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(72) Inventors:  
• **WRIGHT, Alec**  
**Guildford, Surrey GU2 7SU (GB)**  
• **ROGAN, Andrew Robert John**  
**Moray, Aberdeenshire IV36 2ZH (GB)**

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

(74) Representative: **Serjeants LLP**  
**Dock**  
**75 Exploration Drive**  
**Leicester, LE4 5NU (GB)**

(54) **CARTOMIZER WITH FASTENING ELEMENTS FOR AN AEROSOL GENERATION DEVICE**

(57) A cartomizer (1) equips an aerosol generation device (3) and comprises :  
- a first part (4) comprising a reservoir (7) of aerosol-forming precursor,  
- a second part (5) comprising a heating chamber (8) heating the aerosol-forming precursor to generate an aerosol, movable relative to the first part (4), and comprising with the first part (4) complementary fastening elements holding them attached together in a closed or open position when they are set together in a first or second relative position,  
- a fluid path (6-1, 6-2) defined between the reservoir (7) and heating chamber (8) and comprising an outlet (15) either facing an inlet (16) in the open position to allow the aerosol-forming precursor to reach the heating chamber (8), or offset from the inlet (16) in the closed position to prevent the aerosol-forming precursor to reach the heating chamber (8).

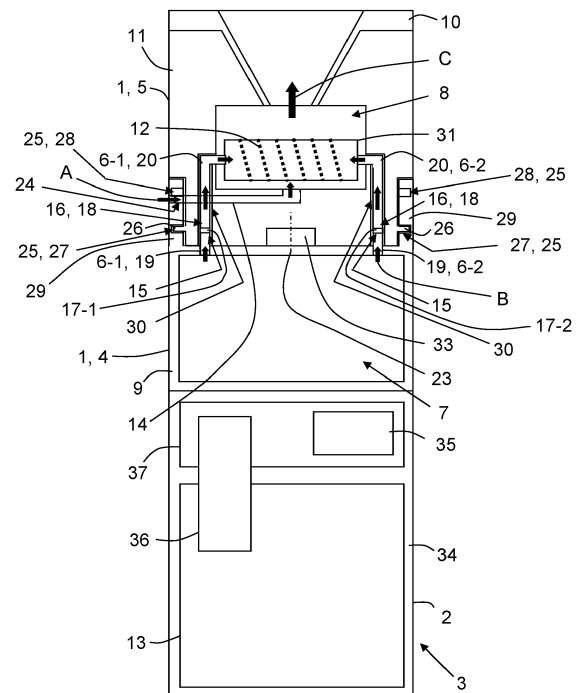


FIG.2

## Description

### Field of the invention

**[0001]** The present invention relates to an aerosol generation device, and more precisely to a cartomizer intended for equipping an aerosol generation device.

### Background

**[0002]** Some aerosol generation devices comprise a control device comprising a power source, possibly a rechargeable battery, and a cartomizer mechanically and electrically coupled to this electrical and control device.

**[0003]** Generally the cartomizer is a consumable formed as an exchangeable assembly of a cartridge (or capsule) and an atomizing device. The cartridge comprises at least one reservoir containing an aerosol-forming precursor. The atomizing device is arranged for heating aerosol-forming precursor to generate an aerosol in a heating (or atomization) chamber fluidly coupled to a mouthpiece (or mouth end). When the user sucks on the mouthpiece during a vaping session, the aerosol generated in the heating chamber of the atomization device reaches the mouthpiece, which allows the user to inhale the aerosol.

**[0004]** In the following description the term "aerosol" may include a suspension of precursor as one or more of solid particles, liquid droplets and gas. Such a suspension may be in a gas including air. Aerosol herein may generally refer to, or include, a vapor, and may include one or more components of the precursor.

**[0005]** Also in the following description the term "aerosol-forming precursor" (or "precursor", or "aerosol-forming substance", or else "substance") may refer to a fluid. The precursor may be processable by the heating device of the cartomizer to form an aerosol, and may comprise components such as one or more nicotinoids, one or more cannabinoids, or caffeine. A component may be carried by a carrier, which may be an aerosolizable liquid comprising aerosol former such as propylene glycol, glycerol for instance, water and oil such as terpene. A flavoring may also be present in the aerosol-forming precursor. The flavoring may include Ethylvanillin (vanilla), menthol, Isoamyl acetate (banana oil) or similar, for instance.

