for example, comprise paper and/or non-woven fabric.

[0033] In the present embodiment, the substrate may have a substantially flat cuboid shape or a pod shape having a size of 18 x 12 x 1.2 mm, with each of length, width and depth of the cuboid being selected within a range of +/- 40%, for example. Generally, the length of the substrate in the preferred embodiments is between 40 and 10 mm, preferably between 30 and 12 mm, more preferably between 25 and 14 mm, and most preferably between 22 and 15 mm. The width of the substrate in the preferred embodiments is between 30 and 6 mm, preferably between 25 and 8 mm, more preferably between 20 and 9 mm, and most preferably between 16 and 9 mm. The height of the substrate in the preferred embodiments is between 3 and 0.5 mm, preferably between 2 and 0.6 mm, more preferably between 1.8 and 0.8 mm, and most preferably between 1.6 and 0.9 mm.

[0034] The aerosol generating substrate is designed to be preferably longer than or equal to the length of the heating chamber 107 in the longitudinal direction (shown as the dashed straight line in figure 4a). In this case, when the cover is in the closed position, the part which sticks out of the device after insertion is contained in and pressed by a hollow of the cover 104 (as shown in figure 3a and 3b). In other words, the heating chamber 107 has a substantially cuboid shape corresponding to the shape of the substrate 103, with the size of 18 x 12 x 1.2 mm, with each of length, width and depth of the cuboid being selected within a range of +/- 40%. The length of the heating chamber is preferably less than 18 mm, and the width and depth of the heating chamber 107 is preferably longer than 12 mm and 1.2 mm. More specifically, the length of the aerosol generation chamber 107 in the preferred embodiments is between 40 and 9 mm, preferably between 30 and 11 mm, more preferably between 25 and 13 mm, and most preferably between 22 and 14 mm. The width of the chamber 107 in the preferred embodiments is between 31 and 6 mm, preferably between 26 and 8 mm, more preferably between 21 and 9 mm, and most preferably between 17 and 9 mm. The depth of the chamber 107 in the preferred embodiments is between 4 and 0.5 mm, preferably between 3 and 0.6 mm, more preferably between 2.8 and 0.8 mm, and most preferably between 2 and 0.9 mm.

[0035] This means that the opening 105 of the heating chamber 107 is large enough for the easy insertion of the substrate 103 into the heating chamber 107. In other embodiments, the substrate 103 has a shorter length compared to the heating chamber 107.

[0036] Figure 2 shows a flow chart of the process of inserting, consuming and discarding the substrate 103 in and from the aerosol generation device 1. Before using the device 1 and consuming the substrate 103, the user first opens the cover 104 of the device 1 with no substrate in the device 201. The user then inserts the substrate 103 into the opening 105 of the heating chamber 107 along a first axis along the longitudinal direction of the device 202. The substrate 103 needs to be pressed down until the user feels a click sense from the substrate, while the ejection mechanism is transitioned from an ejected state to a holding-locked state (discussed below) 203. This means that when the substrate 103 reaches the limit of its travel, the bottom surface of the heating chamber 107 is locked in place (in its lower position), lowering the consumable substantially or fully into the heating chamber 107. The user closes the cover 204, while the ejection mechanism is translated from the holding-locked state to a holding-unlocked state (discussed below). The user switches the device on, e.g. by pressing a button on the device 205, and starts consuming the substrate 206. In an alternative embodiment, sensors may be arranged in the device 1 so as to sense the closing of the cover and the existence of the substrate 103 in the device 1, which then trigger the heating for the substrate 103 automatically. After the user has finished consuming the substrate 103, the user simply opens the cover 207. At least a part of the substrate 103 pops up and sticks out from the opening 105 of the heating chamber 107, since the ejection mechanism 101 is transitioned from the holding-unlocked state to the ejected state (discussed below). In one embodiment, a sensor is arranged to sense the opening of the cover 104 so as to stop the heating of the heating chamber 107. Finally, the user discards the substrate 103 from the device 208.

[0037] The specific configuration of the ejection mechanism is illustrated in figures 2a to 2d, 3a to 3c and 4.

[0038] The ejection mechanism 101 is at least indirectly connected to the heating chamber 107 and the cover 104. The heating chamber 107 has two openings set on the opposite sides of the heating chamber 107 along the insertion direction 108 of the substrate 103. One of the two openings is the opening 105 for inserting and discarding the substrate 103, and a part of the ejection mechanism, namely the support member (discussed below), can be inserted into the other opening at the lower end of the heating chamber 107. That part of the ejection mechanism supports the substrate as a bottom, an internal lower surface or the floor, of the heating chamber 107 while heating the substrate 103, and protrudes into the heating chamber 107 in the ejected state. This surface can move vertically. The surface is ejected or protruded in the heating chamber 107 to an extent that, when the user wants to change the substrate 103, at least a part of the substrate 103 protrudes out of the heating chamber 107, so that the user can take out the substrate 103 from the device 1 by hand. Preferably, the surface protrudes up into half of the heating chamber 107. For example, if the length of the substrate 103 is 18 mm and the length of the heating chamber 107 is identical to the length of the substrate 103, which is also 18 mm, the ejection mechanism can protrude a predetermined distance of 9 mm into the heating chamber 103, so that the substrate 103 sticks out of the chamber with an identical distance of 9 mm. With this arrangement, the user can easily discard the substrate 103 by nipping the protruded part of the substrate 103, and the substrate 103 does not easily fall out of the heating chamber 107. The ejection mechanism also has a part which protrudes from an upper surface of the main body of the device 1 when the cover 104 is in the open position, and the ejection mechanism

