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(72) Inventors:
• **HOLROYD, Simon**
London W6 0AU (GB)
• **ROWE, Christopher James**
Cambridge CB1 7BL (GB)

(74) Representative: **Isarpatent**
Patent- und Rechtsanwälte Behnisch Barth
Charles
Hassa Peckmann & Partner mbB
Friedrichstrasse 31
80801 München (DE)

(71) Applicant: **JT International S.A.**
1202 Geneva (CH)

(54) **INHALER DEVICE AND CONSUMABLE CARTRIDGE FOR SAME**

(57) The invention provides a consumable cartridge (1) for an inhaler device (10), such as a personal vaporizer or electronic smoking article. The cartridge (1) comprises a casing (2) defining a cavity (C) that holds a volume of liquid (L) to be vaporized. The casing (2) includes at least one opening (5) for insertion of a piercing member (15) through the opening (5) into the cavity (C), and a sealing membrane (3) which is configured to be pierced or ruptured by the piercing member (15) when inserted through the opening (5) to release the liquid (L) held in the cavity (C) for vaporization. The present invention also

provides an inhaler device (10), such as an electronic smoking article, for generating vapour (V) for inhalation. The inhaler device (10) comprises a body portion (11) configured to receive a consumable cartridge (1) according to the invention; and a mouthpiece (14) provided on the body portion (11) for conveying or delivering vapour (V) generated from the liquid (L) to a user, wherein the device (10) includes a piercing member (15) configured for insertion into and/or through the at least one opening (5) to pierce or rupture the sealing membrane (3) to access the liquid (L) for vaporization.

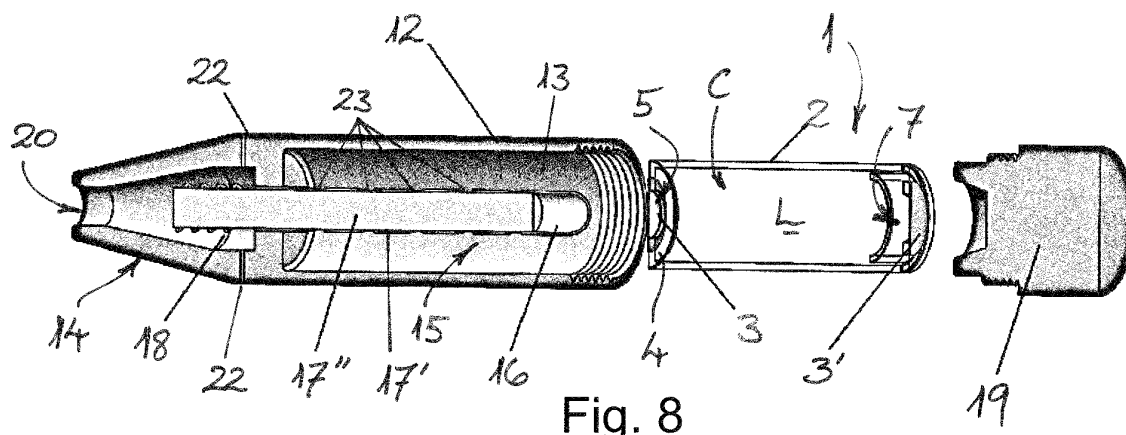


Fig. 8

Description

Field of the Invention

[0001] The present invention relates to a consumable cartridge for an inhaler device, such as a personal vaporizer device or an electronic cigarette, and to an inhaler device which includes such a consumable cartridge.

Background of the Invention

[0002] Personal vaporizer devices, such as electronic cigarettes or "e-cigarettes" as they are also known, have gained in popularity over the past ten years as an alternative to traditional smoking articles, like cigarettes, cigars, and cigarillos. Because the technology employed in personal vaporizer devices is still quite young, however, developments in the design and configuration of such devices are on-going to improve their performance and their reliability, as well as their ease of production and their production costs.

Summary of the Invention

[0003] In view of the above, an object of the invention is to provide a new and improved consumable cartridge for an inhaler device, such as a personal vaporizer device or an electronic cigarette or e-cigarette. In particular, it would be desirable to provide such a new and improved consumable cartridge in the form of a replaceable, or single-use, or disposable cartridge or capsule for a vaporizer device.

[0004] In accordance with the invention, a consumable cartridge for an inhaler device, such as a personal vaporizer or an electronic smoking article, as recited in claim 1 and an inhaler device as recited in claim 10 are provided. Furthermore, various advantageous or preferred features of the invention are recited in the dependent claims.

[0005] According to one aspect, therefore, the present invention provides a consumable cartridge for an inhaler device, such as a personal vaporizer or electronic smoking article, the cartridge comprising: a casing defining a cavity for holding a volume of a liquid to be vaporized. The casing includes at least one opening for insertion of a piercing member through the opening into the cavity, and a sealing membrane which is configured to be pierced or ruptured by the piercing member when inserted through the opening to release the liquid held therein for vaporization.

[0006] In a preferred embodiment, the at least one opening is formed in a wall of the casing and is sized to have a diameter larger than a diameter of the piercing member which is configured to be inserted through it. In this regard, the at least one opening may be sized to substantially correspond to a diameter of the piercing member. In this way, the at least one opening may be only slightly larger than the piercing member to just enable the piercing member to pass there-through. In an

alternative embodiment, however, the at least one opening in the casing may be substantially larger than a diameter of the piercing member.

[0007] In a preferred embodiment, the sealing membrane covers or extends over the at least one opening. The sealing membrane preferably comprises a flexible and/or elastomeric material. The sealing membrane may, for example, comprise a sheet, film, or foil which is configured to be pierced or ruptured by the piercing member. The sealing membrane preferably comprises a polymer plastic material, although other materials, such as a metal foil, may also be contemplated. In a preferred embodiment, the sealing membrane may be configured to seal around the piercing member after the piercing member has been inserted through the opening. To this end, a sealing membrane of an elastomeric material is particularly desirable. In an alternative embodiment, however, a seal, such as an O-ring, may be provided in or adjacent to the at least one opening for sealing around the piercing member after the piercing member has been inserted through the opening.

