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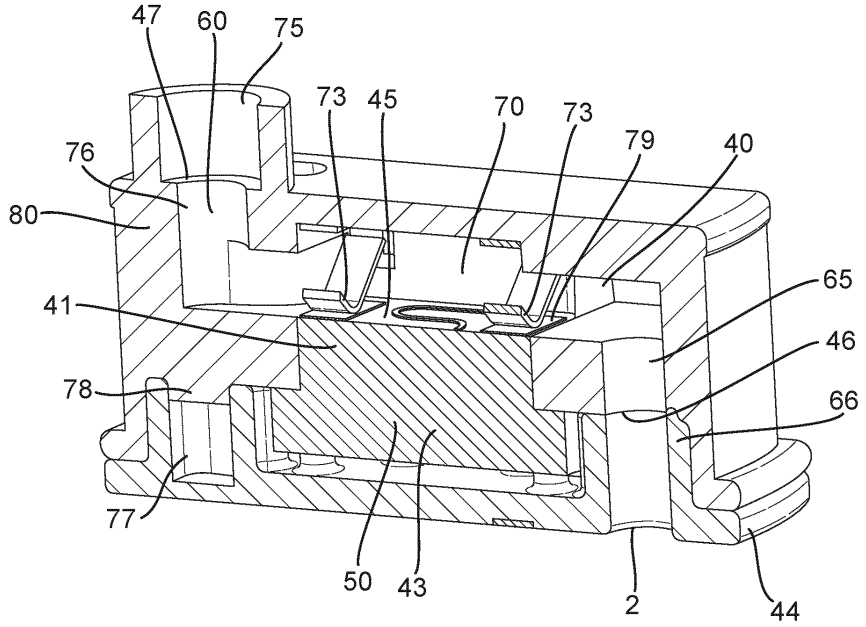
(54) **CAPSULE FOR AN ELECTRONIC CIGARETTE**

(57) A capsule (100) has a first end (1) to engage with an electronic cigarette device and a second end (3) arranged as a mouthpiece portion (5) having a vapour outlet (6). The capsule further comprises a vaporising chamber 40 having an air inlet 46 and a vapour outlet 47, a storage reservoir (30) to store liquid to be vaporised; a heating element 41 to vaporise liquid received from the storage reservoir; a vapour flow path 75 extending between the vaporising chamber and the mouthpiece, and a vapour draining chamber 77 arranged to collect liquid condensate from the vapour flow path. Free ends (71a) of the electrical contact elements 70 for the heating element are folded flush with the surface of the base (22) of the holder 44 for the heating element to couple a seal member 80 to the holder, forming a lower housing portion (20).

Fig. 4



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Description

Field of Invention

[0001] The present invention relates to a capsule for an electronic cigarette.

Background

[0002] Electronic cigarettes are an alternative to conventional cigarettes. Instead of generating a combustion smoke, they vaporize a liquid, which can be inhaled by a user. The liquid typically comprises an aerosol-forming substance, such as glycerin or propylene glycol that creates the vapor. Other common substances in the liquid are nicotine and various flavorings.

[0003] The electronic cigarette is a hand-held inhaler system, comprising a mouthpiece section, a liquid store, and a power supply unit. Vaporization is achieved by a vaporizer or heater unit which typically comprises a heating element in the form of a heating coil and a fluid transfer element, such as a wick, arranged to transfer fluid from the liquid store to the heating element. Vaporization occurs when the heater heats up the liquid in the fluid transfer element until the liquid is transformed into vapor. The vapor can then be inhaled via an air outlet in the mouthpiece.

[0004] The electronic cigarette may comprise a capsule seating which is configured to receive disposable consumables in the form of capsules. Capsules comprising the liquid store and the vaporizer are often referred to as "cartomizers". In this case, the vaporizer of the cartomizer is connected to the power supply unit when received in the capsule seating such that electricity can be supplied to the heater of the cartomizer to heat the liquid to generate the vapor. Often some form of mechanical mechanism is used to retain the capsule in the capsule seating such that it does not fall out and separate from the device.

[0005] In order to transfer liquid from the liquid store to the heating element, the wick must be arranged between the liquid store and vaporization chamber such that, when the wick is heated, capillary action transports liquid through the porous structure of the wick from the liquid store to the heating element.

[0006] It is an object of the present invention to provide a capsule for an electronic cigarette which reduces the chance of fluid leakage.

Summary of Invention

[0007] According to a first aspect there is provided a capsule for an electronic cigarette, the capsule having a first end configured to engage with an electronic cigarette device and a second end arranged as a mouthpiece portion having a vapour outlet. The capsule further comprises a vaporising chamber having an air inlet and a vapour outlet. A storage reservoir is configured to store a liquid to be vaporised. A heating element is configured to vaporise liquid received from the storage reservoir and generate a vapour. A vapour flow path extending between the vaporising chamber and the mouthpiece to allow the generated vapour to flow from the vaporising chamber to the mouthpiece. A vapour draining chamber arranged to collect liquid condensate from the vapour flow path.

[0008] In some cases, the vapour draining chamber is arranged downstream of the vaporising chamber. Preferably, the vapour draining chamber is arranged between the vaporising chamber and the vapour flow path. This arrangement may ensure that liquid flows out of the vaporising chamber before it is able to flow into the vapour draining chamber.

[0009] The vapour draining chamber may therefore be thought of as a storage tank for collecting and storing leaked fluid or condensates which may build up in the vapour flow path.

[0010] The storage reservoir may extend between the mouthpiece and the vaporising chamber. The heating element may at least partially delimit the vaporising chamber.

[0011] The heating element may comprise a capillary-type heating element. This may facilitate efficient delivery of liquid from the storage reservoir to the vaporising chamber via capillary action.

[0012] The vapour flow path may comprise a vapour conduit extending from the vapour outlet of the vaporising chamber. The vapour conduit provides a fluid connection between the vaporising chamber and the mouthpiece, allowing the generated vapour to flow along the conduit to the mouthpiece.

