

(19)



(11)

EP 3 981 266 A1

(12)

EUROPEAN PATENT APPLICATION

(43) Date of publication:
13.04.2022 Bulletin 2022/15

(51) International Patent Classification (IPC):
A24F 40/40 ^(2020.01)

(21) Application number: **20200262.2**

(52) Cooperative Patent Classification (CPC):
A24F 40/40; A24F 40/20

(22) Date of filing: **06.10.2020**

(84) Designated Contracting States:
**AL AT BE BG CH CY CZ DE DK EE ES FI FR GB
GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO
PL PT RO RS SE SI SK SM TR**
Designated Extension States:
BA ME
Designated Validation States:
KH MA MD TN

- **PLEVNIK, Marko**
London, NW3 2JR (GB)
- **YAMAGUCHI, Akira**
1207 Geneva (CH)
- **HASEGAWA, Ryo**
1209 Genève (CH)
- **BOUCHUIGUIR, Layth Sliman**
1293 Bellevue (CH)
- **KAYAMA, Yusuke**
Tokyo, 105-6927 (JP)

(71) Applicant: **JT International SA**
1202 Geneva (CH)

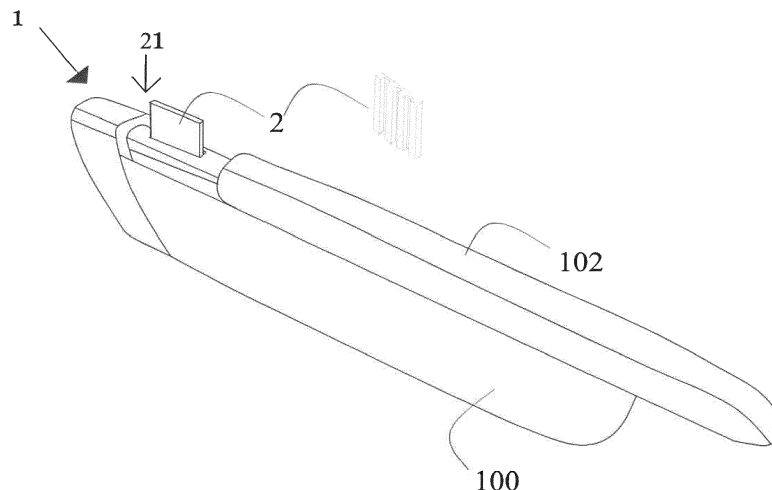
(74) Representative: **Bardehle Pagenberg**
Partnerschaft mbB
Patentanwälte Rechtsanwälte
Prinzregentenplatz 7
81675 München (DE)

(72) Inventors:
• **LYELL, Nathan**
Woking, Surrey, GU227RN (GB)
• **SPOERRI, Monique**
London, SW16 1TB (GB)

(54) AEROSOL GENERATION DEVICE WITH EJECTION MECHANISM USING LEVERAGE

(57) The present invention relates to an aerosol generation device with an ejection mechanism using leverage. More specifically, an aerosol generation device (1), comprising: an aerosol generation chamber (103) configured to receive and heat a substrate (2) to generate aerosol; a cover (102) which can be in a closed position (31) covering the aerosol generation chamber (103), and

in an open position (33) exposing the aerosol generation chamber (103); an ejection mechanism (101) having a lever (1011) and being at least partially engaged with the cover (102) so as to eject at least a portion of the substrate (2) out of the aerosol generation chamber (103) when the cover (102) is in the open position.

**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 using leverage.

BACKGROUND

10 **[0002]** The popularity and use of aerosol generation devices (also known as heat-not-burn products or vaporizers 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.

15 **[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 comprises moist leaf tobacco or other suitable aerosolisable material to a temperature typically in the range 150 °C to 350 °C. Heating 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 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.

20 **[0004]** In such devices, the substrate is usually contained substantially in an aerosol generation chamber for heating, and the user usually needs to push a button to eject the substrate out of the aerosol generation 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 reduces the ingress of the aerosol generation device, and may complicate the operation of the device for the user.