[0008] In a preferred embodiment, the sealing membrane at least partially, and preferably substantially entirely, surrounds and/or encloses the liquid to form a capsule which is housed within the cavity of the casing. In this way, the sealing membrane forms a capsule holding the liquid within the cavity. The sealing membrane is accessible by the piercing member inserted via the opening into the casing. In a preferred embodiment, the sealing membrane may be configured to rupture when pierced by the piercing member, such that the liquid may flow out of the capsule to fill the cavity of the casing. It will be noted that the sealing membrane may only partially surround and/or enclose the liquid to form part of a capsule, e.g. a half-capsule, which may then combined and sealed with a rigid capsule part.

[0009] In a preferred embodiment, the casing is substantially cylindrical and the at least one opening is provided in a respective end region of the casing.

[0010] In a preferred embodiment, the casing includes a second opening opposite to and substantially aligned with the first opening. In this regard, the piercing member may be configured to extend through the casing and/or to pass out of the cavity through the second opening. Accordingly, the sealing membrane may cover or extend over each of the openings.

[0011] According to another aspect, the invention provides an inhaler device, such as an electronic cigarette, for generating vapour for inhalation, the device comprising: a body portion configured to receive a consumable cartridge according to any one of the embodiments described above; and a mouthpiece provided on the body portion for conveying or delivering vapour to a user. The inhaler device includes a piercing member configured for insertion into or through the at least one opening to pierce or rupture the sealing membrane to access the liquid for vaporization.

[0012] In a preferred embodiment, the piercing mem-

ber includes a tip portion configured to pierce or cut the membrane and a liquid conveying portion configured to convey the liquid from the cartridge to an aerosol generating means in the device for vaporizing the substance. In a preferred embodiment, the liquid conveying portion of the piercing member is configured to convey the liquid to the aerosol generating means by capillary action. To this end, the liquid conveying portion preferably comprises at least one of a fibrous material or a wicking material and/or a tube for conveying the liquid to the aerosol generating means. The tube of the liquid conveying portion preferably includes one or more laterally formed apertures or holes for admitting liquid into the tube.

[0013] In a preferred embodiment, the aerosol generating means comprises a heater, and especially a heating coil, which is provided at or on an end region of the liquid conveying portion of the piercing member. For example, if the liquid conveying portion of the piercing member comprises a fibrous material or a wicking material, the heater, e.g. heating coil, may be provided around an end region of that fibrous or wicking material. The aerosol generating means, or at least a part thereof, is preferably located within the mouthpiece.

[0014] In a preferred embodiment, the piercing member has a length equal to or greater than a length of the casing. In this way, the piercing member may be configured to be inserted through substantially a full length of the casing.

Brief Description of the Drawings

[0015] For a more complete understanding of the invention and the advantages thereof, exemplary embodiments of the invention are explained in more detail in the following description with reference to the accompanying drawing figures, in which like reference characters designate like parts and in which:

Fig. 1(a)-(c) is a series of schematic cross-sectional views showing a consumable cartridge according to one embodiment being deployed in an inhaler device according to an embodiment of the invention;

Fig. 2(a)-(c) is a series of schematic cross-sectional views showing a consumable cartridge according to another embodiment being deployed in an inhaler device according to another embodiment of the invention;

Fig. 3 is a schematic cross-sectional perspective view of the inhaler device shown in Figs. 2(a)-(c) in a disassembled state;

Fig. 4 is a schematic side view of the consumable cartridge shown in Fig. 3;

Fig. 5(a)-(b) are schematic cross-sectional views

showing a consumable cartridge being deployed in an inhaler device according to the embodiment of Figs. 2(a)-(c);

Fig. 6(a)-(e) is a series of schematic cross-sectional views showing a consumable cartridge according to a further embodiment being deployed in an inhaler device according to a further embodiment of the invention;

Fig. 7(a)-(c) is a series of schematic cross-sectional views showing a consumable cartridge according to yet another embodiment being deployed in an inhaler device according to yet another embodiment of the invention;

Fig. 8 is a schematic cross-sectional perspective view of the inhaler device shown in Figs. 7(a)-(c) in a disassembled state;

Fig. 9 is a schematic cross-sectional view showing a consumable cartridge being deployed in an inhaler device according to the embodiment of Figs. 7(a)-(c); and

Fig. 10 is a schematic cross-sectional view showing a consumable cartridge in an inhaler device according to the embodiment of Figs. 7(a)-(c).

[0016] The accompanying drawings are included to provide a further understanding of the present invention and are incorporated in and constitute a part of this specification. The drawings illustrate particular embodiments of the invention and together with the description serve to explain the principles of the invention. Other embodiments of the invention and many of the attendant advantages of the invention will be readily appreciated as they become better understood with reference to the following detailed description.

[0017] It will be appreciated that common and/or well understood elements that may be useful or necessary in a commercially feasible embodiment are not necessarily depicted in order to facilitate a more abstracted view of the embodiments. The elements of the drawings are not necessarily illustrated to scale relative to each other. It will further be appreciated that certain actions and/or steps in an embodiment of a method may be described or depicted in a particular order of occurrences while those skilled in the art will understand that such specificity with respect to sequence is not actually required. It will also be understood that the terms and expressions used in the present specification have the ordinary meaning as is accorded to such terms and expressions with respect to their corresponding respective areas of inquiry and study, except where specific meanings have otherwise been set forth herein.

Detailed Description of Embodiments

[0018] With reference firstly to Fig. 1 (a)-(c) of the drawings, a consumable cartridge 1 for an inhaler device, such as an e-cigarette, is shown being deployed in the inhaler device 10. The cartridge 1 includes a generally cylindrical casing 2 which defines a cavity C for holding a volume of a liquid L to be vaporized. In this regard, the liquid L is surrounded and/or enclosed by a flexible membrane 3 which forms a capsule and seals the liquid L within the cavity C of the casing 2. An end wall 4 of the casing 2 includes a generally circular first opening 5 located generally centrally of the casing 2 for alignment with a piercing member 15 of the inhaler device 10.