is in the ejected state and the holding-locked state. The part which protrudes from the upper surface of the main body is configured to trigger the ejection mechanism 101 to transition from the holding-locked state to the holding-unlocked state when the part is pressed by the cover 104 from the open position to the closed position.

[0039] In this embodiment, more specifically, the ejection mechanism 101 comprises a support member 1014 (marked with cross lines), springs 1013, 1065, and a snap or clip member 1014 (marked with slashes) having an upper portion 1017 (marked with dense slashes) and a lower portion 1018 (marked with loose slashes). The support member 1014 is configured to support the substrate 103. The snap or clip member 1014 is configured to snap or clip the support member 1014 so as to lock the bottom surface in the lower position or the lower limit, where the substrate is substantially inserted in the heating chamber 107 for heating, by the snapping of the protrusions comprised by the support member 1014 and the snap or clip member 1014. At least one of the springs 1013 is configured to provide the ejection force for the ejection mechanism 101, more specifically the support member, to eject at least a part of the substrate 103 out of the heating chamber 107.

[0040] In a preferred embodiment, the support member 1014 comprises an arm that supports the substrate 103 and a cap portion underneath the arm which contains at least a part of the spring 1013 inside so as to ensure that the support member 1014 and the spring 1013 move together along the first axis (shown as the dashed straight line in figure 3a). The arm supports or forms at least a part of the bottom surface of the heating chamber 107. In an alternative embodiment, the arm is directly supported by the spring 1013 of the ejection mechanism 101.

[0041] In the preferred embodiment, the snap member 1014 comprises an upper portion 1017 and a lower portion 1018 mechanically engaged with another spring 1019 as shown in figure 5. The upper portion 1017 is slidably engaged with the lower portion 1018. The upper portion 1017 is preferably able to protrude further than the receiving opening 105 when the cover 104 is in the open position, and function as a button 1064 for the transition from the holding-locked state to the holding-unlocked state. In a preferred embodiment, as shown in the figures, two protrusions 1064 of the snap member 1014 protrude from the opening 105 so that the cover 104 can press down the snap member firmly and evenly, more stably and with a better sealing performance. The lower portion 1018 comprises the protrusion of the snap member 1012, to snap and hold the support member 1014 in position. The snapping of the protrusions 1015 and 1016 of the lower portion 1018 and the support member 1014 is made and released when the cover presses down the button 1064 of the upper portion 1017, which slidably presses the lower portion 1018 down or along a second axis (not shown). The protrusions 1015, 1016 of the support member 1014 and the lower portion 1018 are also slidably engaged. For prolonging the life of the device with constant ejection and insertion of the substrate 103, the ejection mechanism 101 comprises or is preferably made of a metal material. Preferably, the lower portion 1018 and at least the protrusion of the arm are made of metal.

[0042] As shown in figure 5, the upper portion 1065 is engaged with a torsion spring 1065 with the other part of the device 1, preferably the lower portion 1018, so as to ensure that a spring force is exerted to keep the button 1064 of the upper portion 1017 protruding out of the housing of the main body of the device 1 ready to be pressed by the cover 104 when the cover 104 is in the open position. In this embodiment, the cover 104 comprises a protrusion configured to press the button 1064 of the upper portion 1017 down.

[0043] Hereinafter, the different states of the ejection mechanism 101 in the device 1, more specifically the ejected state, the holding-locked state and the holding-unlocked state, are discussed with figures 2a to 2d, 3a to 3c and 4.

The Ejected State

[0044] The ejected state occurs when the cover 104 is opened without a substrate 103 being inserted or when the cover 104 is opened and the substrate 103 sticks out of the opening 105 of the heating chamber 107. In other words, the device 1 or the ejection mechanism 101 is in or transitioned into the ejected state when the user opens the cover (201, 207).

[0045] As shown in figures 3a, 4a and 4b, in the ejected state of the ejection mechanism 101, the cover 104 is in the open position, and the ejection mechanism 101 is configured to receive the substrate 103 or make the received substrate 103 at least partially protrude out of the heating chamber 102, and the ejection mechanism 101 can be transitioned into the holding-locked state.

[0046] More specifically, the cover 104 is opened by the user, and the button 1064 located on the upper part of the upper portion 1017 is released from the pressure of the protrusion 1041 of the cover 104, and protrudes out of the main body of the device 1 from the openings adjacent to the receiving opening 105. The lower portion 1018, which is slidably engaged with the upper portion 1017 on an inclined plane, is also released to its initial position, where the lower portion 1018 is ready to be sliding pressured aside and can snap the protrusion 1015 of the support member 1014. The lower portion 1017 is supported by a spring or the lower portion 1017 per se is made of or comprises a rigid material so that the lower portion 1018 remains in its initial position, or bounces or springs back to its initial position when it is released from the pressure of the upper portion 1017.