[0013] The capsule according to any preceding claim wherein the vapour flow path comprises a main portion which extends in a direction that is substantially parallel to the axial direction of the capsule. Preferably, the main portion extends linearly and substantially adjacent to a length of an internal wall of the capsule. This provides an efficient path along which vapour can travel from the vaporising chamber to the mouthpiece. The internal wall of the capsule may be a wall of the storage reservoir.

[0014] Preferably, the vapour draining chamber extends in a direction that is substantially parallel to the extension of the main portion of the vapour flow path. In other words, a longitudinal axis of the vapour draining chamber may be parallel to, and in some cases coaxial with, a longitudinal axis of the main portion of the vapour flow path. Preferably, the vapour outlet of the vaporising chamber fluidly communicates with the vapour flow path in a direction that is substantially perpendicular to a longitudinal direction of the capsule. This direction may be considered as being substantially transversal to the direction of the main portion of the vapour flow path. This arrangement may ensure that liquid and/or condensates collected within the main portion of the vapour flow path, do not return to the vaporising chamber but are instead collected in the vapour draining chamber.

[0015] Preferably, when the capsule is held vertically

in its operative configuration, the vapour draining chamber is arranged substantially below the main portion of the vapour flow path. This allows liquid condensate in the main portion of the vapour flow path to flow into the vapour draining chamber under the action of gravity. Thus, the liquid condensate is automatically collected within the vapour draining chamber during usage of the capsule, without the need to redirect the condensates. This provides a simpler structure which helps reduce manufacturing costs.

[0016] A connecting conduit may be provided, which may be arranged between the main portion of the vapour flow path and the vapour outlet of the vaporising chamber. The connecting conduit may be further arranged to fluidly couple the main portion of the vapour flow path with the vapour outlet of the vaporising chamber. This may help the generated vapour flow from the vaporising chamber into the main portion of the vapour flow path, without leaking into other parts of the capsule.

[0017] In some examples, the vapour draining chamber may be arranged substantially adjacent to the heating element or vaporising chamber. In this case, by adjacent we mean that the vapour draining chamber may be arranged on a side of the heating element or vaporising chamber (for example a left side or a right side), or below the heating element or vaporising chamber. Advantageously, this configuration reduces the risk of liquid leaking from the vapour draining chamber and returning to the vaporising chamber. The capsule may further comprise a capsule holder and a seal member. Preferably, the vapour draining chamber is delimited by the capsule holder and the seal member. The vapour draining chamber can therefore be formed by a combination of the structures provided by the holder and the seal member, rather than being an additional component that needs to be arranged within the capsule. This reduces the complexity of the capsule. Furthermore, fewer individual components results in fewer connection points between components, reducing the change of fluid leaking between components.

[0018] The capsule holder may be arranged to form a lower end of the capsule when the capsule is held vertically in its operative configuration. The holder may be arranged to hold the heating element at the lower end of the capsule so that the heating element may be easily connected to a main body of an electronic cigarette via an electrical connection.

[0019] Preferably, the capsule holder and seal member are arranged to form a fluid tight seal around the vapour draining chamber. This may prevent condensates which have collected within the vapour draining chamber from leaking out of the vapour draining chamber into the capsule.

[0020] According to another aspect there is provided an electronic cigarette comprising a main body and a capsule wherein the main body comprises a power supply unit, electrical circuitry, and a capsule seating configured to connect with the capsule, the capsule comprising: a first end configured to engage with the electronic cigarette device and a second end arranged as a mouthpiece portion having a vapour outlet, the capsule further comprising: a vaporising chamber having an air inlet and a vapour outlet; a storage reservoir configured to store a liquid to be vaporised, the storage reservoir extending between the mouthpiece and the vaporising chamber; a heating element configured to vaporise liquid received from the storage reservoir and generate a vapour, wherein the heating element at least partially delimits the vaporising chamber; a vapour flow path extending between the vaporising chamber and the mouthpiece to allow the generated vapour to flow from the vaporising chamber to the mouthpiece; and a vapour draining chamber arranged to collect liquid condensate from the vapour flow path.

[0021] There may be provided an electronic cigarette comprising a capsule according to any of the above described capsules.

Brief Description of Drawings

[0022] Embodiments of the present invention will now be described by wait of example with reference to the accompanying drawings in which:

Figure 1a shows a perspective view of part of a capsule for an electronic cigarette;

Figure 1b shows an exploded perspective view of a capsule for an electronic cigarette;

Figure 1c shows a perspective view of a capsule for an electronic cigarette;

Figure 2a shows a perspective view of a seal member of a capsule for an electronic cigarette;

Figure 2b shows a perspective view of a holder of a capsule for an electronic cigarette;

Figure 3a shows an exploded perspective view of a lower housing portion of a capsule for an electronic cigarette;

Figure 3b shows a perspective view of a lower housing portion of a capsule for an electronic cigarette;

Figure 3c shows a perspective view of a lower housing portion of a capsule for an electronic cigarette;

Figure 4 shows a cross sectional view of part of a capsule for an electronic cigarette.

Detailed Description

[0023] Figure 1c illustrates a capsule 100 for an electronic cigarette. As most clearly shown in Figure 1b the

capsule 100 comprises an upper housing portion 10 and a lower housing portion 20 which are configured to connect together. The capsule has a first end 1 configured to engage with an electronic cigarette device and a second end 3 arranged as a mouthpiece portion 5 having a vapour outlet 6.

[0024] The upper housing portion 10 includes a storage reservoir 30 arranged to contain a liquid to be vaporised. The lower housing portion 20 includes a vaporising chamber 40, where the vaporising chamber 40 has an air inlet 46 and a vapour outlet 47, as illustrated in Figure 4. A fluid transfer element 50 is positioned between the storage reservoir 30 and the vaporising chamber 40, and is arranged to transfer liquid between the storage reservoir 30 and the vaporising chamber 40 by capillary action. A heating element 41 is partially located within the vaporising chamber 40 and is arranged to heat the liquid that is transferred by capillary action to the vaporising chamber 40 by the fluid transfer element. The heating element 41 therefore vaporises the liquid in order to generate a vapour.