[0019] In this regard, the inhaler device or e-cigarette 10 includes a body portion 11 which comprises a housing 12 defining a chamber 13 for receiving the cartridge 1. The piercing member 15 of the inhaler device or e-cigarette 10 includes a tip portion 16 which projects into the chamber 13 in alignment with the first opening 5. As the consumable cartridge 1 is inserted into the chamber 13, the tip portion 16 of the piercing member 15 passes through the first opening 5 and comes into contact with the flexible membrane 3 forming the capsule enclosing the liquid L within the cavity C. By screwing or otherwise bringing a power supply unit or battery unit 19, provided here in the form of an end cap, into connection with the housing 12 of the e-cigarette 10, the cartridge 1 is fully driven or forced into the chamber 13. This, in turn, causes the sharp tip portion 16 of the piercing member 15 to pierce or cut the membrane 3, thereby causing the membrane 3 to rupture or burst which allows the liquid L to flow into and to fill the cavity C in the casing 2. As is apparent from the drawings, the tip portion 16 of piercing member 15 comprises a tubular element which is cut at an acute angle to present a sharp tip. Furthermore, the piercing member 15 has a liquid conveying portion 17 comprising a fibrous material or a wicking material extending within and from the tubular element of the tip portion 16 for conveying the liquid L from the cavity C of the cartridge 1 under capillary action to an aerosol generating means (not shown) of the inhaler device 10. In this embodiment, a seal or O-ring (not shown) may be provided in the first opening 5 for sealing around the piercing member 15 after the piercing member 15 has been inserted to prevent any leakage of liquid L through the opening 5.

[0020] Referring now to Figs. 2(a)-(c) as well as to Figs. 3, 4, 5(a)-(b) of the drawings, an alternative, but nevertheless similar, embodiment of a consumable cartridge 1 and an inhaler device 10 are illustrated. As before, the inhaler device or e-cigarette 10 comprises a body portion 11 which includes a housing 12 having a chamber 13 for receiving the cartridge 1. A mouthpiece 14 is provided at one end of the body portion 11 for conveying or delivering vapour generated from the liquid L to a user. Again, also, the cartridge 1 has a generally cylindrical casing 2 defining a cavity C for holding a volume of a liquid L to be

vaporized. The liquid L is surrounded or enclosed by a flexible membrane 3 which forms a capsule and seals the liquid L within the cavity C of the casing 2. An end wall 4 of the cylindrical casing 2 has a first opening 5 located generally centrally of the casing 2 for alignment with a piercing member 15 of the inhaler device 10. As the consumable cartridge 1 is inserted into the housing 12, a tip portion 16 of the piercing member 15 passes through the first opening 5 and comes into contact with the flexible membrane 3 forming the capsule enclosing the liquid L within the cavity C. By bringing an end cap 19 (e.g. power supply unit or battery unit) into connection with the housing 12 of the e-cigarette 10, the cartridge 1 is fully driven or forced into the chamber 13. This, in turn, causes the sharp tip portion 16 of the piercing member 15 to pierce or cut the membrane 3. In this embodiment, the capsule membrane 3 does not burst but the liquid nevertheless flows via the tip portion 16 and a liquid conveying portion 17 comprising a rod-like element of a fibrous material or a wicking material which extends within and/or from the tip portion 16 of the piercing member 15 for conveying the liquid L from the cavity C of the cartridge 1 via capillary action to an aerosol generating means 18 of the inhaler device 10. In this case, the aerosol generating means 18 comprises an electrical resistance heating wire or filament which is wound in the form of a heating coil around an end region of the fibrous material of the liquid conveying portion 17. In this way, by activating the heating coil 18, the liquid L in the end region of the fibrous material of the liquid conveying portion 17 surrounded by the heating wire is heated and vaporized to generate a vapour V for inhalation by a user via the mouthpiece 14. In operation, when a user draws upon an outlet 20 at an end of the mouthpiece 14, air is drawn into a vapour chamber 21 surrounding the aerosol generating means 18 via air inlet openings 22 formed in sides of the mouthpiece 14. The airflow mixes with vapour V generated and passes to the user via the outlet 20 for inhalation, as seen in Fig. 5(b).

[0021] With reference to Figs. 6(a)-(e) of the drawings, another consumable cartridge 1 for an inhaler device 10, such as an e-cigarette, is shown being deployed in the device 10. The cartridge 1 in this example again has a cylindrical casing 2 which encloses a cavity C for holding a volume of a liquid L to be vaporized. In this case, however, a membrane 3 seals the liquid L within the cavity C of casing 2 by being fixed simply to cover or extend over a first opening 5 located in an end wall 4 generally centrally of the casing 2 for alignment with the piercing member 15 of the inhaler device 10 (to be described below). In addition, an opposite end wall 6 of the casing 2 in this embodiment includes a second opening 7 that is substantially aligned with the first opening 5 of approximately the same size. Furthermore, a sealing membrane 3' is also provided fixed covering or extending over this second opening 7 to seal the liquid L within the cavity C.

[0022] In this embodiment, the inhaler device 10 again includes a body portion 11 which comprises a housing

12 defining a chamber 13 for receiving the cartridge 1. In this example, the piercing member 15 of the inhaler device 10 is significantly longer and projects into and extends substantially through a full length of the chamber 13, with a tip portion 16 of the piercing member 15 positioned centrally for alignment with the first opening 5 of the cartridge 1. The piercing member 15 again includes a liquid conveying portion 17, which in this case comprises both a tube 17' from which the pointed distal tip portion 16 is formed and a rod-like element 17'' of a fibrous or wicking material which extends within and/or from an end of the tube 17' opposite the tip portion 16 for conveying liquid L from the cartridge 1 via capillary action. To ensure a reliable flow of liquid L from the cartridge, the tube 17' has a plurality of lateral holes 23 which communicate with a central channel of the tube 17', and the central channel in turn communicates with the rod-like element 17'' of fibrous or wicking material extending within it and from the end thereof.