SUMMARY OF THE INVENTION

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

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

- an aerosol generation chamber configured to receive and heat a substrate to generate aerosol,
- 35 - a cover which can be in a closed position covering the aerosol generation chamber, and in an open position exposing the aerosol generation chamber, and
- an ejection mechanism having a lever and being at least partially engaged with the cover so as to eject at least a portion of the substrate out of the aerosol generation chamber when the cover is in the open position;

40 wherein the ejection mechanism can be in an ejected state in which at least a portion of the substrate protrudes from the aerosol generation chamber, and in a non-ejected state in which the substrate is fully contained by the aerosol generation chamber; and

the ejection mechanism translates from the non-ejected state to the ejected state when the cover is moved from the closed position to the open position, thereby ejecting the substrate by rotating the lever.

45 **[0007]** The ejection mechanism improves the convenience of using and replacing 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 allows for a simple inner structure of the aerosol generation device.

50 **[0008]** According to a 2nd embodiment, in the 1st embodiment, when the cover is moved from the open position to the closed position, the lever rotates back to an original position so as to enter the non-ejected state, in which the aerosol generation chamber is fully inserted with the substrate.

[0009] According to a 3rd embodiment, in any one of the preceding embodiments, the cover can be in an intermediate position between the open position and the closed position, the lever does not rotate when the cover is moved from the closed to the intermediate position, and the lever ejects the substrate by rotating when the cover is moved from the intermediate position to the open position.

55 **[0010]** With this arrangement, the substrate is only ejected when the aerosol generation chamber is fully exposed, which avoids incidental operation by the user.

[0011] According to a 4th embodiment, in any one of the preceding embodiments, the lever at least partially defines the bottom surface of the aerosol generation chamber.

[0012] According to a 5th embodiment, in any one of the preceding embodiments, the ejection mechanism has a sliding track, and a sliding block connected with the cover and the lever is arranged to slide in the sliding track so as to trigger the rotation of the lever.

[0013] According to a 6th embodiment, in the preceding embodiment, a fixing mechanism causes the lever to mechanically engage with the sliding block so that the lever rotates when the sliding block slides and vice versa.

[0014] According to a 7th embodiment, in any one of the 5th or 6th embodiments, a protrusion (1021) of the cover is slidably engaged with a protrusion of the sliding block so that when the cover is moved from the closed position to the open position, or from the open position to the closed position, the lever is pressed down or lifted up, respectively.

[0015] According to an 8th embodiment, in any one of the 5th to 7th embodiments, the protrusion (1021) of the cover and/or the protrusion of the sliding block are made of metal.

[0016] With this arrangement, the life of the ejection mechanism and the device is prolonged.

[0017] According to a 9th embodiment, in any one of the preceding embodiments, the aerosol generation device has an elongated shape, and the cover is arranged to slide in a longitudinal direction of the aerosol generation device.

[0018] Preferred embodiments are now described, by way of example only, with reference to the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0019]

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

Figure 2: is a schematic illustration of the aerosol generation device according to the exemplary embodiment of the present invention;

Figures 3a to 3c: show exposed schematic views of the aerosol generation device in different states according to the exemplary embodiment of the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0020] Preferred embodiments of the present invention are described hereinafter and in conjunction with the accompanying drawings.

[0021] 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.

[0022] 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 102, and a main body 106. The cover 102 is slidably engaged with the main body 106 via a slide track (not shown). When taking the surface of the device 1 perpendicular to the insertion direction 21 as the side surfaces of the aerosol generation device 1, the cover is arranged on a side surface of the main body of the device 1, and slides along the direction which is perpendicular to the insertion direction of the substrate 2. When taking the direction parallel to the insertion direction 21 as the transverse direction, and the direction perpendicular to the insertion direction 21 as the longitudinal direction, the cover 102 is arranged to slide in a longitudinal direction of the aerosol generation device 1. The cover 102 has a closed position 31 covering the aerosol generation chamber 103 when the user consumes the substrate 103 and an open position 33 exposing the opening of the aerosol generation chamber 103 comprised by the aerosol generation device 1 for inserting or discarding the substrate 103. The aerosol generation chamber 33 is vertically orientated in the main body, namely arranged along the transverse direction of the device 1. In the present embodiment, there is also an intermediate position between the closed position and the open position. When the cover 102 is slid to the intermediate position, the opening of the aerosol generation chamber 103 is completely exposed. In a preferred embodiment, when the cover 102 is slid from the closed position to the intermediate position, the cover 102 just reveals the complete opening of the aerosol generation chamber 103.