[0025] The fluid transfer element 50 generally takes the form of a capillary-style wick which is configured to transport liquid from the storage reservoir 30 through to the vaporising chamber 40 via capillary action through the wick structure, driven by the evaporation of liquid from the centre of the wick by the heating element 41. Generally, the fluid transfer element 50 has an elongate form which extends across the internal volume of the vaporising chamber 40. In this way, when the upper and lower housing portions are brought together as shown in Figure 1b and the internal volume of the storage reservoir 30 is filled with liquid as shown in Figure 1a, the fluid transfer element 50 is in fluid communication with the liquid within the internal volume of the storage reservoir 30 and so liquid is drawn into the vaporising chamber 40 through the fluid transfer element 50 during heating.

[0026] The lower housing portion 20 comprises a seal member 80 and a holder 44, as shown in Figures 3a-3c. The seal member 80 has an outer housing wall 21 defining the outer bounds of the lower housing portion 20. As most clearly shown in Figure 2a the seal member 80 also has a number of internal walls 23 which are arranged to engage with the holder 44 when the capsule 100 is assembled.

[0027] As can be seen from Figures 1b and 1c, two integral housing portions, i.e. the upper and lower housing portions 10, 20, together form the outer housing of the capsule 100 as well as each of the vaporising chamber 40 and storage reservoir 30. This configuration simplifies the assembly of the capsule because the insertion of separate components within the outer housing, for example to provide the vaporising chamber or the storage reservoir, is not required. Furthermore the alignment of components, which when not precisely achieved can lead to leakage, can be more accurately achieved by having fewer individual and separately installable components.

[0028] The heating element 41 comprises a capillary type heating element having a liquid capillary part 43 which is arranged to receive the liquid to be vaporised from the storage reservoir 30 and a heating surface 45 which is arranged to vaporise the received liquid. The liquid capillary part 43 therefore carries out the function of the previously described fluid transfer element 50. The heating surface 45 delimits a surface of the vaporising chamber 40, in particular, the boundary between the vaporising chamber 40 of the seal member 80 and the holder 44.

[0029] In order to aid transfer of the liquid between the storage reservoir 30 and the heating surface 45, the heating surface 45 and the liquid capillary part 43 are in fluid communication with each other. To facilitate the transfer the heating element 41, i.e. the heating surface 45 and, the liquid capillary part 43, is formed from a rigid, porous ceramic, which transports the liquid from the storage reservoir 30 via capillary action through the porous structure, driven by the evaporation of liquid by the heating surface 45.

[0030] Turning to Figure 2a, a heater track 41a is shown positioned on the heating surface 45, between two ends 42 of the heating element 41. The heater track 41a vaporises the received liquid which the liquid vapour to be generated within the vaporising chamber 40, which then flows along the vaporisation flow path 70 and out of the vaporising chamber 40.

[0031] The two contact ends 42 are arranged to provide electrical contact points between first and second electrical contact elements 70. By providing power to the electrical contact elements 70 and subsequently to the heating element 41 the current can be provided through the heating element 41 to heat the heating element and vaporise a liquid transported from the storage reservoir 30 through the fluid transport element 50 within the vaporising chamber 40. The heating element 41 is held within the holder 44 which forms the base 22 of the lower housing portion 20.

[0032] As can be seen in Figure 2a, each electrical contact element 70 comprises a longitudinally extending portion 71 which extends substantially parallel to a longitudinal axis of the capsule 100 and a base portion 72 which extends substantially perpendicular to a longitudinal axis of the capsule 100. As can be seen in Figure 2a, the base portion 72 of each contacting plate 70 comprises a folded region 73 having a substantially triangular shape. The folded region 73 of each electrical contact element 70 is arranged to come into contact with the two ends 42 of the heating element 41.

[0033] The electrical contact elements 70 provide the additional function of coupling the seal member 80 to the holder 44 of the lower housing portion 20. As shown in Figures 3a and 3b, each longitudinally extending portion 71 passes through a corresponding aperture 74 in the holder 44. The free ends 71a of the longitudinally extending portions 71 are then folded such that they lie substantially flush with an external surface of the base 22,

as shown in Figure 3c. The free ends 71a of the electrical contact elements 70 therefore hold the holder 44 and seal member 80 together to form the lower housing portion 20.

[0034] The electrical contact elements 70 are therefore arranged in a substantially U-shaped manner, having a vertically extending portion (i.e. the longitudinally extending portions 71) and two horizontally extending portions (i.e. the base portion 72 and the free ends 71a). It should be noted that vertical and horizontal directions are defined with reference to the capsule when it is held in its operative configuration, as shown in Figure 1c. Thus, both the base portion 72 and the free ends 71a extend in a direction substantially perpendicularly to the longitudinally extending portion 71. The base portion 72 and the free ends 71a are substantially parallel to each other.

[0035] In this way when the capsule 100 is received in an aerosol generating device, for example a main body of an electronic cigarette, the free ends 71a of the electrical contact elements 70 are exposed through the lower housing portion 20, as shown in Figure 3c, such that they may contact corresponding contacts which are connected to the battery in order to provide current through the contact plate 70 to the heating wire.

[0036] Further details of the heating element 41 and the storage reservoir 30 will now be described.