[0023] As the consumable cartridge 1 is inserted into the chamber 13, the tip portion 16 of the piercing member 15 is aligned with and passes through the first opening 5 and thereby pierces the flexible membrane 3, as seen in Fig. 6(b) and Fig. 6(c). As the cartridge 1 is further inserted into the chamber 13, the tip portion 16 of the piercing member 15 is seen in Fig. 6(d) to also be aligned with the second opening 7. By then screwing or otherwise bringing an end cap or battery unit 19 into connection with the housing 12 of the e-cigarette 10, the cartridge 1 is fully driven or forced into the chamber 13, as seen in Fig. 6(e). This then causes the tip portion 16 of the piercing member 15 to pierce or cut the membrane 3' covering the second opening 7, such that the piercing member 15 extends through substantially a full length of the casing 2 with the tip portion 16 projecting beyond the end wall 6 and residing within a corresponding recess in the end cap 19. In this embodiment, the sealing membranes 3, 3' are of an elastomeric material so that the membranes 3, 3' seal around the piercing member 15 after the piercing member 15 passes through the respective membrane. This prevents any unwanted leakage of the liquid L through the membranes 3, 3' and/or through the openings 5, 7.

[0024] Referring now to Figs. 7(a)-(c) and Figs. 8-10 of the drawings, an alternative, but nevertheless similar, embodiment of a cartridge 1 and an inhaler device 10 to that described with reference to Figs. 6(a)-(e) are illustrated. As before, the inhaler device or e-cigarette 10 comprises a body portion 11 which includes a housing 12 having a chamber 13 for receiving the cartridge 1. A mouthpiece 14 is provided at one end of the body portion 11 for conveying or delivering vapour generated from the liquid L to a user. Again, the cartridge 1 has a generally cylindrical casing 2 and defines a cavity C which holds a volume of a liquid L to be vaporized. An end wall 4 of the cylindrical casing 2 has a first opening 5 located generally centrally of the casing 2 for alignment with a piercing member 15 of the inhaler device 10. As the consumable

cartridge 1 is inserted into the housing 12, as shown in Fig. 7(b) and Fig. 9, a sharp or pointed tip portion 16 of the piercing member 15 pierces or cuts the flexible sealing membrane 3 covering the first opening 5, such that the piercing member 15 passes through the first opening 5 into the cavity C, where it comes into contact with the liquid L. By pressing the cartridge 1 in the direction of arrows A in Fig. 9, the cartridge 1 is further inserted into the chamber 13. Because the piercing member 15 is longer than the casing 2 of the cartridge, the tip portion 16 encounters an opposite end wall 6 of the casing having a second opening 7 covered and sealed by a membrane 3'. By bringing an end cap 19 (e.g. a power supply unit or battery unit) into connection with the housing 12 of the device 10, the cartridge 1 is fully driven or forced into the chamber 13. This, in turn, causes the tip portion 16 of the piercing member 15 to pierce or cut the membrane 3' and to penetrate through the second opening 7 and beyond the casing 2 into a recess within the end cap 19.

[0025] In this embodiment, the elongate piercing member 15 again has a liquid conveying portion 17, which comprises both a tube 17' from which the pointed tip portion 16 is formed and a rod-like element 17'' of wicking material which extends within the tube 17' and projects from an end of the tube 17' opposite the tip portion 16 for conveying the liquid L from the cartridge 1 via capillary action. To ensure a reliable flow of liquid L from the cartridge 1 regardless how much liquid is in the cavity C, the tube 17' has a plurality of lateral holes 23 which communicate with a central channel of the tube 17' and the rod-like element 17'' of wicking material therein. Thus, the liquid L flows via capillary action to an aerosol generating means 18 of the inhaler device 10, which in this case again comprises an electrical resistance heating wire or filament which is wound in the form of a heating coil around an end region of the rod-like element 17'' of wicking material. In this way, by activating the heating coil 18, the liquid L in the end region of the rod-like element 17'' of fibrous surrounded by the heating wire is heated and vaporized to generate a vapour V for inhalation by a user via the mouthpiece 14. In operation, when a user draws upon an outlet 20 at an end of the mouthpiece 14, air is drawn into a vapour chamber 21 surrounding the aerosol generating means 18 via air inlet openings 22 formed in sides of the housing 12 or mouthpiece 14. In this way, the airflow mixes with the vapour V generated and then passes to the user via the outlet 20 for inhalation, as seen in Fig. 10.

[0026] As will be understood by persons of ordinary skill in the art, the power supply unit or battery unit 19 will typically cooperate with a controller or microcontroller module present in the inhaler device 10. These are operatively connected to the aerosol generating means 18 in order to provide electric power or current to the heating coil and to control the vaporization process. A sensor (not shown) may optionally be provided in the piercing member 15 to determine the liquid content remaining in the cartridge 1.

[0027] Although specific embodiments of the invention are illustrated and described herein, it will be appreciated by those of ordinary skill in the art that a variety of alternate and/or equivalent implementations exist. It should be appreciated that the exemplary embodiment or exemplary embodiments are examples only and are not intended to limit the scope, applicability, or configuration in any way. Rather, the foregoing summary and detailed description will provide those skilled in the art with a convenient road map for implementing at least one exemplary embodiment, it being understood that various changes may be made in the function and arrangement of elements described in an exemplary embodiment without departing from the scope as set forth in the appended claims and their legal equivalents. Generally, this application is intended to cover any adaptations or variations of the specific embodiments discussed herein.