[0047] As shown in figure 4b, the top surface of the arm of the support member 1014 supports the substrate 103 in a

position that at least a part of the substrate 103 protrudes out of the opening 105, and the arm of the support member 1014 protrudes at least partially into the heating chamber at an upper position or upper limit of the bottom surface. The support member 1014 is supported by the spring 1013 arranged underneath it in a loose state of the spring 1013. The user takes out the substrate 103 by grabbing the protruding part of the substrate 103. If the heating chamber 107 is vacant, as shown in figure 4a, the user inserts the substrate into the heating chamber 107 along a first axis (shown in the dashed straight line in figure 4a). The top surface of the arm is pushed down together with the substrate 103 until the lower position or the lower limit is reached, where the protrusion 1015 of the support member 1014 is snapped by the protrusion 1016 of the snap member 1014, more specifically the lower portion 1018. As shown in the figures, the protrusion 1015 of the support member 1014 and the lower surface of the upper portion 1017 both have inclined surfaces slidingly engaged with the top surface of the lower portion 1018. With this configuration, the protrusion 1016 of the snap member 1012 can keep the ejection mechanism 101 in the holding-locked state by snapping the protrusion 1015 of the arm or release the protrusion 1015 of the arm so as to exert the ejection force.

The Holding-locked State

[0048] In figures 3b and 4c, the ejection device is in the holding-locked state. The cover 1041 is in its open position and the substrate 103 is contained substantially in the heating chamber 107, ready to be consumed.

[0049] More specifically, as shown in the enlarged figure in the dashed circle of figure 4c, after the substrate 103 is pressed down by the user and substantially contained in the heating chamber 107, the plane surfaces of the protrusions 1015, 1016 of the support member 1014 and the lower portion 1018 are clipped or snapped with each other. In other words, the protrusion 1015 of the arm is partially engaged with the protrusion 1016 of the snap member in a sliding manner, so that the protrusion 1016 of the snap member can be slidingly pressed by the protrusion 1015 of the arm along the second axis (not shown) when the user pushes the substrate 103 into the chamber, until the protrusion 1016 of the support member is snapped by the protrusion 1015 of the snap member so as to keep the ejection mechanism 101 in the holding-locked state. The spring 1013 which supports the supporting member 1014 is in a compressed state. The upper portion springs back and the button 1064 out from an opening of the housing of the device 1 with the support of another spring which is a torsion spring 1065 as shown in figure 5.

The Holding-unlocked State

[0050] In figures 3c and 4d, the ejection device is in the holding-unlocked state. For consuming the substrate 103, the user rotates the cover 104 to its closed position, and the substrate 103 is contained substantially in the heating chamber 107 and pressed by the cover 104 to be heated and consumed.

[0051] More specifically, as shown in the enlarged figure in the dashed circle of figure 4d, the lower portion 1018 is pressed away from the snap position by the upper portion 1017 (not shown) due to the pressure from the cover 1041. The protrusion 1016 of the lower portion 1018 does not snap or clip the protrusion 1015 of the support member 1014 in the holding-unlocked states. In other words, the upper portion 1017 is configured to press the lower portion 1018 along a second axis (not shown) through a sliding force until the protrusion 1015 of the arm is released or detached from the protrusion 1016 of the support member 1012, when the upper portion 1017 is pressed down by the cover 104 from the open position to the closed position. While the support member 101 is released from the snapping of the snap member 1014, the spring 1013 is still in its compressed state generating an ejection force on the support member 1014 and the substrate 103, and the substrate 103 is substantially maintained in the heating chamber 107 by the pressure from the cover 1041. A fixing mechanism (not shown) in the cover 1041 and/or the main body of the device 1 is configured to maintain the cover 1041 in the closed position against the ejection force from the springs through the substrate 103, and the fixing mechanism preferably comprises magnets or snap fasteners. With the fixing mechanism, the cover 104 prevents the ejection of the substrate 103 by the ejection force, and allows for the commencement of the vaping session.

[0052] After finishing consuming the substrate 103, the user may open the cover 104 of the device 1. The button 1064 and at least a part of the substrate 103 are sprung out of the main body of the device, and the ejection mechanism is transitioned from the holding-unlocked state to the ejected state so that the user is able to remove the substrate 103 from the heating chamber 107 by simply opening the cover 104.