[0037] As shown in Figure 4, the capsule comprises a fluid pathway 60 which extends from an air inlet 2 of the capsule 100 to the outlet in the mouthpiece 5. The fluid pathway 60 comprises an airflow path 65, a vaporisation flow path 70, and a vapour flow path 75. The airflow path 65 extends through the holder 44 between the air inlet of the capsule 100 and an inlet 46 of the vaporising chamber 40, in order to allow air to enter the vaporising chamber 40. The vaporisation flow path 70 extends through the vaporising chamber 40 between the inlet 46 and a vapour outlet 47 of the vaporising chamber 40. The vapour flow path 75 extends through the upper housing portion 10 between the vapour outlet 47 and the mouthpiece 5, in order to allow the generated vapour to flow from the vaporising chamber to the mouthpiece 5.

[0038] As shown in Figure 4 the holder 44 of the lower housing portion comprises a tubular wall 66 extending through the holder 44, which defines the airflow path 65 The airflow path 65 may be thought of as a tubular passageway or conduit aligned with the elongate axis of the capsule 100. In other words, the airflow path 65 is substantially parallel to a longitudinal axis of the capsule 100. The airflow path 65 extends partially into the seal member 80 in order to fluidly connect with the inlet 46 of the vaporising chamber 40.

[0039] Similarly, the upper housing portion 10 includes an outer wall forming the outer boundary of the storage reservoir 30 and a tubular wall which defines the vapour flow path 75 extending between the vaporising chamber 40 and the mouthpiece 5. The vapour flow path 75 may be thought of as a tubular passageway or conduit aligned with the elongate axis of the capsule 100. In other words, the vapour flow path 75 is substantially parallel to a longitudinal axis of the capsule 100.

[0040] The vaporisation flow path 70 extends in a direction that is substantially perpendicular to an axial direction (i.e. a longitudinal axis) of the capsule 100. The vaporisation flow path 70 may therefore be thought of as a transversal passageway. By arranging the vaporisation flow path 70 transversally rather than longitudinally through the capsule, the length of the vaporization flow path 70 is increased. That is to say, a horizontally arranged vaporisation flow path 70 results in a longer flow path between the airflow path 65 and the vapour flow path 75, compared to a vertically arranged vaporisation flow path 70. It should be noted that vertical and horizontal directions are with reference to the capsule when it is held in its operative configuration, as shown in Figure 1c. Thus, this arrangement increases the length of the vaporisation flow path 70 across the heating element 41. The heating element 41 is therefore exposed to a longer vaporisation flow path 70 allowing a more consistent, as well as a greater volume, of vapour to be generated.

[0041] As a result of the transversal passageway defined by the vaporisation flow path 70, the vapour flow path 75 is offset from the longitudinal axis of the capsule 100, as shown in Figure 4. Said another way, the vapour flow path 75 can be thought of as being located on one side of a median plane that passes through the outlet 6 of the mouthpiece 5, bisecting the width of the capsule 100. This has the effect that, the vapour flow path 75 is located towards a side of the capsule 100, substantially adjacent to a length of the internal wall of the capsule. The vapour flow path 75 can be thought of as comprising a main portion 76 that extends in a direction that is substantially parallel to the longitudinal axis of the capsule. Specifically, the main portion 76 extends linearly along the internal wall of the capsule 100. The vapour flow path 75 may also be thought of as comprising a connecting conduit positioned between the main portion 76 of the vapour flow path 75 and the vapour outlet of the vaporising chamber 40. This acts to fluidly couple the main portion 76 of the vapour flow path 75 with the vapour outlet of the vaporising chamber 40.

[0042] The capsule comprises a vapour draining chamber 77 arranged to collect liquid condensate from the vapour flow path 75. The vapour draining chamber 77 is located within the holder 44, substantially adjacent to a side of the heating element 41. For example, the vapour draining chamber 77 may be arranged on either the left side or the right side of the heating element 41 when the capsule is held in its operative configuration. Turning again to Figure 4, the vapour draining chamber 77 is delimited by the capsule holder 44 from below and the seal member 80 from above. The combination of the holder 44 and the seal member 80 form a fluid tight seal around the vapour draining chamber 77. This ensures that any fluid within the vapour draining chamber 77 does not leak out of the vapour draining chamber 77 and damage other components within the capsule.

[0043] In order for the vapour draining chamber 77 to be able to collect liquid condensate from the vapour flow path 75, a drain hole 78, which may also be referred to as a drainage conduit 78, fluidly couples the vapour flow path 75 with the vapour draining chamber 77. The drain hole 78 takes the form of a small hole located underneath the main portion of the vapour flow path 75, and it extends through the fluid tight seal formed by the seal member 80 and the holder 44. The drain hole 78 acts to separate the vapour draining chamber 77 from the rest of the capsule components, including the vaporising chamber 40, the storage reservoir 30, and the flow path 60. As such, the vapour draining chamber 77 can be thought of as a separate reservoir configured to store condensate received from the vapour flow path 75. As a result of the fluid seal, any condensate collected within the vapour draining chamber 78 is prevented from leaking out of the vapour draining chamber 77. Importantly, the condensates are prevented from leaking into any of the electrical components within the capsule, which could lead to short circuits. Additionally the condensates are prevented from passing back into main vapour flow path 75 and so they are not inhaled by the user, improving the user's inhalation experience.

[0044] During operation, when the capsule 100 is held in a substantially vertical orientation, the vapour draining chamber 77 is located underneath the main portion of the vapour flow path 75. This arrangement allows liquid condensate present within the main portion 76 of the vapour flow path 75 to flow, or drain, into the vapour draining chamber 77 under the action of gravity alone, without the need to be redirected. This simplifies the construction of the capsule 100.

[0045] In some developments, the seal member 80 comprises a lip 79, located at the connection between the vaporisation flow path 70 and the air flow path 65. In particular, the lip 79 is located at the inlet 46 of the vaporisation chamber 40, as shown in Figure 4. The lip 79 acts to prevent liquid leaking back into the air flow path 65 through the inlet 46 of the vaporisation chamber 40.

[0046] As the skilled person will appreciate, the capsule described above, and any of its modifications, can be used as part of an electronic cigarette. For example, an electronic cigarette comprises a main body having a power supply, electrical circuitry, and a capsule seating. The capsule seating of the main body is arranged to engage with and electrically connect with the first end of the capsule described above.