[0028] It will also be appreciated that in this document the terms "comprise", "comprising", "include", "including", "contain", "containing", "have", "having", and any variations thereof, are intended to be understood in an inclusive (i.e. non-exclusive) sense, such that the process, method, device, apparatus or system described herein is not limited to those features or parts or elements or steps recited but may include other elements, features, parts or steps not expressly listed or inherent to such process, method, article, or apparatus. Furthermore, the terms "a" and "an" used herein are intended to be understood as meaning one or more unless explicitly stated otherwise. Moreover, the terms "first", "second", "third", etc. are used merely as labels, and are not intended to impose numerical requirements on or to establish a certain ranking of importance of their objects.

List of Drawing Signs

[0029]

1	cartridge
2	casing
3	membrane
3'	membrane
4	end wall of casing
5	first opening
6	end wall of casing
7	second opening
10	inhaler device or e-cigarette
11	body portion
12	housing
13	chamber
14	mouthpiece
15	piercing member
16	tip portion
17	liquid conveying portion
17'	tube
17"	rod-like element of wicking material
18	aerosol generating means or heating coil
19	end cap or power supply unit

20	outlet of mouthpiece
21	vapour chamber
22	air inlet opening
23	lateral hole
5	C cavity
L	liquid
V	vapour

10 Claims

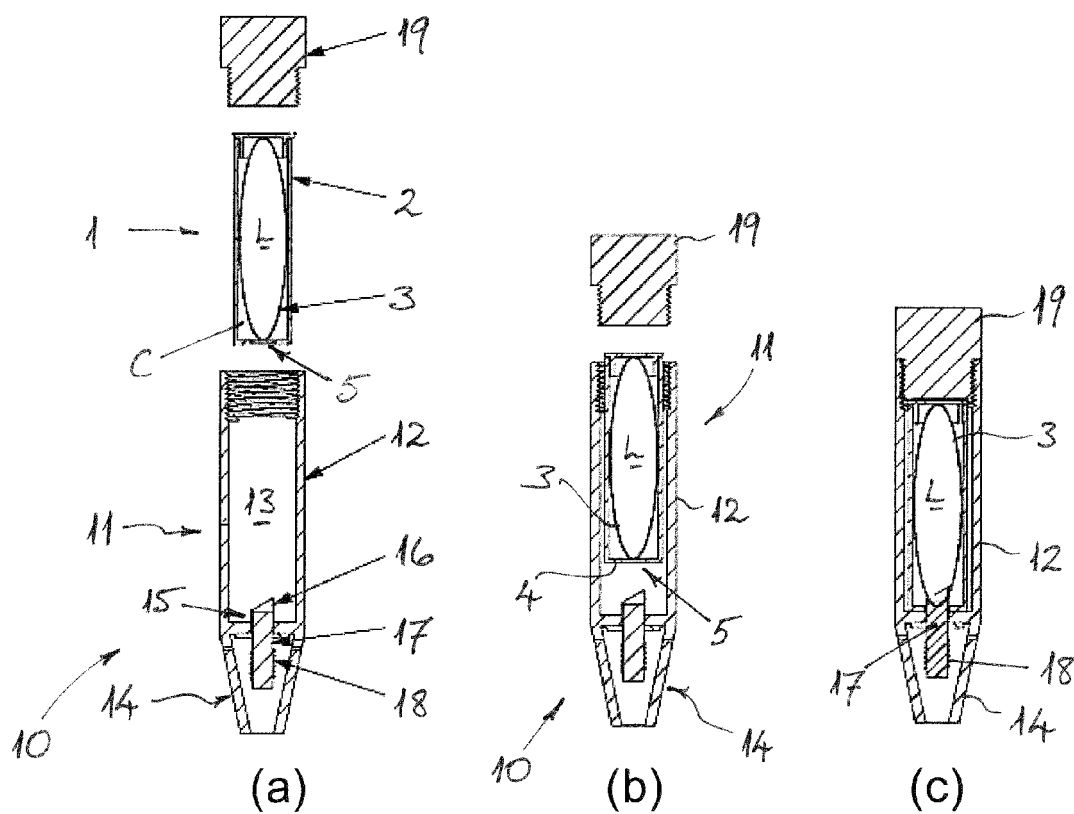
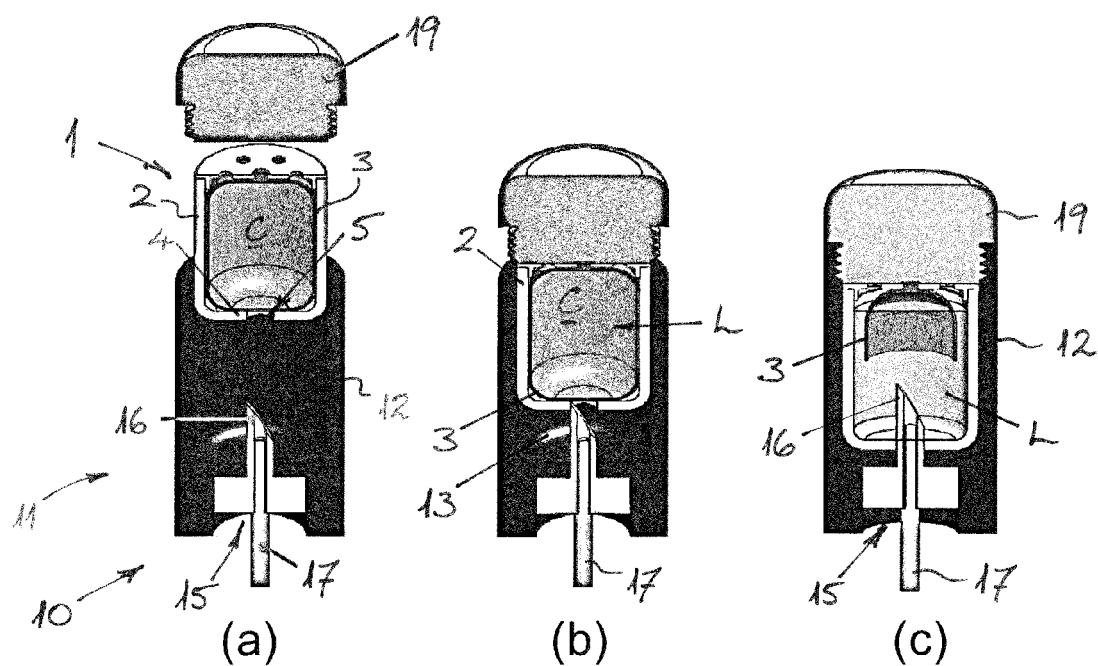
1. A consumable cartridge (1) for an inhaler device (10), such as a personal vaporizer or an electronic smoking article, the cartridge (1) comprising:
 - a casing (2) defining a cavity (C) which holds a volume of a liquid (L) to be vaporized, wherein the casing (2) includes at least one opening (5) for insertion of a piercing member (15) through the opening (5) into the cavity (C), and a sealing membrane (3) which is configured to be pierced or ruptured by the piercing member (15) when inserted through the opening (5) to release the liquid (L) held in the cavity (C) for vaporization.
2. A consumable cartridge (1) according to claim 1, wherein the opening (5) is formed in a wall of the casing (2) and has a diameter larger than a diameter of the piercing member (15) configured to be inserted through it, wherein the opening (5) is preferably sized to substantially correspond to a diameter of the piercing member (15).
3. A consumable cartridge (1) according to claim 1 or claim 2, wherein the sealing membrane (3) covers or extends over the at least one opening (5).
4. A consumable cartridge (1) according to any one of claims 1 to 3, wherein the sealing membrane (3) surrounds and/or encloses the liquid (L) to form a capsule which is housed within the cavity (C) of the casing (2).
5. A consumable cartridge (1) according to claim 4, wherein the sealing membrane (3) forming the capsule holding the liquid (L) within the cavity (C) is accessible by the piercing member (15) inserted via the opening (5) in the casing (2).
6. A consumable cartridge (1) according to claim 4 or claim 5, wherein the sealing membrane (3) is configured to rupture when pierced by the piercing member (15).
7. A consumable cartridge (1) according to any one of claims 1 to 6, wherein the casing (2) includes a second opening (7) opposite to and substantially aligned