Claims

1. An aerosol generation device (1), comprising:

- an aerosol generation chamber (107) configured to receive and heat a substrate (103) to generate aerosol,
- a cover (104) having a closed position covering the aerosol generation chamber (107), and an open position

exposing the aerosol generation chamber (107), and
 - an ejection mechanism (101) configured to be at least indirectly connected with the aerosol generation chamber (107) and the cover (104), and having an ejected state, a holding-locked state, and a holding-unlocked state;

5 wherein

- in the ejected state, the cover (104) is in the open position, and the ejection mechanism (101) is configured to receive the substrate (103) or make the received substrate (103) at least partially protrude out of the aerosol generation chamber (107), and the ejection mechanism (101) can be translated into the holding-locked state,
 10 - in the holding-locked state, the cover (103) is in the open position, and the ejection mechanism (101) is configured to hold the substrate in a predetermined position where the substrate (103) is fully inserted in the aerosol generation chamber (107), and the ejection mechanism (101) can be translated into the holding-unlocked state by moving the cover (104) from the open position to the closed position, and
 15 - in the holding-unlocked state, the cover (104) is in the closed position, and the ejection mechanism (101) is configured to exert an ejection force on the substrate (103), which is held in the predetermined position by the cover (104), and the ejection mechanism (101) can be translated into the ejected state by moving the cover (104) from the closed position to the open position.

2. The aerosol generation device (1) according to claim 1, wherein the aerosol generation chamber has an opening (105) for receiving the substrate (103), and the ejection mechanism (101) comprises a surface (1011) at least partially defining the bottom surface of the aerosol generation chamber (107) and protruding into the aerosol generation chamber (107) in the ejected state.

3. The aerosol generation device (1) according to the preceding claim, wherein the ejection mechanism (101) is configured to receive the substrate (103) by the user pushing it in the chamber (107), and the bottom surface (1011) is pushed down with the substrate (103) along a first axis while the ejection mechanism (101) is translating from the ejected state to the holding-locked state.

4. The aerosol generation device (1) according to any one of preceding claims, the ejection mechanism (101) comprises a snap member (1012), which is configured to remain the ejection mechanism (101) in the holding-locked state.

5. The aerosol generation device (1) according to any one of the preceding claims, wherein the ejection mechanism (101) comprises a first spring (1013) configured to exert the ejection force.

6. The aerosol generation device (1) according to any one of the claims 2 to 5, wherein the ejection mechanism (101) comprises a support member (1014) having an arm which supports or forms the bottom surface of the ejection mechanism and is supported by the first spring (1013) of the ejection mechanism (101).

7. The aerosol generation device (1) according to the preceding claim, wherein the arm has a protrusion (1015) which corresponds to a protrusion (1016) comprised by the snap member (1012);
 the protrusion (1016) of the snap member (1012) is capable of keeping the ejection mechanism (101) in the holding-locked state by snapping the protrusion (1015) of the arm or releasing the protrusion (1015) of the arm so as to exert the ejection force.

8. The aerosol generation device (1) according to any one of the claims 4 to 7, wherein the snap member (1012) protrudes above the receiving opening (105) when the cover (104) is in the open position, and can be pressed down by the cover (104) when in the closed position so as to release the support member (1014).

9. The aerosol generation device (1) according to any one of the claims 4 to 8, wherein the snap member (1012) comprises an upper portion (1017) and a lower portion (1018) mechanically engaged with a second spring (1019); and the upper portion (1017) is able to protrude above the receiving opening (105) when the cover (104) is in the open position, the lower portion (1018) comprising the protrusion of the snap member (1012).

10. The aerosol generation device (1) according to the preceding claim, wherein the upper portion (1017) and the lower portion (1018) are slidingly engaged;
 the upper portion (1017) is configured to press the lower portion (1018) along a second axis through a sliding force until the protrusion (1015) of the arm is released from the protrusion (1016) of the support member (1012), when the upper portion (1017) is pressed down by the cover (104) from the open position to the closed position; and

the protrusion (1015) of the arm is partially engaged with the protrusion (1016) of the snap member in a sliding manner, so that the protrusion (1016) of the snap member can be slidingly pressed by the protrusion (1015) of the arm along the second axis, when the user pushes the substrate (103) into the chamber, until the protrusion (1016) of the support member is snapped by the protrusion (1015) of the snap member so as to keep the ejection mechanism (101) in the holding-locked state.

11. The aerosol generation device (1) according to any one of the claims 9 or 10, wherein the lower portion (1018) and the arm are made of metal.

12. The aerosol generation device (1) according to any one of the preceding claims, comprising a fixing mechanism configured to maintain the cover (104) in the closed position against the ejection force when the ejection mechanism is in the holding-unlocked state, and the fixing mechanism comprises magnets or snap fasteners.

13. The aerosol generation device (1) according to any one of the preceding claims, wherein the cover (104) is rotationally hinged on the main body (106) of the aerosol generation device (1).

14. The aerosol generation device (1) according to any one of the preceding claims, wherein the aerosol generation chamber (107) has a flat cuboid shape corresponding to the shape of the substrate (103).