**[0006]** The heating of the aerosol-forming precursor is carried out by conduction, convection and/or radiation by a heating device of the atomization device, which is possibly housed inside the heating chamber. Such a heating device may comprise one or more electrically activated resistive and/or inductive heating elements.

**[0007]** The aerosol generation device may be portable, i.e. usable when held by a user, and adapted to generate a variable amount of aerosol, e.g. by activating the heating device partially or totally possibly for a variable amount of time (as opposed to a metered dose of aerosol). The variable amount of aerosol can be controlled

by a controller and an inhalation sensor and possibly by user's input(s) on a user interface. The inhalation sensor may be sensitive to the strength of inhalation as well as the duration of inhalation to enable a variable amount of vapor to be provided (so as to mimic the effect of smoking a conventional combustible smoking article such as a cigarette, cigar or pipe). Generally, the inhalation sensor is a flow or pressure sensor or microphone positioned in the air flow path in the aerosol generation device.

**[0008]** Sometimes the aerosol generation device includes also a temperature regulation control to drive the temperature of the heating device and/or the heated aerosol-forming precursor to a specified target temperature and thereafter to maintain the temperature at the target temperature that enables an efficient generation of aerosol.

**[0009]** The invention concerns the cartomizers comprising :

- a first part comprising a reservoir storing an aerosol-forming precursor,
- a second part comprising a heating chamber configured, when it is fed with air and aerosol-forming precursor, for heating the latter to generate an aerosol, and movable relative to this first part between relative closed and open positions, and
- at least one fluid path defined between the reservoir and heating chamber and comprising an outlet in the first part and an inlet located in the second part, this outlet facing this inlet in the open position to allow the aerosol-forming precursor to leave the reservoir to reach the heating chamber, and this outlet being offset from this inlet in the closed position to prevent the aerosol-forming precursor to reach the heating chamber.

**[0010]** With this type of cartomizer, notably described in the patent document US 9,861,136 B2, the user couples first the first part to the second part to constitute a cartomizer and then mechanically and electrically couples the cartomizer to the corresponding electrical and control device to constitute an aerosol generation device. When the user couples the first part to the second part, the cartomizer is ready to use, i.e. in its open position, and therefore when he couples this cartomizer to the electrical and control device a vaping session can start after switching the aerosol generation device on. At the end of the vaping session the user has two possibilities : either he switches the aerosol generation device off and leaves it in the open position, or he must rotate manually the second part relative to the first part to cause a transition from the open position to the closed position.

**[0011]** In the first alternative the cartomizer remains in its open position and therefore some aerosol-forming precursor may leak out of it at both ends (mouth end and air inlet end), notably when the aerosol generation device is carried (with no guarantee that it will remain in an upright position). Therefore, if the user wants to avoid a

leakage when he carries the aerosol generation device, he must continuously maintain the cartomizer in upright position, which is not an easy task.

**[0012]** In the second alternative the second part of the cartomizer is no longer coupled to the associated first part (which remains coupled to the electrical and control device). So, when the user wants to start a new vaping session he must couple again the second part to the first part (coupled to the electrical and control device), which can take time, notably when the second part and the first part with the electrical and control device have been stored in different locations. Moreover, such a solution requires to provide with sealing means not only the first part but also the second part to avoid leakages of aerosol-forming precursor, which renders more complex the first and second parts of the cartomizer.

### Summary of the invention

**[0013]** The proposed invention provides notably an embodiment of a cartomizer intended for equipping an aerosol generation device and comprising :

- a first part comprising a reservoir storing an aerosol-forming precursor,
- a second part comprising a heating chamber configured, when it is fed with air and aerosol-forming precursor, for heating the latter to generate an aerosol, and movable relative to this first part between relative closed and open positions, and
- at least one fluid path defined between the reservoir and heating chamber and comprising an outlet in the first part and an inlet located in the second part, this outlet facing this inlet in the open position to allow the aerosol-forming precursor to leave the reservoir to reach the heating chamber, and this outlet being offset from this inlet in the closed position to prevent the aerosol-forming precursor to reach the heating chamber.