Claims

1. A capsule for an electronic cigarette, the capsule having a first end configured to engage with an electronic cigarette device and a second end arranged as a mouthpiece portion having a vapour outlet, the capsule further comprising:
   a vaporising chamber having an air inlet and a vapour outlet;
   a storage reservoir configured to store a liquid to be vaporised;
   a heating element configured to vaporise liquid received from the storage reservoir and generate a vapour;
   a vapour flow path extending between the vaporising chamber and the mouthpiece to allow the generated vapour to flow from the vaporising chamber to the mouthpiece; and
   a vapour draining chamber arranged to collect liquid condensate from the vapour flow path.

2. The capsule according to claim 1 wherein the heating element comprises a capillary-type heating element.

3. The capsule according to claim 1 or clam 2 wherein the vapour flow path comprises a vapour conduit extending from the vapour outlet of the vaporising chamber.

4. The capsule according to any preceding claim wherein the vapour flow path comprises a main portion which extends in a direction that is substantially parallel to the axial direction of the capsule.

5. The capsule according to claim 4 wherein the main portion extends linearly and substantially adjacent to a length of an internal wall of the capsule.

6. The capsule according to claims 4 or 5, wherein the vapour draining chamber extends in a direction that is substantially parallel to the extension of the main portion of the vapour flow path.

7. The capsule according to claim 4 or claim 5 or claim 6 wherein, when the capsule is held vertically in its operative configuration, the vapour draining chamber is arranged substantially below the main portion of the vapour flow path so that liquid condensate in the main portion of the vapour flow path can flow into the vapour draining chamber under the action of gravity.

8. The capsule according to any of claims 4 to 7 further comprising a connecting conduit, arranged between the main portion of the vapour flow path and the vapour outlet of the vaporising chamber, further arranged to fluidly couple the main portion of the vapour flow path with the vapour outlet of the vaporising chamber.

9. The capsule according to any preceding claim further comprising a capsule holder and a seal member, and wherein the vapour draining chamber is delimited by the capsule holder and the seal member.

10. The capsule according to claim 9 wherein the capsule holder is arranged to form a lower end of the capsule when the capsule is held vertically in its operative configuration.

11. The capsule according to claim 9 or claim 10 wherein the capsule holder and seal member are arranged to form a fluid tight seal around the vapour draining chamber.

12. An electronic cigarette comprising a main body and a capsule wherein the main body comprises a power supply unit, electrical circuitry, and a capsule seating configured to connect with the capsule, the capsule comprising:
a first end configured to engage with the electronic cigarette device and a second end arranged as a mouthpiece portion having a vapour outlet, the capsule further comprising:

a vaporising chamber having an air inlet and a vapour outlet;
a storage reservoir configured to store a liquid to be vaporised;
a heating element configured to vaporise liquid received from the storage reservoir and generate a vapour;
a vapour flow path extending between the vaporising chamber and the mouthpiece to allow the generated vapour to flow from the vaporising chamber to the mouthpiece; and
a vapour draining chamber arranged to collect liquid condensate from the vapour flow path.