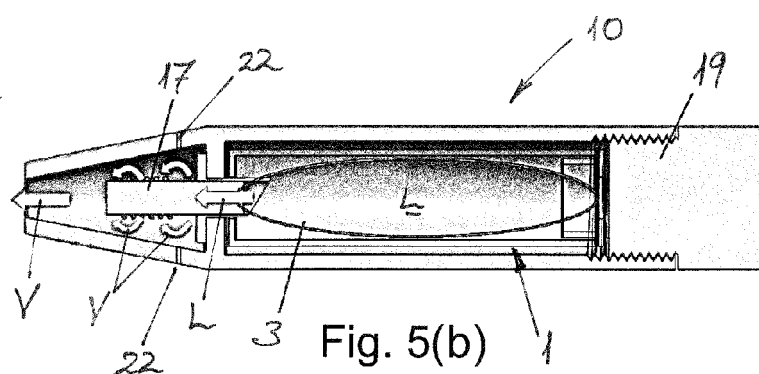
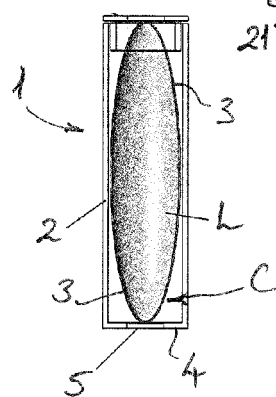
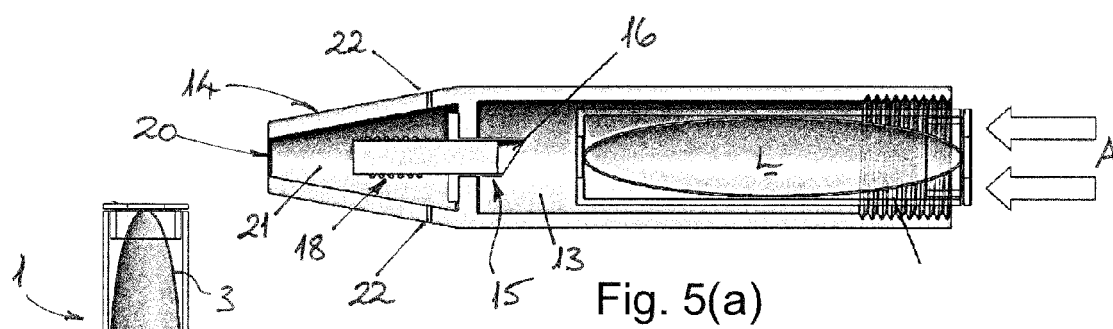
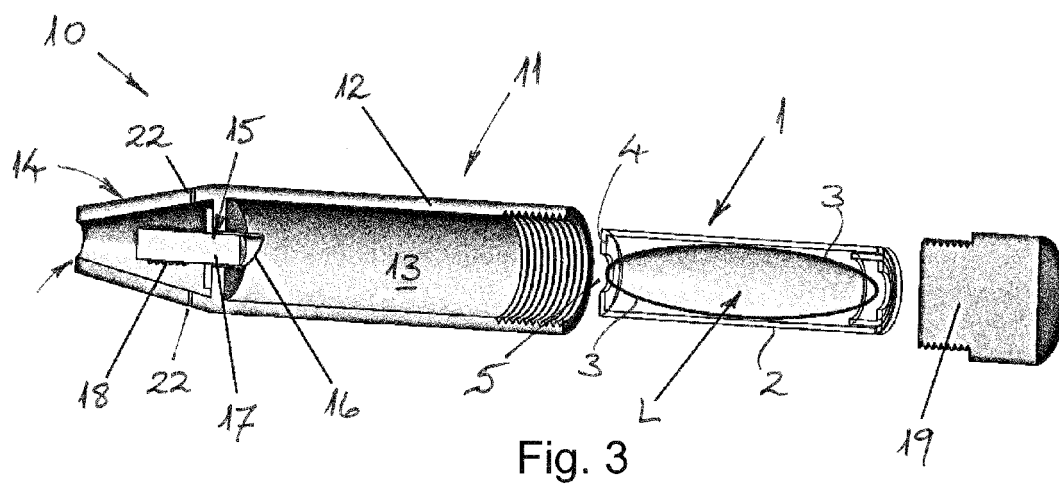
with the first opening (5), the piercing member (15) preferably being configured to pass out of the cavity (C) through the second opening (8).

figured to be inserted through substantially a full length of the casing (2).