[0023] A schematic perspective illustration of the aerosol generating substrate 2 is shown in figure 1. The substrate 2 may for example comprise nicotine or tobacco, and 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.

[0024] The substrate 2 is porous such that air can flow through the substrate 2 and collect aerosol as it does so. The substrate 2 may for example be a foam, or packed strands or fibres. The substrate 2 maybe formed through an extrusion and/or rolling process into a stable shape. The aerosol generating substrate 2 may be shaped to provide one air flow channel on one side or , in preferred embodiment, multiple air flow channels as shown in figure 1, more preferably, on both sides. These can be aligned with the air flow channel of the aerosol generating device 1 in order to increase air flow through the aerosol generation 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.

[0025] 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 depth 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.

[0026] The aerosol generating substrate is preferably designed to be shorter than or equal to the length of the aerosol generation chamber 103 in the longitudinal direction 21 so that the substrates can be fully covered by the cover 102 and completely enclosed and contained in the aerosol generation chamber 103 when the cover is in the closed position of the cover 102. In other words, the aerosol generation chamber 107 has a substantially cuboid shape corresponding the shape of the substrate 103, with a size of, e.g., 20 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 aerosol generation chamber is preferably greater than the length of the substrate 2, herein 18 mm, and the width and depth of the aerosol generation chamber 107 are preferably greater than the width and depth of the substrate 2, which are 12 mm and 1.2 mm, respectively. More specifically, the length of the aerosol generation chamber in the preferred embodiments is between 45 and 11 mm, preferably between 35 and 13 mm, more preferably between 30 and 14 mm, and most preferably between 25 and 15 mm. The width of the chamber 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 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.

[0027] The cuboid of the aerosol generation chamber has two openings on the two opposite ends forming two surfaces perpendicular to the transverse direction. One of the openings (the "first opening") is configured to be the opening for inserting and discarding the substrate 2 and can be covered by the cover 102.

[0028] Referring to figure 2, the main body further comprises an ejection mechanism 101 (shown in dark), a LiPo battery 106, a PCBA 104 comprising a controller or a CPU, and a USB-C connector 1063 for charging the LiPo battery 1061 and/or transmitting data to the device 1. The ejection mechanism 101 is configured to eject the substrate 2 out of the aerosol generation chamber 103 by supporting the substrate 2 via the second opening of the aerosol generation chamber 103. The aerosol generation chamber 103 is engaged with the ejection mechanism. This means that at least a portion of the substrate 2 can stick out of the first opening of the aerosol generation chamber automatically when the substrate 2 is ejected by the ejection mechanism, and the substrate 2 can be taken out by the hand of the user after the cover is opened.

[0029] Before using the device 1 and consuming the substrate 2, the user first opens the cover 102 of the device 1 by sliding the cover 102 along the longitudinal direction till the intermediate position or the open position. The user then inserts the substrate 103 into the first opening of the aerosol generation chamber 103 along the insertion direction 21. The user then closes the cover 102 by sliding it to the closed position 31. The user switches on the device by means of a button on the device 1, and starts consuming the substrate 2. In an alternative embodiment, sensors may be arranged in the device 1 so as to sense the closing of the cover and/or the existence of the substrate 2 in the device 1, which then trigger the heating for the substrate 2 automatically. After the user has finished consuming the substrate 2, the user simply opens the cover 2 until the cover is slid to the open position 33. At least a part of the substrate 2 pops up and sticks out automatically from the first opening of the aerosol generation chamber 103. In a preferred embodiment, a sensor is configured to sense the opening of the cover 102 so as to stop the heating of the aerosol generation chamber 103. Finally, the user discards the substrate 2 from the device 1.

[0030] The specific configuration of the ejection mechanism 101 is illustrated in figures 3a to 3c.