Fig. 1a

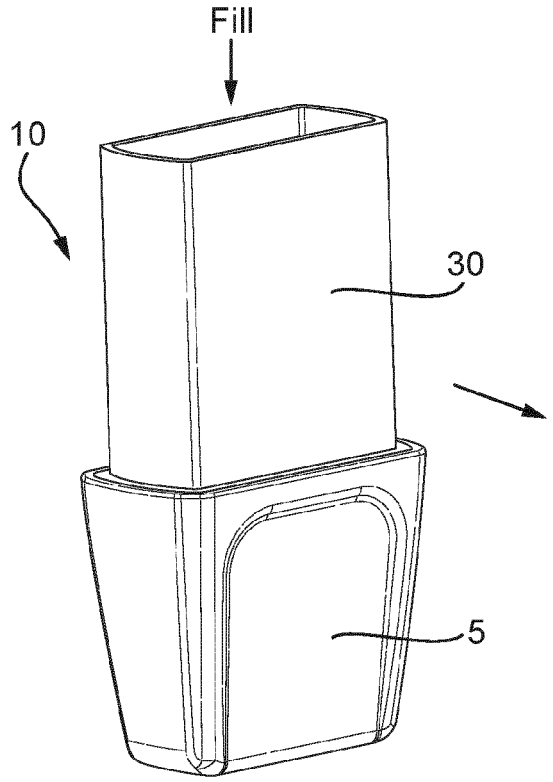

Fig. 1b

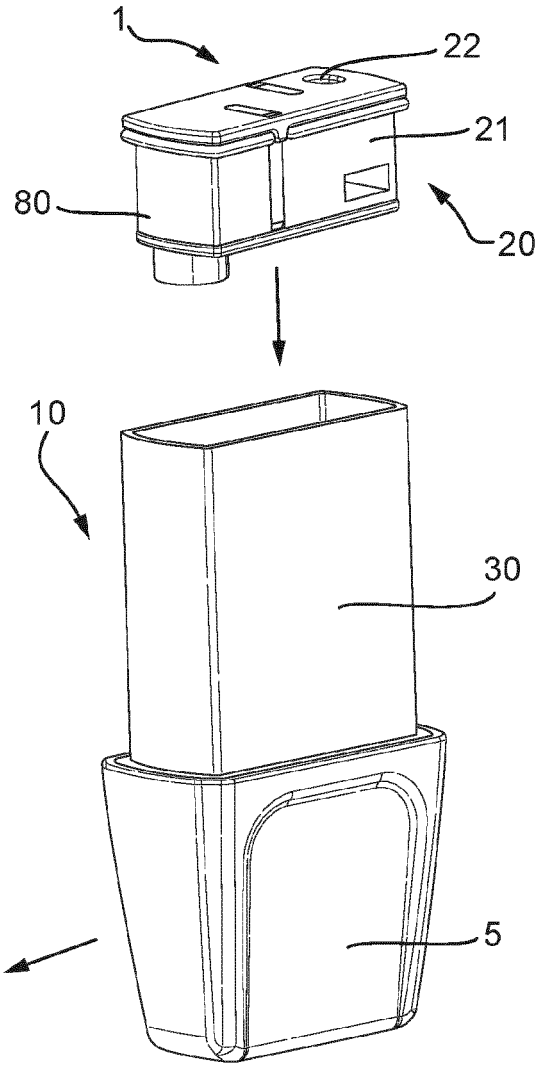

Fig. 1c

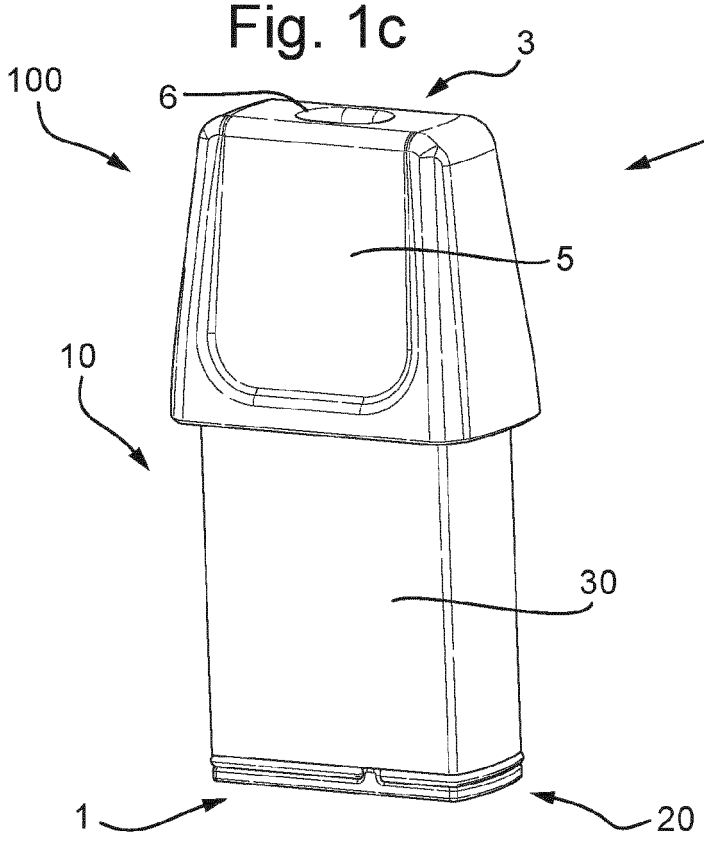

Fig. 2a

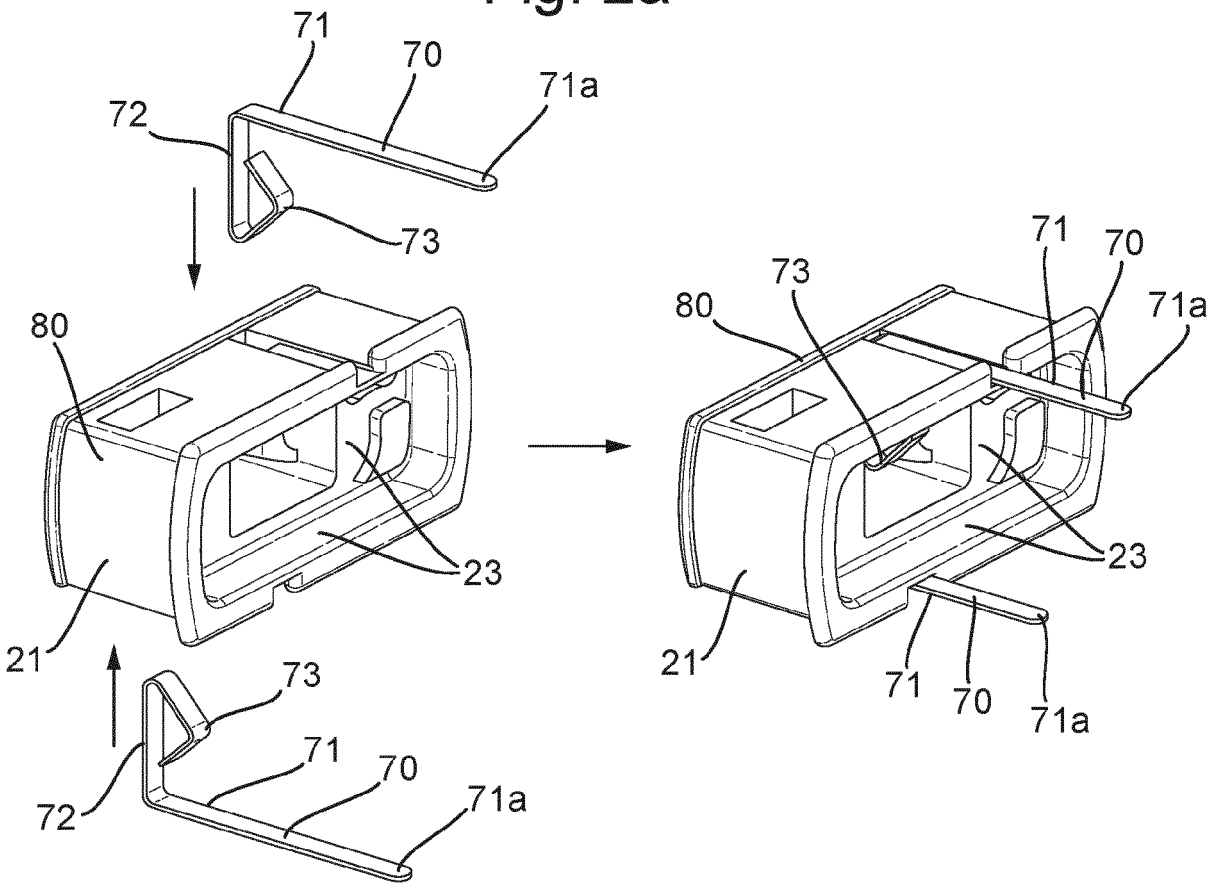
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Fig. 2b