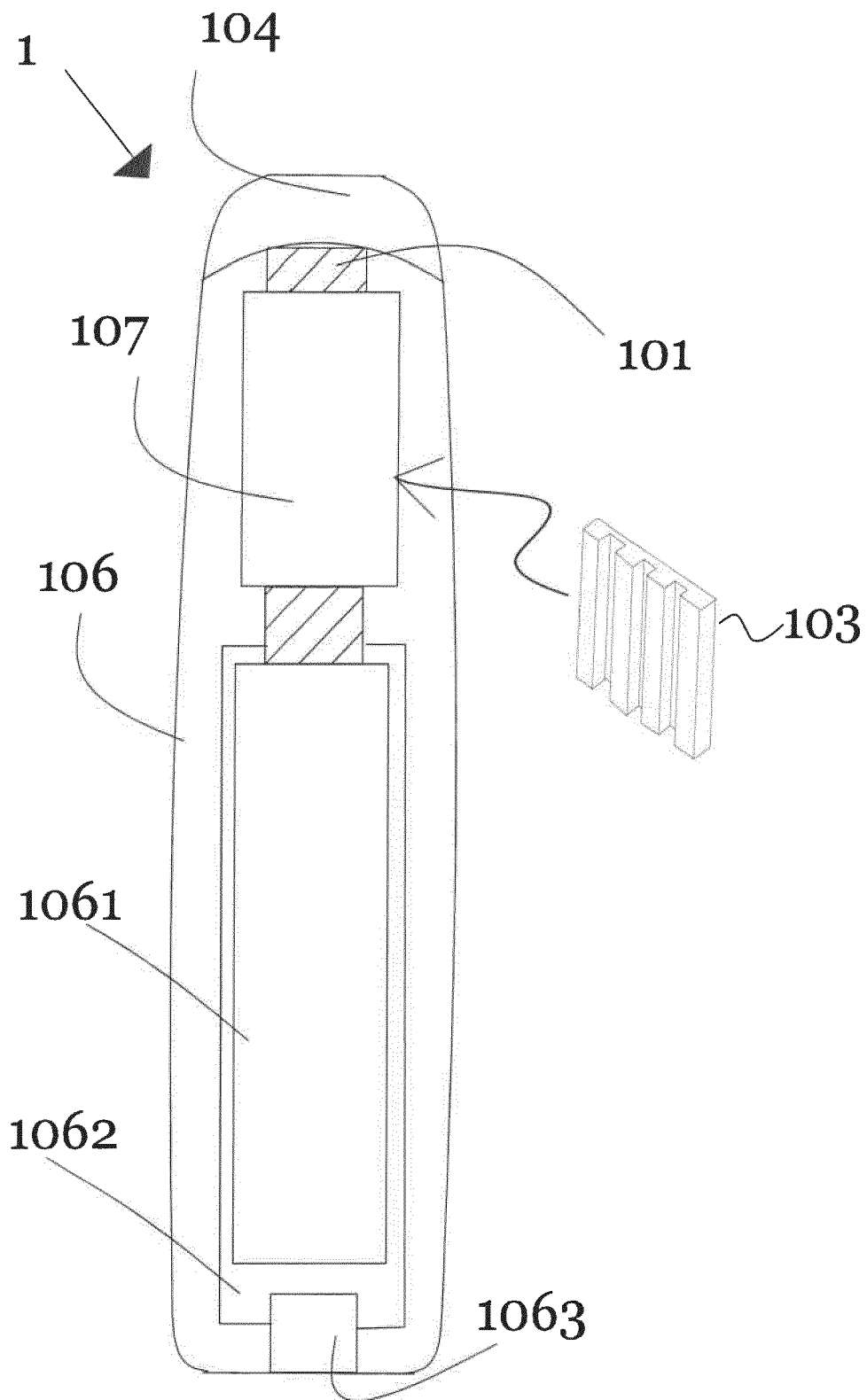


Fig. 1

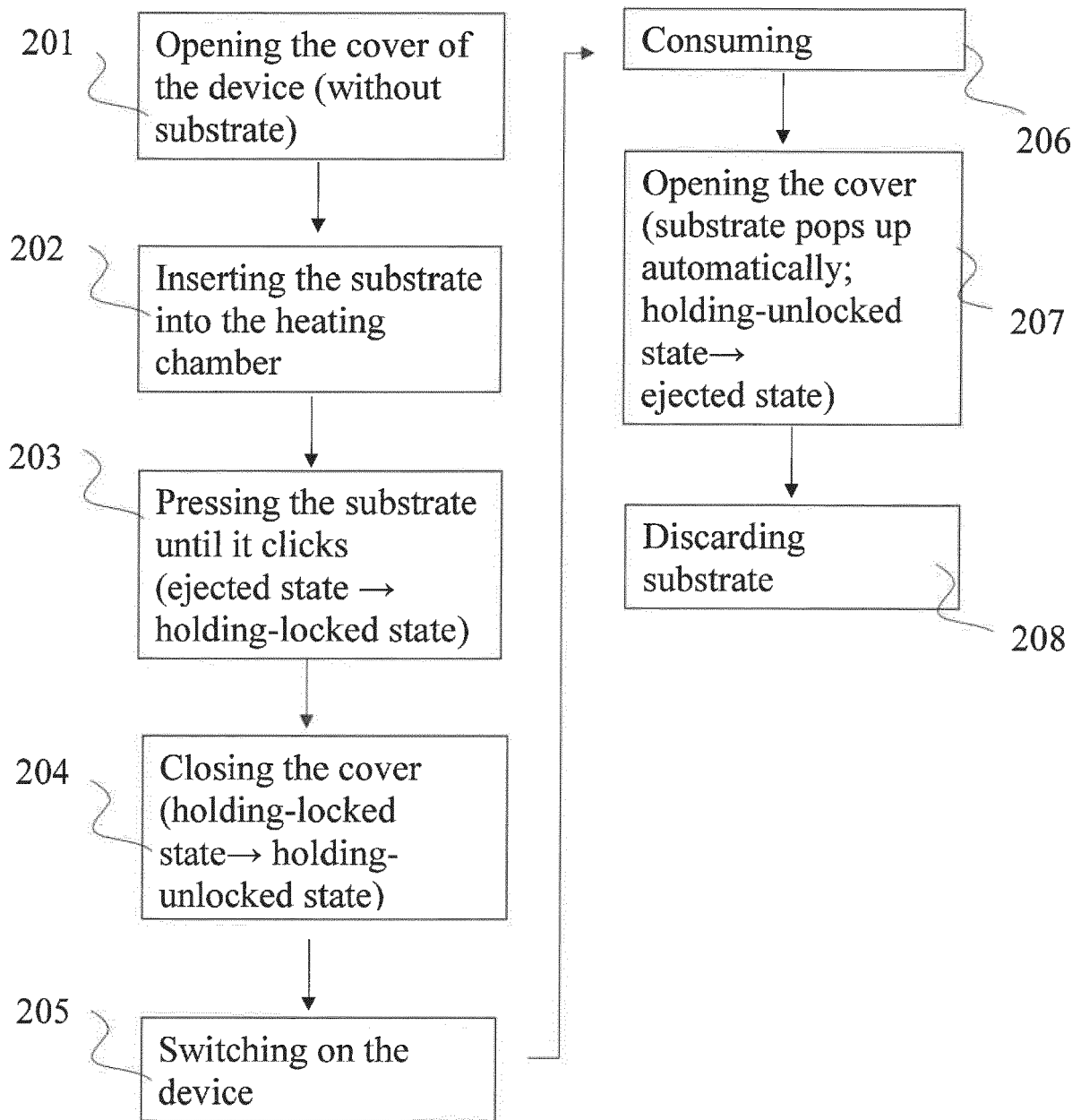


Fig. 2