[0031] The ejection mechanism 101 at least indirectly connects with aerosol generation chamber 103 and the cover 102, and is at least partially engaged with the cover 102. The ejection mechanism 101 comprises a lever 1011 similar to or in the form of a seesaw. The lever 1011 has two straight beams or rods pivoted at a fixed hinge in the device 1.

The two beams are integrated into one piece and fixedly form a predetermined angle. A top end of one of the two beams is configured to support the substrate as a bottom (the internal lower surface or the floor) of the aerosol generation chamber 103 while the substrate 2 is heated, and protrudes into the aerosol generation chamber 103. Thus, at least a part of the substrate 2 is ejected out of the first opening of the aerosol generation chamber 103 when the cover 102 is slidingly opened. The leverage movement of the lever 1011 is triggered by the cover 102 and can be separated into two states: an ejected state and a non-ejected state. In the ejected state, the substrate 2 protrudes from the aerosol generation chamber 103, and in the non-ejected state, the substrate 2 is fully contained by the aerosol generation chamber 103. The ejection mechanism 101 transitions from the non-ejected state to the ejected state when the cover 102 is moved from the closed position 31 to the open position 33, thereby ejecting the substrate 2 by rotating the lever 1011. More specifically, the lever 1011 does not rotate when the cover 102 is slid from the closed position 31 to the intermediate position 32, and the lever 1011 ejects the substrate 2 by the leverage movement when the cover 102 is slid from the intermediate position 32 to the open position 33.

[0032] The ejection mechanism further comprises a sliding track 1013 in which a sliding block 1012 is arranged and configured to engage with the cover and the lever so as to trigger the leverage movement of the lever 1011. The sliding track 1013 is arranged along the transverse direction of the device 1, wherein the sliding block 1012 moves along the same axis. Along that axis, the sliding block has two opposite ends. The first end has an inclined plane surface, and at least a part of the second end forms an arc. The cover 102 comprises a protrusion having an inclined plane surface which slidingly engages and cooperates with the inclined surface of the sliding block 1012 between the intermediate position 32 and the closed position 33. In other words, when the cover moves from the intermediate position 32 to the closed position 33, the inclined surface of the protrusion of the cover 102 presses the sliding block 1012 so that it moves downwards, the arc of the sliding block 1012 presses down one beam of the lever 1011, and the other beam of the lever 1011 is lifted up because of the leverage movement.

[0033] In a preferred embodiment, at least parts of the ejection mechanism comprise or are preferably made of metal material; preferably the protrusion 1021 of the cover 102 and/or the inclining surface of the sliding block 1012 are made of metal.

[0034] In another preferred embodiment, a fixation mechanism (not shown) is configured to cause the lever 1011 to mechanically engage with the arc of the sliding block 1012 so that the lever 1011 rotates when the sliding block 1012 slides and vice versa. More specifically, in one embodiment, a spring may be arranged underneath the beam of the lever 1011. In another embodiment, a ring may be configured on the sliding block 1012 through which the beam of the lever 1011 extends. In yet another embodiment, magnets may be arranged in the lever 1011 and the sliding block 1012. Having this fixation mechanism, the beam of the lever rotates and moves together with the sliding block 1012 and the cover 102. The substrate 2 is thus automatically inserted into the heating chamber 103 from the closed position 33 to the intermediate position 32 with the beam of the lever 1011, which supports the substrate 2, rotating down.

[0035] In other embodiments, the device 1 may be not configured with the fixation device. The user may insert the substrate 2 into the aerosol generation chamber 102 when the cover 102 is in the open position 33. Since the beam of the lever 1011 close to the heating chamber is lifted up and protrudes in the aerosol generation chamber 102, the substrate 2 also at least partially protrudes out of the aerosol generation chamber 102. The user may simply hold the device 1 horizontally so that with the weight of the substrate 2, the lever resets back due to gravity when the cover is slid from the intermediate position 32 to the closed position 31.

[0036] Hereinafter, the process performed by and the different states of the ejection mechanism 101 in the device 1, more specifically the ejected state and the non-ejected state, are discussed with reference to figures 3a to 3c.