**[0014]** This cartomizer is characterized in that its first part and its second part comprise respectively complementary first and second fastening elements arranged for holding the second part attached to the first part either in the closed position when they are set together in a first relative position, or in the open position when they are set together in a second relative position.

**[0015]** Thanks to the invention, in both closed and open positions the first and second parts are attached together, which notably avoids the user having to decouple the second part from the first part when he does not want temporarily to use the aerosol generation device and to couple the second part to the first part when he wants to use the aerosol generation device.

**[0016]** The embodiment of cartomizer may comprise other aspects or features, considered separately or combined, as defined hereafter.

- In an example of embodiment, the second fastening element comprises two bayonet mount legs, and the first fastening element comprises two first bayonet mount members arranged for receiving and holding respectively the bayonet mount legs in the open position and two second bayonet mount members arranged for receiving and holding respectively the bayonet mount legs in the closed position. In a variant, the first fastening element may comprise two bayonet mount legs, and the second fastening element comprises two first bayonet mount members arranged for receiving and holding respectively the bayonet mount legs in the open position and two second bayonet mount members arranged for receiving and holding respectively the bayonet mount legs in the closed position.
- In this example of embodiment as in its variant the first bayonet mount members may be distant from corresponding second bayonet mount members along a direction parallel to an axis of rotation of the second part, such that the first part is spaced from the second part in the closed position.
- In the last example of embodiment as in its variant the first and second bayonet mount members may be recesses.
- In another example of embodiment, the cartomizer may comprise at least one valve arranged in the (each) fluid path and configured to be opened in the open position and closed in the closed position.
- In the last example of embodiment, the valve or each valve may be arranged in the outlet of its fluid path. For instance, the inlet of each fluid path may also comprise another valve.
- In the last example of embodiment, the (each) valve may comprise a resealable wall configured to open when it is subject to a constraint in the open position and to automatically close when the constraint disappears in the closed position. For instance, the (each) fluid path may comprise an opening element arranged for constraining the resealable wall in the open position to force the opening of the corresponding valve. When the valve is positioned in the outlet of the first part, the opening element is positioned in the inlet in a manner that allows to engage and open the valve when the outlet and inlet are facing each other. The opening element may be a tube portion, a pin, a needle, a probe and the like, for instance.
- In another example of embodiment, the (each) fluid path may comprise a first sub-part comprising the outlet and protruding from the first part to be housed in the second part at least in the open position, and a second sub-part defined in the second part and comprising the inlet. In this case, the first and second sub-parts of each fluid path are positioned adjacent to each other in the open position and are spatially separated in the closed position.
- Each first sub-part may comprise an end defining its outlet and comprising the valve, and each opening

element may be an end of a second sub-part which comprises the inlet. In a variant, each second sub-part may comprise an end defining its inlet and comprising the valve, and each opening element may be an end of a first sub-part which comprises the outlet.

- The cartomizer may comprise first and second fluid paths comprising respectively first and second valves.
- The second part may be rotatably mounted on an external face of a housing of the first part in order to be an extension of the first part.
- The first sub-parts of the first and second fluid paths and an axis of rotation of the second part may be located in a same plane.
- The heating chamber may comprise an aerosol-forming precursor collecting element to collect aerosol-forming precursor flowing into each fluid path, and a heating device in contact with this aerosol-forming precursor collecting element.
- The aerosol-forming precursor collecting element may be a liquid capillary element, such as a fiber or ceramic wick. The aerosol-forming precursor collecting element may be positioned between two fluid paths so as to collect fluid at its both ends.
- The heating device may be a resistive heater and/or an inductive heater in contact with the liquid capillary element.
- In another example of embodiment, the cartomizer may comprise a pulling force element configured to provide an attraction force between the first and second parts. For instance, the pulling force element may be a spring-type device or a magnetic device. In this case, the spring-type device or the magnetic device is preferably inserted between the first and second parts to provide attraction force in the open and/or closed positions.
- The second part may comprise an air passage configured for feeding the heating chamber with air, and this air passage may be connected to an air inlet of the first part in the open position.