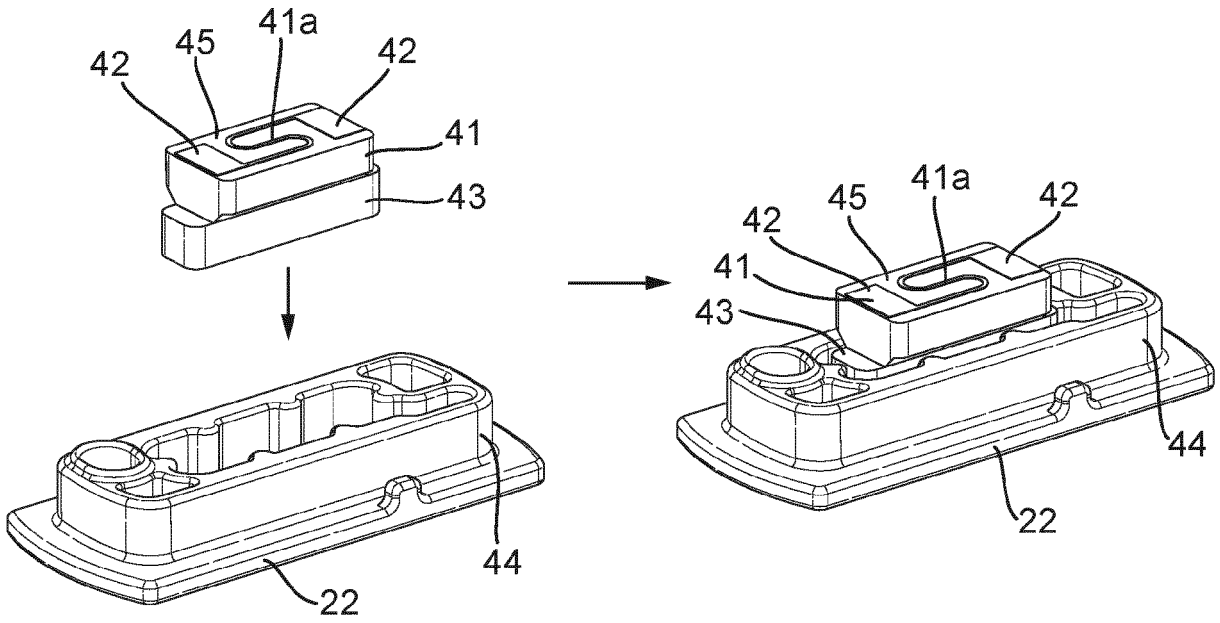
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Fig. 3a