The Non-Ejected State

[0037] In figures 3a and 3b, the ejection mechanism 101 is in the non-ejected state. The substrate 2 is fully inserted in the aerosol generation chamber 103. One beam of the lever 1011, which supports the substrate 2, is pressed down by the substrate, and the other beam of the lever 1011 is lifted up together with the sliding block 1012.

[0038] When the user slides the cover in the longitudinal direction from the closed position 31 to the intermediate position 32, the ejection device remains in the non-ejected state. The distance L1 between the protrusion of the cover 102 and the end of the cover which covers the aerosol generation chamber 103 is configured to be longer than the width of the aerosol generation chamber 103. With this arrangement, the lever 1011 starts to rotate and pivoted at the fixed hinge, or fulcrum in the device, when the cover is slid to the intermediate position 32, so that the substrate 2 and the first opening of the aerosol generation chamber 103 are fully exposed during the transition from the non-ejected state to the ejected state.

The Ejected State

[0039] Figure 3c shows the ejected state of the ejection mechanism 101. The cover is slid to the open position 33. A

stop structure (not shown) is arranged in the device 1 to stop the cover 102 from sliding back any further. A fixation structure (not shown) may also be arranged in the device 1, so as to make the cover 102 bi-stable, i.e. it can stably maintain the position in the open state or in the closed state. The fixation structure may consist of center springs or magnets. The sliding block 1012 is pressed by the protrusion of the cover 102, which has a trapezoid shape, and slid down.

[0040] The beam of the lever 1011 which connects with the sliding block 1012 is pressed down, while the other beam of the lever 1011 is lifted up and protrudes into the aerosol generation chamber 103. The substrate 2 is supported and sticks out of the aerosol generation device for the user to discard it out of the device.

Claims

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

- an aerosol generation chamber (103) configured to receive and heat a substrate (2) to generate aerosol,
- a cover (102) which can be in a closed position (31) covering the aerosol generation chamber (103), and in an open position (33) exposing the aerosol generation chamber (103), and
- an ejection mechanism (101) having a lever (1011) and being at least partially engaged with the cover (102) so as to eject at least a portion of the substrate (2) out of the aerosol generation chamber (103) when the cover (102) is in the open position;

wherein the ejection mechanism (101) can be in an ejected state in which the substrate (2) protrudes from the aerosol generation chamber (103), and in a non-ejected state in which the substrate (2) is fully contained by the aerosol generation chamber (103); and

the ejection mechanism (101) translates from the non-ejected state to the ejected state when the cover (102) is moved from the closed position (31) to the open position (33), thereby ejecting the substrate (2) by rotating the lever (1011).

2. The aerosol generation device (1) according to claim 1, wherein when the cover (102) is moved from the open position (33) to the closed position (31), the lever (1011) rotates back to an original position so as to enter the non-ejected state, in which the aerosol generation chamber (103) is fully inserted with the substrate (2).

3. The aerosol generation device (1) according to any one of claims 1 or 2, wherein the cover (102) can be in an intermediate position (32) between the open position (33) and the closed position (31), the lever (1011) does not rotate when the cover (102) is moved from the closed position (31) to the intermediate position (32), and the lever (1011) ejects the substrate (2) by rotating when the cover (102) is moved from the intermediate position (32) to the open position (33).

4. The aerosol generation device (1) according to any one of the preceding claims, wherein the lever (1011) at least partially defines the bottom surface of the aerosol generation chamber (103).

5. The aerosol generation device (1) according to any one of the preceding claims, wherein the ejection mechanism (101) has a sliding track (1013), and a sliding block (1012) slidably engaged with the cover (102) and the lever (1011) is arranged to slide in the sliding track (1013) so as to trigger the rotation of the lever (1011).

6. The aerosol generation device (1) according to the preceding claim, wherein a fixing mechanism causes the lever (1011) to mechanically engage with the sliding block (1012) so that the lever (1011) rotates when the sliding block (1012) slides and vice versa.