**[0017]** The proposed invention provides also an embodiment of an aerosol generation device comprising an electrical and control device and a cartomizer such as the one above introduced and mechanically and electrically coupled to this electrical and control device.

**[0018]** The embodiment of aerosol generation device may comprise other features, considered separately or combined, as defined hereafter.

- The electrical and control device may comprise a power source storing electrical energy.
- The power source may be a rechargeable battery.
- The aerosol generation device may constitute an electronic cigarette (or e-cigarette).

## Brief description of the figures

**[0019]** The invention and its advantages will be better understood upon reading the following detailed description, which is given solely by way of non-limiting examples and which is made with reference to the appended drawings, in which :

- Figure 1 (FIG.1) schematically illustrates an example of embodiment of an aerosol generation device according to the invention, with a cartomizer set in a closed position, and
- Figure 2 (FIG.2) schematically illustrates the aerosol generation device of figure 1 with its cartomizer set in an open position.

## Detailed description of embodiments

**[0020]** The invention aims, notably, at offering a cartomizer 1 intended for being mechanically and electrically coupled to an electrical and control device 2 to define together an aerosol generation device 3.

**[0021]** In the following description it will be considered that the aerosol generation device 3 is an electronic cigarette (or e-cigarette or else personal vaporizer). But an aerosol generation device according to the invention could be of another type, as soon as it comprises a cartomizer 1 according to the invention and allows the generation of an aerosol by heating an aerosol-forming precursor. So, for instance, the aerosol generation device 3 could be an inhaler.

**[0022]** It is recalled that an "aerosol-forming precursor" (or "aerosol-forming substance") may be a fluid (for instance a liquid), and may comprise one or more components such as nicotinoid(s), cannabinoid(s), or caffeine, and/or a flavoring.

**[0023]** It is also recalled that the term "aerosol" may include a suspension of precursor as one or more of solid (very small) particles, liquid droplets, vapor and gas, and that such a suspension may be in a gas including air.

**[0024]** As illustrated in figures 1 and 2 a cartomizer 1, according to the invention and intended for equipping an aerosol generation device 3, comprises a first part 4, a second part 5, and at least one fluid path 6-j.

**[0025]** The first part 4 comprises a reservoir 7 arranged for storing an aerosol-forming precursor. In the non-limiting example of figures 1 and 2 the first part 4 comprises only one reservoir 7. But it could comprise several (for instance two, three or four) reservoirs storing identical or different aerosol-forming precursors. It could be possible to have two different aerosol-forming precursors to either have them react with each other in a heating chamber 8 (for instance one with nicotine salts and the other one with an acid source (e.g. a benzoic acid)) or to allow the user to choose between different flavours (first flavour, second flavor, or a mixture of both (possibly the user being able to determine the amount of each of them)).

**[0026]** The (each) reservoir 7 is defined in a first hous-

ing 9 of the first part 4. The (each) reservoir 7 may be integral with, or inserted in, the first housing 9.

**[0027]** For instance, the coupling between the cartomizer 1 (and more precisely the first housing 9) and the electrical and control device 2 can be done by screwing by means of two corresponding threaded portions, or by clipping. In the case of screwing, the first housing 9 (of the first part 4) may comprise a first threaded portion arranged for being screwed relatively to a corresponding second threaded portion of a third housing 34 of the electrical and control device 2. But the electrical and control device 2 could comprise a cavity for receiving a part of the cartomizer 1. In this case, this cavity may comprise magnets interacting with magnets of the cartomizer 1.

**[0028]** The second part 5 comprises a heating (or atomization) chamber 8 configured, when it is fed with air and aerosol-forming precursor, for heating the latter to generate an aerosol. This second part 5 is movable relative to the first part 4 between a relative closed position illustrated in figure 1 and a relative open position illustrated in figure 2. To this effect the first part 4 may comprise a deep guiding hole and the second part may comprise an axis or axle housed into this guiding hole when the first 4 and second 5 parts are coupled together, for instance.