8. A consumable cartridge (1) according to any one of claims 1 to 7, wherein the sealing membrane (3, 3') covers or extends over each opening (5, 7). 5
9. A consumable cartridge (1) according to any one of claims 1 to 8, wherein the casing (2) is substantially cylindrical and the at least one opening (5, 7) is provided in a respective end region of the casing (2). 10
10. An inhaler device (10), such as an electronic smoking article, for generating vapour (V) for inhalation, the device (10) comprising: 15
 - a body portion (11) configured to receive a consumable cartridge (1) according to any of claims 1 to 9; and 20
 - a mouthpiece (14) provided on the body portion (11) for conveying or delivering vapour (V) generated from the liquid (L) to a user; 25
 - wherein the device (10) includes a piercing member (15) configured for insertion into and/or through the at least one opening (5) to pierce or rupture the sealing membrane (3) to access the liquid (L) for vaporization. 30
11. An inhaler device (10) according to claim 10, wherein the piercing member (15) includes a tip portion (16) configured to pierce or cut the membrane (3) and a liquid conveying portion (17) configured to convey the liquid (L) from the cartridge (1) to an aerosol generating means (18) in the device (10) for vaporizing the substance (3). 35
12. An inhaler device (10) according to claim 11, wherein the liquid conveying portion (17) is configured to convey the liquid (L) to the aerosol generating means (18) by capillary action, the liquid conveying portion (17) preferably comprising at least one of a fibrous material or wicking material and a tube for convey the liquid (L) to the aerosol generating means (18). 40

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13. An inhaler device (10) according to claim 12, wherein the tube of the liquid conveying portion (17) includes a plurality of laterally formed apertures (23) for admitting liquid (L) into the tube. 50
14. An inhaler device (10) according to any one of claims 10 to 13, wherein the aerosol generating means (18) comprises a heater, especially a heating coil, provided on an end region of the liquid conveying portion (17), preferably located within the mouthpiece (14). 55
15. An inhaler device (10) according to any one of claims 10 to 14, wherein the piercing member (17) is con-