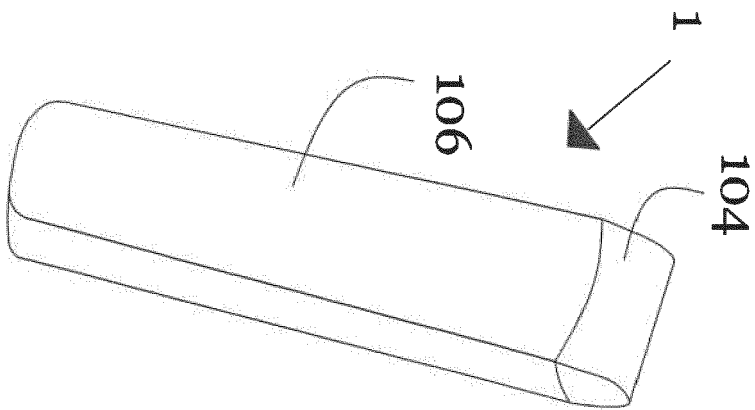
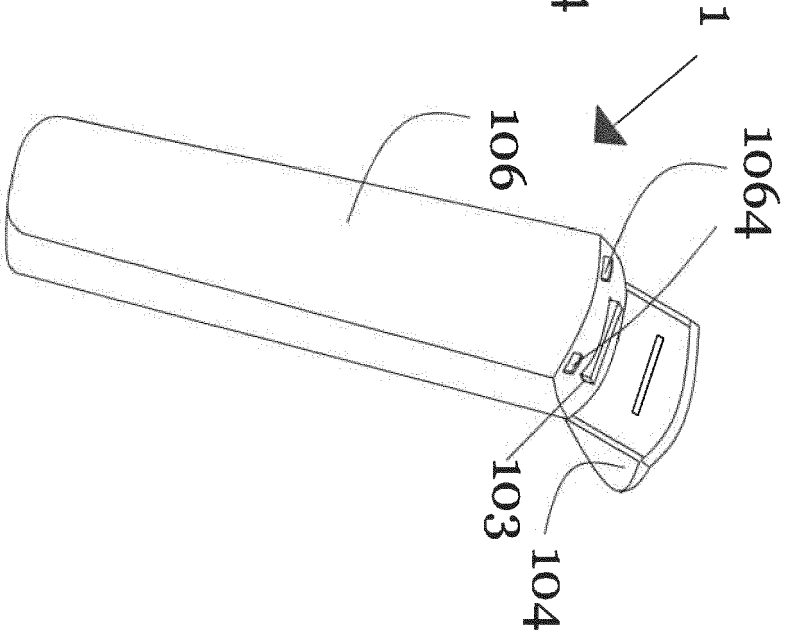
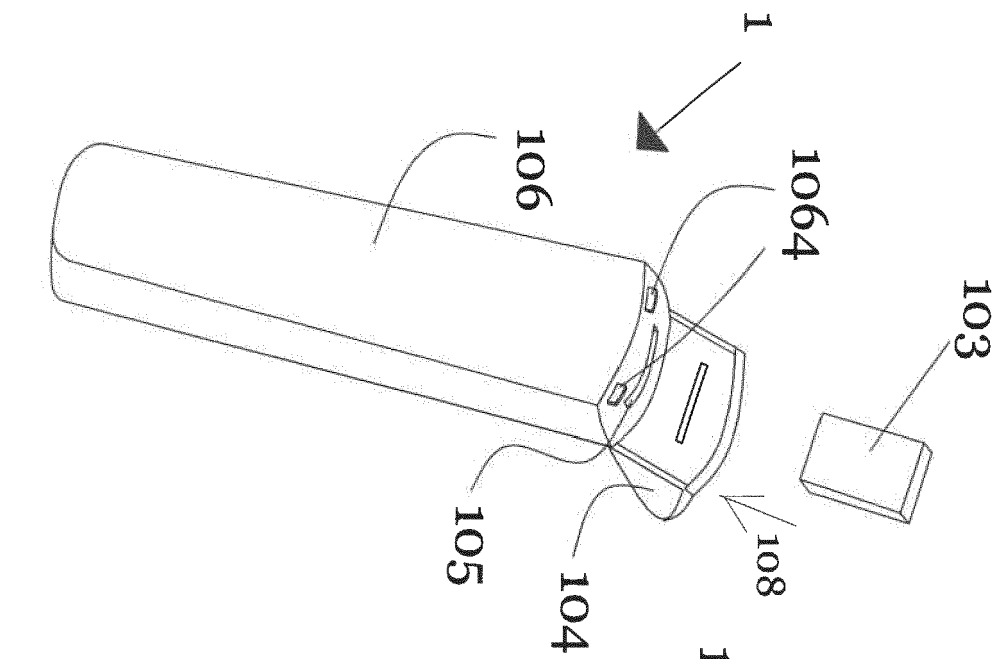