**[0029]** The heating (or atomization) chamber 8 is configured, when it is fed with air and aerosol-forming precursor, for heating the latter to generate an aerosol. For instance, and as illustrated in the non-limiting example of figures 1 and 2 the heating chamber 8 may be fluidly coupled to a mouthpiece (or mouth end) 10, possibly via an aerosol passage (not illustrated).

**[0030]** The mouthpiece 10 is the piece of the cartomizer 1 through which the user inhales the aerosol generated in the heating chamber 8 (and possibly flowing into an aerosol passage) during a vaping session (as illustrated by the arrow C in figure 2).

**[0031]** For instance, and as illustrated in the non-limiting example of figures 1 and 2, the heating chamber 8 may be defined in a second housing 11 of the second part 5. This heating chamber 8 may be integral with, or inserted in, the second housing 11.

**[0032]** In the non-limiting example illustrated in figures 1 and 2 the second housing 11 comprises an end to which the mouthpiece 10 is fixed, for instance by screwing or clipping. But the mouthpiece 10 could also be glued or moulded integrally with the second housing 11.

**[0033]** In the illustrated example the heating chamber 8 comprises an electrical heating device 12 arranged for heating the aerosol-forming precursor to generate the aerosol (originating from a (the) reservoir 7), when it receives electrical energy originating from a power source 13 of the electrical and control device 2. This heating device 12 and the heating chamber 8 belongs to the atomization device of the cartomizer 1.

**[0034]** The heating device 12 may be a resistive heater, such as a resistive coil, and/or an inductive heater, such as a metallic susceptor. In this case, the heating

device 12 may comprise one or more electrically activated resistive and/or inductive heating elements. But in a variant (not illustrated) the heating device 12 could be partly outside the heating chamber 8. The heating can be made by conduction, convection and/or radiation.

**[0035]** To allow the feeding of the heating device 12 with electrical energy during a vaping session, the first part 4 and the electrical and control device 2 may comprise respectively electrical pins intended for contacting each other during their coupling.

**[0036]** The second part 5 comprises at least one air passage 14 configured for feeding its heating chamber 8 with air sucked in by the user. For instance, and as illustrated in the non-limiting example of figures 1 and 2, this (each) air passage 14 may be connected to an air inlet 24 of the first part 4 when the cartomizer 1 is in its open position. This air inlet 24 is in communication with the outside (as illustrated by the arrow A in figure 2). The (each) air passage 14 may be integral with, or inserted in, the second housing 11. When it is inserted, it may be a conduit or pipe. In a variant the air inlet could be defined in the first part 4 and connected to a conduit of the second part 5.

**[0037]** The (each) fluid path 6-j is defined between the (a) reservoir 7 and the heating chamber 8 and comprises an outlet 15 in the first part and an inlet 16 located in the second part 5. As illustrated in figure 2, the outlet 15 (of each fluid path 6-j) is facing the inlet 16 (of the same fluid path 6-j) in the open position to allow the aerosol-forming precursor to leave the corresponding reservoir 7 to reach the heating chamber 8. As illustrated in figure 1, the outlet 15 (of each fluid path 6-j) is offset from the inlet (of the same fluid path 6-j) in the closed position to prevent the aerosol-forming precursor to reach the heating chamber 8.

**[0038]** As illustrated in figures 1 and 2, the first part 4 and the second part 5 comprise respectively complementary first 25 and second 26 fastening elements arranged for holding the second part 5 attached to the first part 4 either in the closed position when they are set together in a first relative position, or in the open position when they are set together in a second relative position.

**[0039]** In other words, now when the first 25 and second 26 fastening elements are set together in the first relative position (figure 1), the first 4 and second 5 parts remain attached together (and therefore are not totally detachable) in the cartomizer relative closed position in which no vaping session can start, and when the first 25 and second 26 fastening elements are set together in the second relative position (figure 2), the first 4 and second 5 parts are attached together in the cartomizer relative open position in which a vaping session can start. So, now in both closed and open positions the first 4 and second 5 parts are attached together, which avoids the user having to decouple the second part 5 from the first part 4 each time he does not want to use temporarily the aerosol generation device 3 and to couple the second part 5 to the first part 4 each time he wants to use the

aerosol generation device 3. Furthermore, this eases coupling between the first 4 and second 5 parts because there is no alignment necessary before coupling them. Moreover, there no risk to lose the second part 5. It also facilitates movement to uncouple the first 4 and second 5 parts and to interrupt the liquid flow from the reservoir 7 to the heating chamber 8.