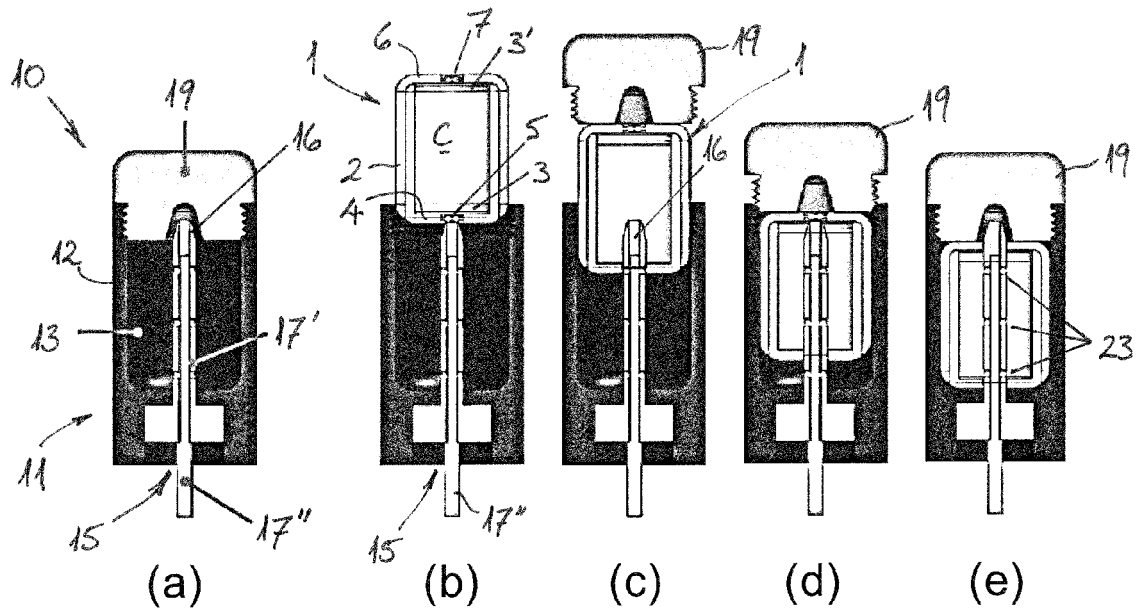


Fig. 6

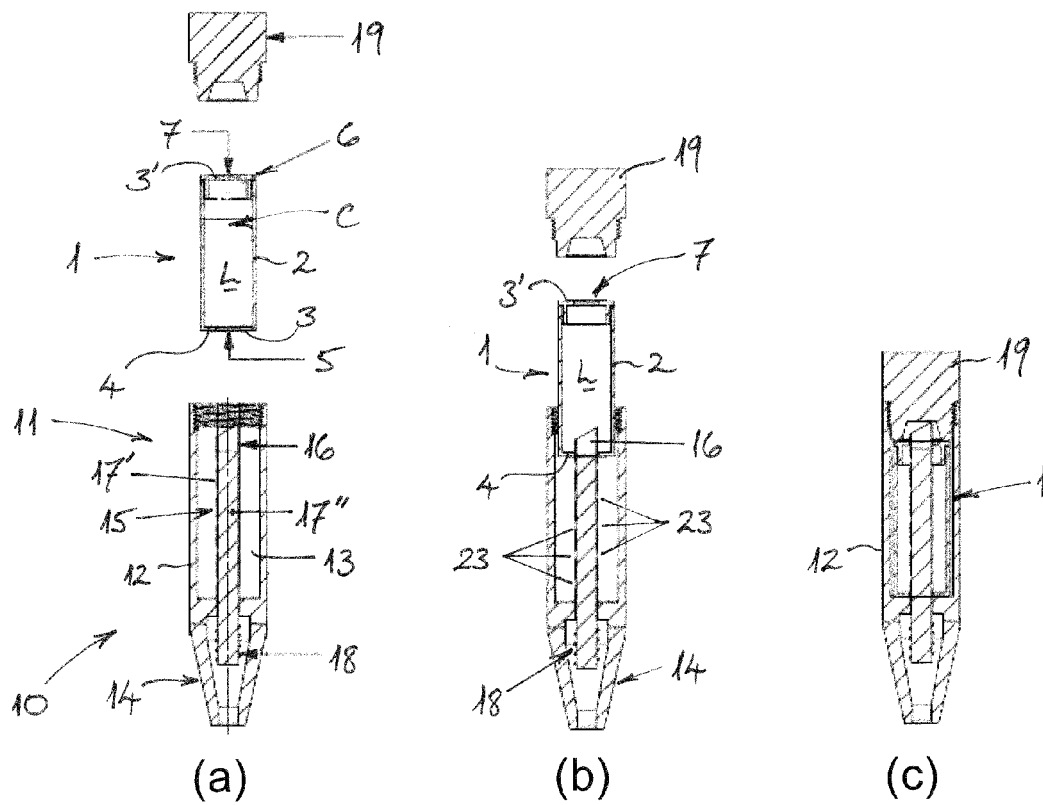
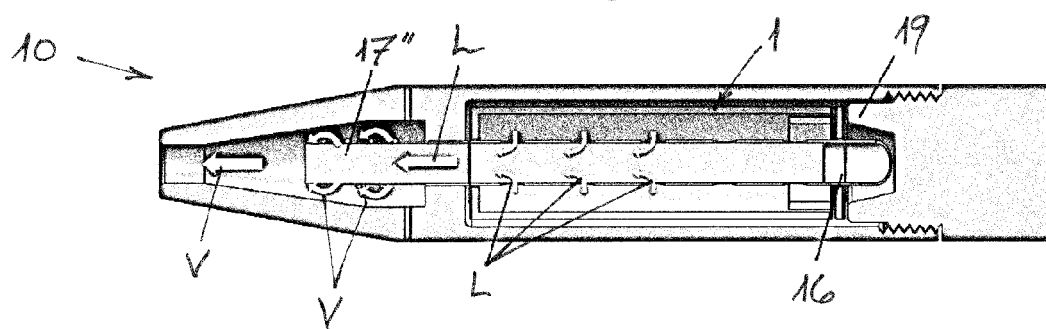
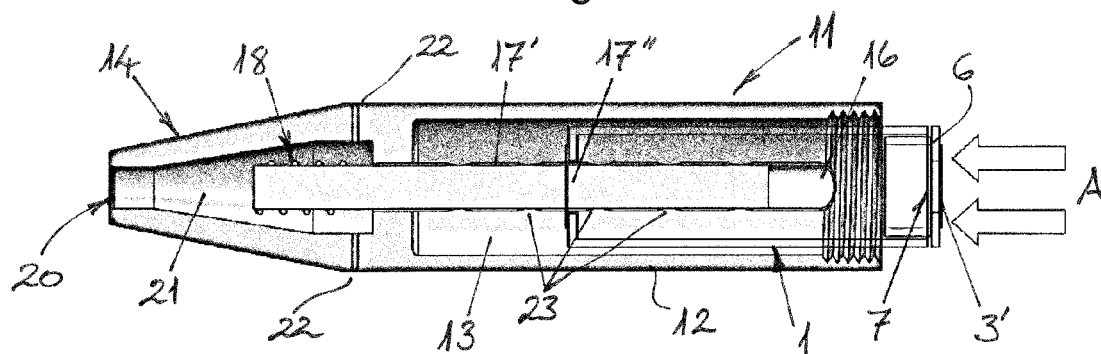
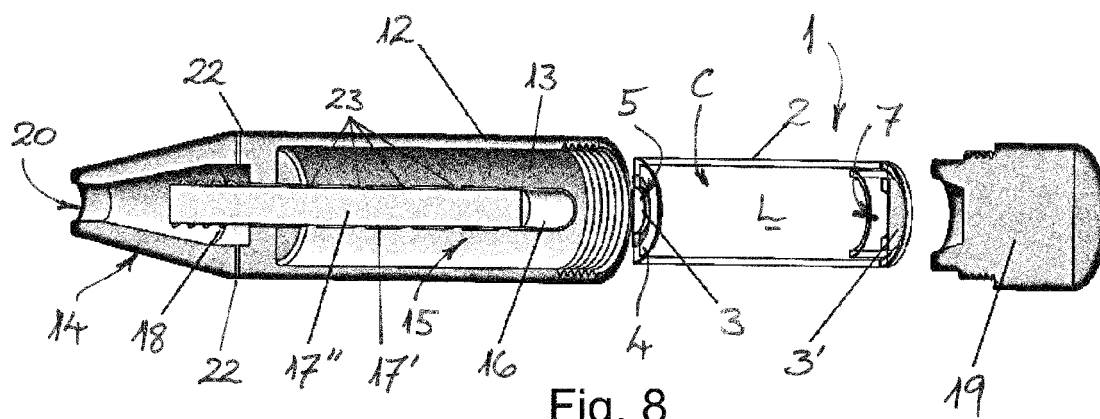


Fig. 7





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