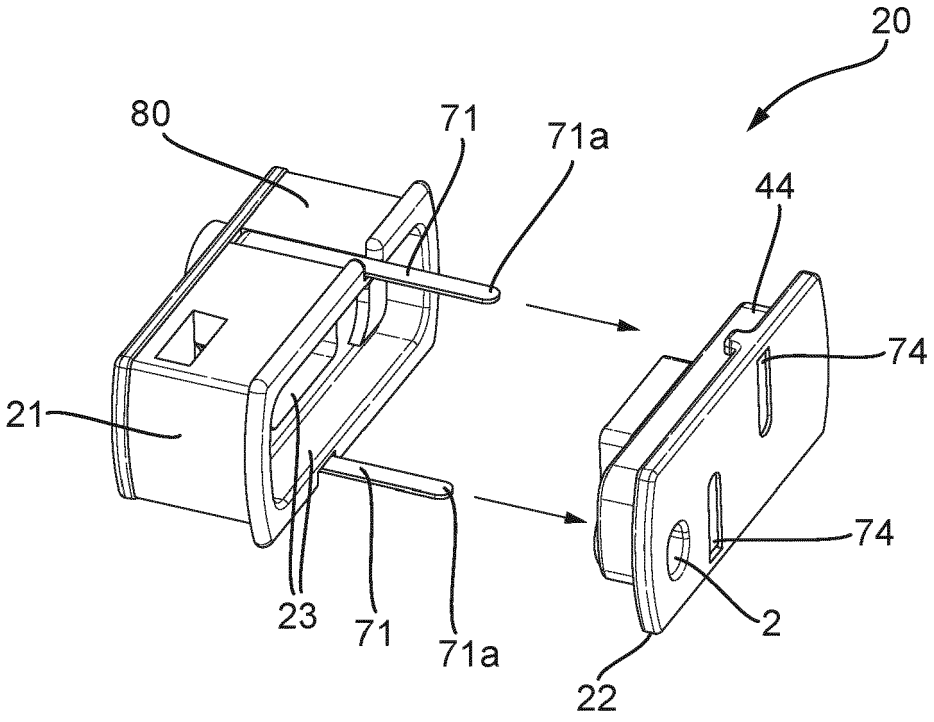


Fig. 3b

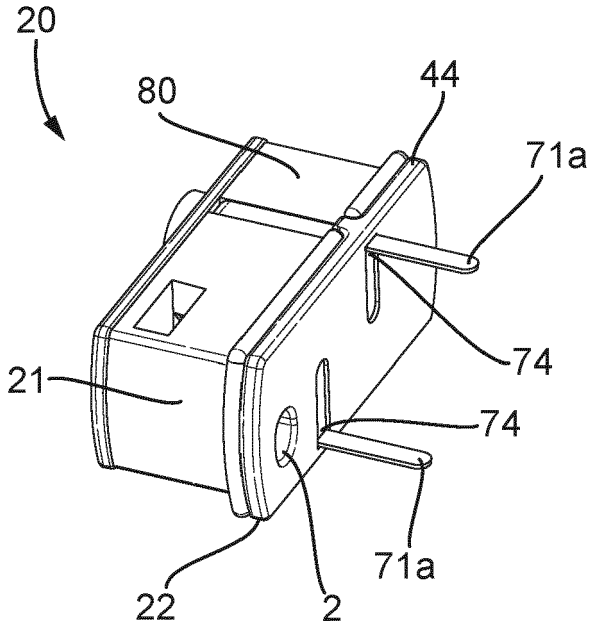


Fig. 3c

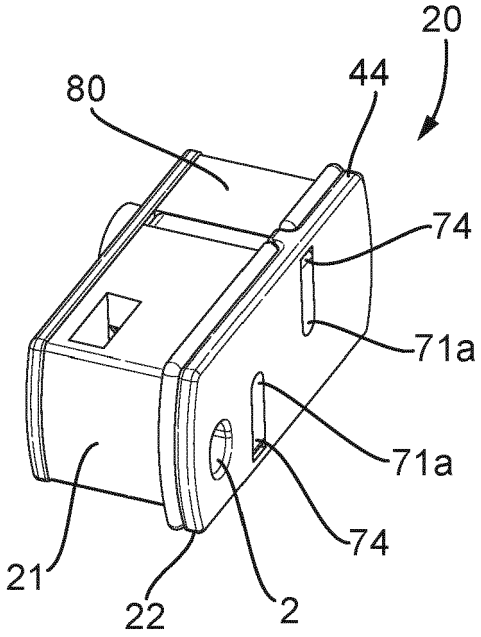
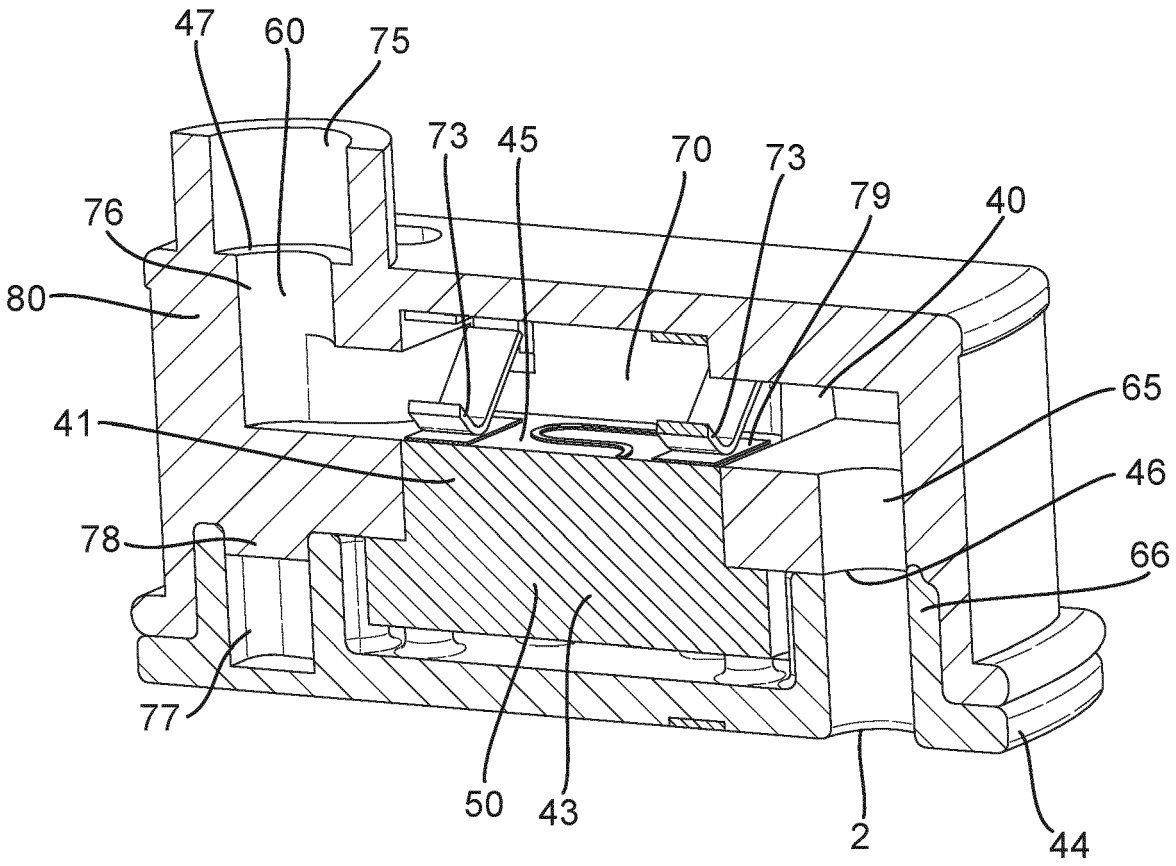


Fig. 4



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EUROPEAN SEARCH REPORT

Application Number
EP 20 19 1190

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	WO 2020/002924 A1 (NICOVENTURES TRADING LTD [GB]) 2 January 2020 (2020-01-02) * page 4, line 5 - page 9, line 8; figure 1 * -----	1-12	INV. A24F40/10 A24F40/42 A24F40/46 A61M11/04
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X	US 2018/116289 A1 (QIU WEIHUA [CN]) 3 May 2018 (2018-05-03) * paragraph [0047] * * paragraph [0035] - paragraph [0055]; figure 1 * -----	1-12	
X	US 2020/085108 A1 (LI GUANGHUI [CN] ET AL) 19 March 2020 (2020-03-19) * paragraph [0102] - paragraph [0105]; figures 13-15 * -----	1-12	

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A24F
A61M

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	28 January 2021	Dobbs, Harvey

CATEGORY OF CITED DOCUMENTS

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ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 20 19 1190

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