**[0040]** For instance, and as illustrated in the non-limiting example of figures 1 and 2, the second fastening element 26 may comprise two bayonet mount legs, and the first fastening element 25 may comprise two first female bayonet mount members 27 and two second female bayonet mount members 28. The two first female bayonet mount members 27 are arranged for receiving and holding respectively the two bayonet mount legs 26 in the open position (and therefore in the first relative position of the first 25 and second 26 fastening elements). The two second female bayonet mount members 28 are arranged for receiving and holding respectively the two bayonet mount legs 26 in the closed position (and therefore in the second relative position of the first 25 and second 26 fastening elements).

**[0041]** In a variant of embodiment (not illustrated), the first fastening element 25 may comprise two bayonet mount legs, and the second fastening element 26 may comprise two first female bayonet mount members and two second female bayonet mount members. The two first female bayonet mount members are arranged for receiving and holding respectively the two bayonet mount legs 26 in the open position (and therefore in the first relative position of the first 25 and second 26 fastening elements). The two second female bayonet mount members are arranged for receiving and holding respectively the two bayonet mount legs 26 in the closed position (and therefore in the second relative position of the first 25 and second 26 fastening elements).

**[0042]** For instance, and as illustrated in the non-limiting example of figures 1 and 2, the first bayonet mount members 27 may be distant from corresponding second bayonet mount members 28 along a direction parallel to an axis of rotation 23 of the second part 5 in order that the first part 4 is spaced from the second part 5 in the closed position. In other words, if one considers the cartomizer 1 in its upright position (in which the axis of rotation 23 is vertical), the two first bayonet mount members 27 are defined at a first vertical level while the two second bayonet mount members 28 are defined at a second vertical level, higher than the first vertical level. In this embodiment the transition between the relative closed and open positions requires a combination of axial translation(s) (parallel to the axis of rotation 23) and rotation(s) (around the axis of rotation 23) for leaving the first bayonet mount members 27 and reaching the axially distant second bayonet mount members 28, and *vice versa*.

**[0043]** But in a variant of embodiment (not illustrated), the first 27 and second 28 bayonet mount members could be defined at a same level. In this case, each first bayonet mount member 27 is separated from the corresponding

second bayonet mount member 28 by a chosen angular sector (possibly, but not limitatively, equal to 90°). In this variant of embodiment the transition between the relative closed and open positions requires a combination of small axial translations (parallel to the axis of rotation 23) and rotations (around the axis of rotation 23) for leaving the first bayonet mount members 27 and reaching the angularly distant second bayonet mount members 28, and *vice versa*.

**[0044]** For instance, and as illustrated in the non-limiting example of figures 1 and 2, the first 27 and second 28 bayonet mount members may be recesses. As illustrated, these recesses 27 and 28 may be joined by a helical recess path defined in a protruding wall 29 of the first housing 9 and allowing the bayonet mount legs 26 to travel between the open and closed positions. In this case the air inlet 24 may be defined in this protruding wall 29 of the first part 4, as illustrated.

**[0045]** But in a variant the recesses 27 and 28 could be defined in two opposite arms protruding from the external face of the first housing 9 which is oriented towards the second housing 11. In this case, each arm comprises a first bayonet mount member 27 and a second bayonet mount member 28 distant from this first bayonet mount member 27. Also in this case the air inlet 24 may be defined in one of the arms of the first part 4.

**[0046]** Also for instance, and as illustrated in the non-limiting example of figures 1 and 2, the cartomizer 1 may comprise at least one valve 17-j arranged in the (a) fluid path 6-j and configured to be opened in the cartomizer open position (illustrated in figure 2) and closed in the cartomizer closed position (illustrated in figure 1).