7. The aerosol generation device (1) according to any one of claims 5 or 6, wherein a protrusion (1021) of the cover (102) is slidably engaged with an end of the sliding block (1012) so that when the cover (102) is moved from the closed position (31) to the open position (33), or from the open position (33) to the closed position (31), the lever (1011) is pressed down or lifted up, respectively.

8. The aerosol generation device (1) according to any one of the preceding claims 5 to 7, wherein at least parts of the ejection mechanism comprises or preferably made of metal material, preferably the protrusion (1021) of the cover (102) and/or the end of the sliding block (1012) are made of metal.

9. The aerosol generation device (1) according to any one of the preceding claims, wherein the aerosol generation device (1) has an elongated shape, and the cover (102) is arranged to slide in a longitudinal direction of the aerosol

generation device (1).

5

10

15

20

25

30

35

40

45

50

55

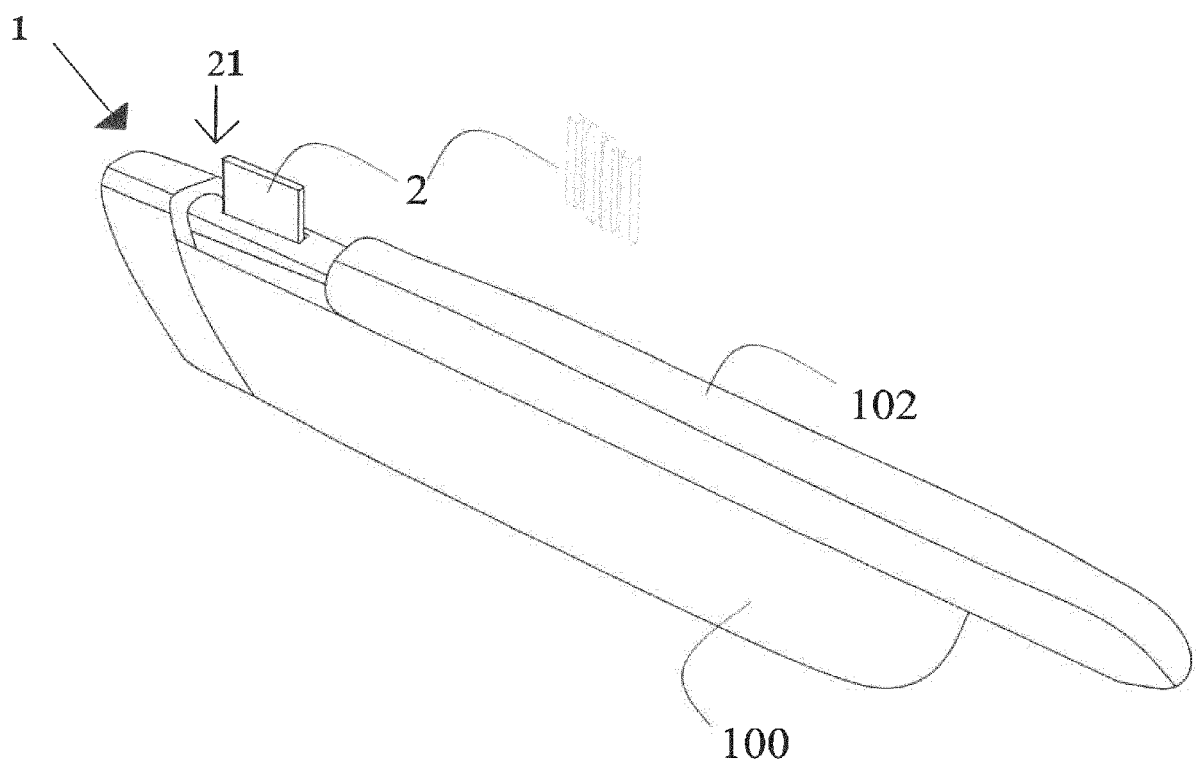


Fig. 1

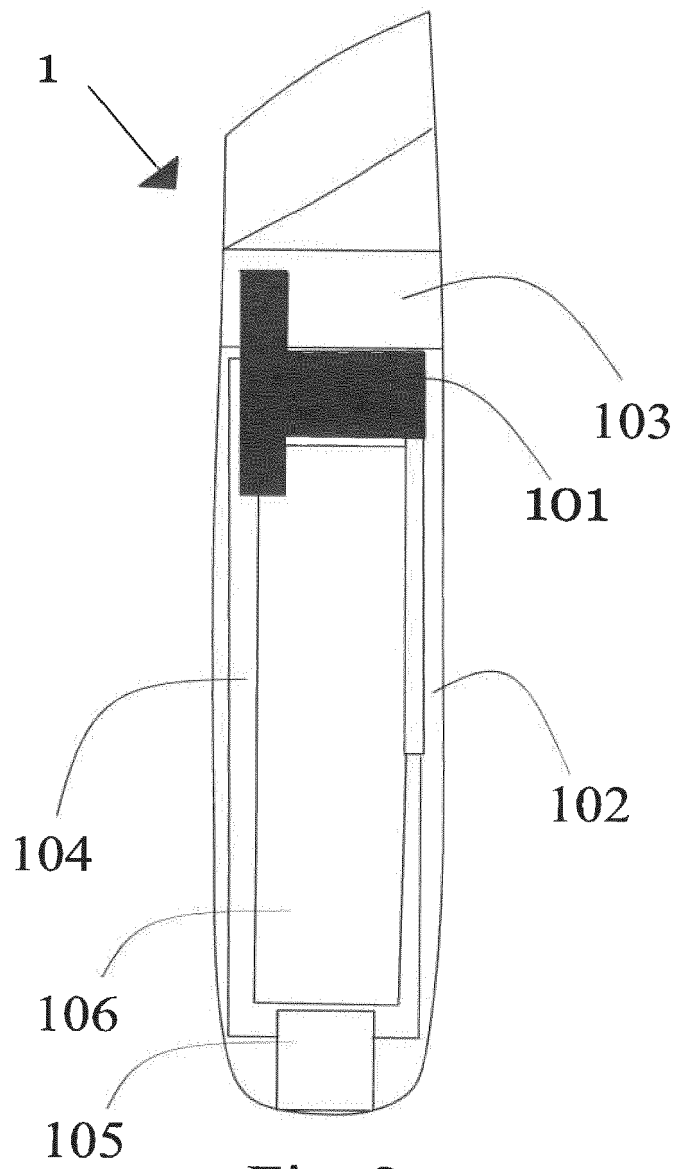
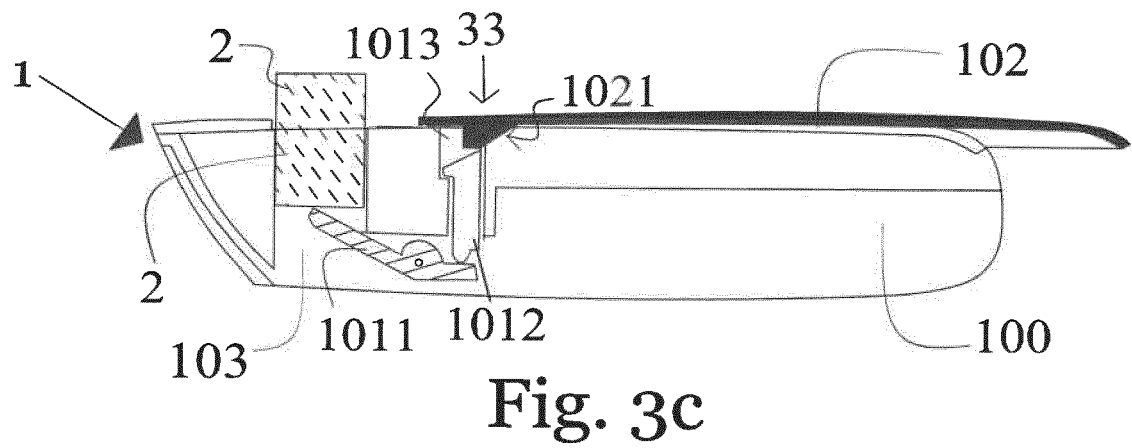
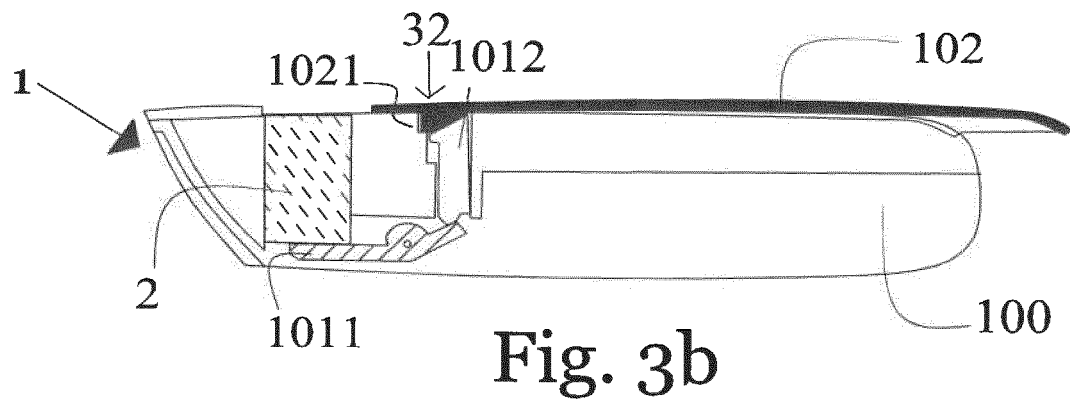
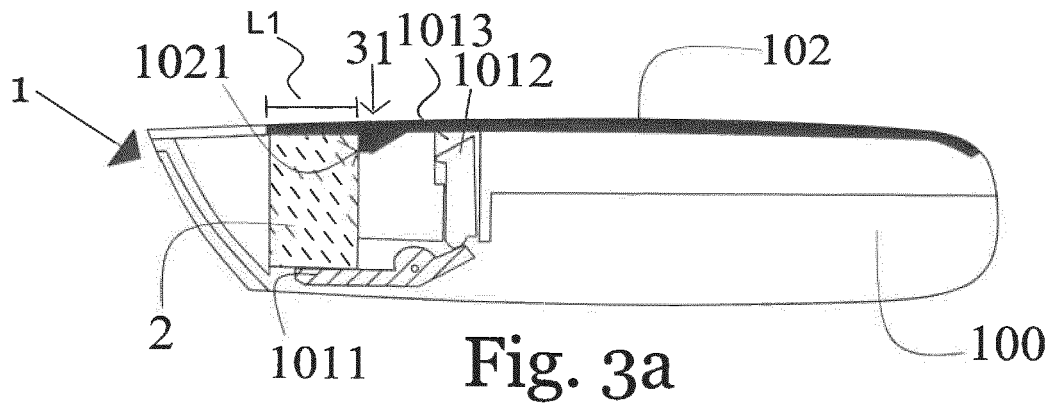


Fig. 2





EUROPEAN SEARCH REPORT

Application Number
EP 20 20 0262

5

10

15

20

25

30

35

40

45

50

55

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	WO 2019/202048 A1 (PHILIP MORRIS PRODUCTS SA [CH]) 24 October 2019 (2019-10-24) * page 10, lines 12 - 18 page 16, line 31 - page 17, line 14 * -----	1-9	INV. A24F40/40
A	EP 3 714 706 A1 (CHINA TOBACCO HUNAN IND CO LTD [CN]) 30 September 2020 (2020-09-30) * paragraph [0045] - paragraph [0055] * -----	1-9	
			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 23 February 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	

EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 20 20 0262

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
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

23-02-2021

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 2019202048 A1	24-10-2019	BR 112020019461 A2	05-01-2021
		CN 111918567 A	10-11-2020
		EP 3781240 A1	24-02-2021
		KR 20210003152 A	11-01-2021
		WO 2019202048 A1	24-10-2019

EP 3714706 A1	30-09-2020	EP 3714706 A1	30-09-2020
		JP 2021505145 A	18-02-2021
		KR 20200095550 A	10-08-2020
		US 2020323263 A1	15-10-2020
		WO 2019114821 A1	20-06-2019