Fig. 3a

Fig. 3b

Fig. 3c

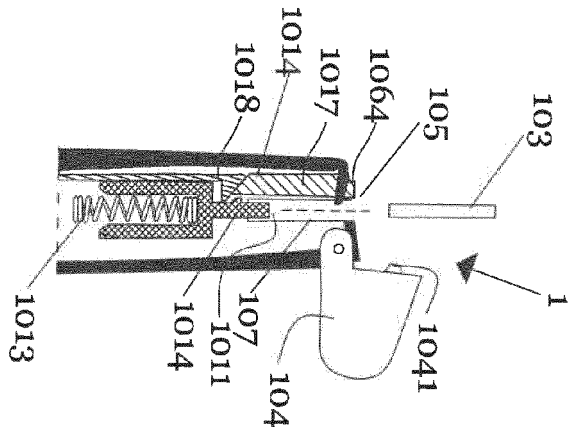


Fig. 4a

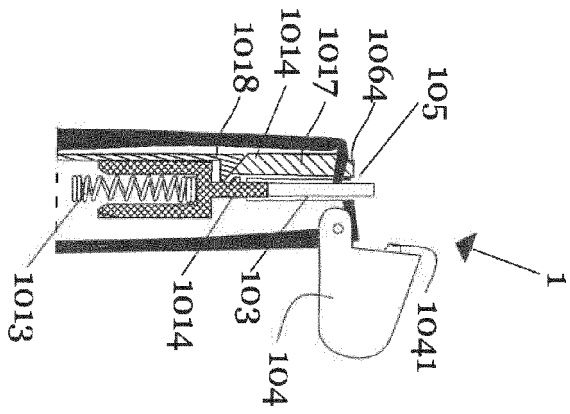


Fig. 4b

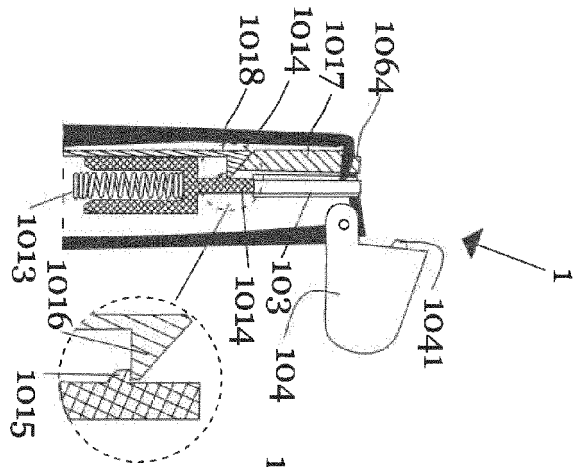


Fig. 4c

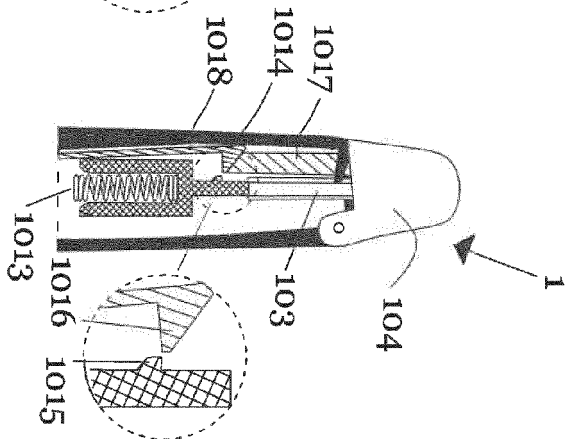


Fig. 4d

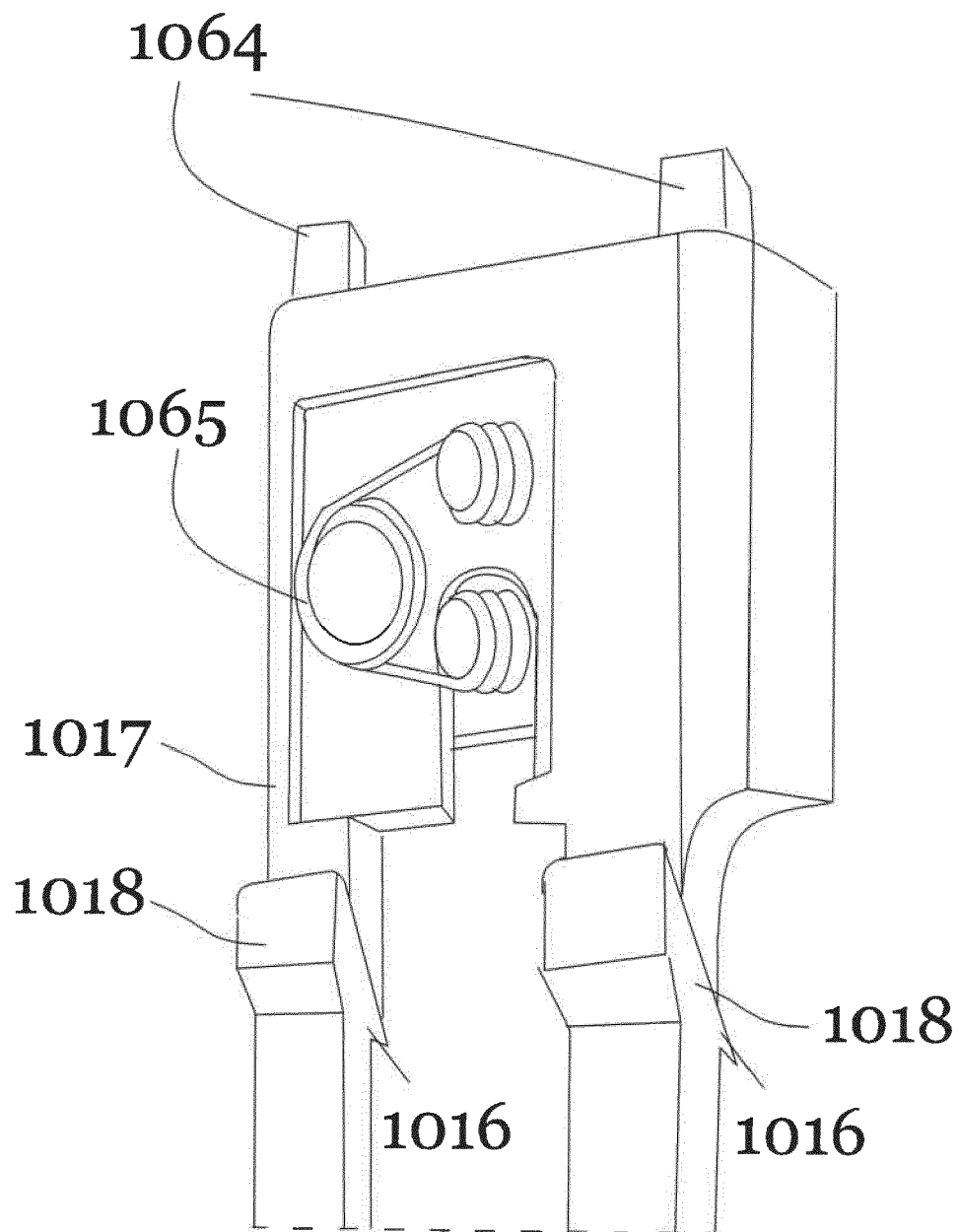


Fig. 5



EUROPEAN SEARCH REPORT

 Application Number
 EP 20 20 0300

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A	CN 109 588 776 A (CHINA TOBACCO HUNAN IND CO LTD) 9 April 2019 (2019-04-09) * embodiment 1 (page 3-4) *	1-14	INV. A24F40/40
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A	EP 3 714 706 A1 (CHINA TOBACCO HUNAN IND CO LTD [CN]) 30 September 2020 (2020-09-30) * paragraph [0045] - paragraph [0055] *	1-14	
			TECHNICAL FIELDS SEARCHED (IPC)
			A24F
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 1 March 2021	Examiner Cardan, Cosmin
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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5 This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
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