**[0047]** With such a valve 17-j associated with each fluid path 6-j it is possible to prevent the aerosol-forming precursor to leave the (its) reservoir 7 when the cartomizer 1 is set in its closed position (in which the fluid path outlet 15 is offset from the corresponding fluid path inlet 16). Indeed, in the cartomizer closed position the valve 17-j is in its closed position and therefore the aerosol-forming precursor is prevented from leaving the reservoir 7 and then cannot reach the free space 32 separating the first 9 and second 11 housings in the illustrated example of embodiment. Furthermore, in the cartomizer open position the valve 17-j is in its open position and therefore the aerosol-forming precursor can leave the reservoir 7 to reach the heating chamber 8 via the corresponding fluid path 6-j (see arrows B). So, when the cartomizer 1 is in its closed position it cannot leak, even when it is not in its upright position.

**[0048]** The valves 17-j allow also to simplify the first 4 and second 5 parts because the number of sealing means is divided by two compared to the proposed solutions of the art.

**[0049]** For instance, and as illustrated in the non-limiting example of figures 1 and 2, each valve 17-j may be advantageously arranged in the outlet 15 of its fluid path 6-j. But in addition the inlet 16 of each fluid path 6-j could also comprise another valve to avoid fluid from dripping

from the fluid path inlet 16 back to the reservoir surface.

**[0050]** In an example of embodiment, each valve 17-j may comprise a resealable wall which is configured to open when it is subject to a constraint in the cartomizer open position and to automatically close when this constraint disappears in the closed position.

**[0051]** For instance, each resealable wall is a kind of "nib" working in the same way as a valve action marker. When such a nib is pressed aerosol-forming precursor flows in its free end, and when it is not pressed (i.e. not subject to a constraint) the aerosol-forming precursor cannot flow to this free end and therefore the valve 17-j is closed to prevent leakage.

**[0052]** When each valve 17-j comprises the above described resealable wall, each fluid path 6-j may comprise an opening element 18 arranged for constraining this resealable wall in the open position to force the opening of the corresponding valve 17-j. So, during a manual transition of the cartomizer 1 from its closed position to its open position (operated by a user), the opening element 18 exerts a constraint on the corresponding resealable wall which finally forces the opening of the latter and therefore of the corresponding valve 17-j.

**[0053]** When the valve 17-j is positioned in the fluid path outlet 15 of the first part 4, the opening element 18 is positioned in the fluid path inlet 16 in a manner that allows to engage and open this valve 17-j when the fluid path outlet 15 and fluid path inlet 16 are facing each other. For instance, the opening element 18 may be a tube portion, a pin, a needle, a probe and the like.

**[0054]** Also in an example of embodiment, each fluid path 6-j may comprise first 19 and second 20 sub-parts.

**[0055]** The first sub-part 19 of each fluid path 6-j comprises the outlet 15 and protrudes from the first part 4 to be housed in the second part 5 at least in the open position. In the illustrated example each first sub-part 19 protrudes from the first part 4 to be housed in the second part 5 only in the open position because the first 27 and second 28 bayonet mount members are defined at different levels. But in the case where the first 27 and second 28 bayonet mount members are defined at a same level, each first sub-part 19 protrudes from the first part 4 to be housed in the second part 5 both in the open and closed positions.

**[0056]** The second sub-part 20 is defined in the second part 5 and comprises the inlet 16.

**[0057]** The first 19 and second 20 sub-parts of each fluid path 6-j are positioned adjacent to each other in the open position, and are spatially separated in the closed position, as illustrated in figure 2. In the illustrated example of embodiment the first 19 and second 20 sub-parts of each fluid path 6-j are axially separated along the direction parallel to the axis of rotation 23 in the closed position. But in the variant of embodiment in which each first bayonet mount member 27 is separated from the corresponding second bayonet mount member 28 by a chosen angular sector, the first 19 and second 20 sub-parts of each fluid path 6-j are separated by a predefined

angular sector in the closed position.

**[0058]** Each first sub-part 19 is preferably an inserted rigid pipe (or conduit) having an inlet coupled to the reservoir 7 and an outlet which is the outlet 15 of its fluid path 6-j. Each second sub-part 20 is also preferably an inserted rigid pipe (or a conduit possibly formed by plastic moulding) having an inlet which is the inlet 16 of its fluid path 6-j and an outlet coupled to the heating chamber 8. In this case, and as illustrated in the non-limiting example of figures 1 and 2, the second housing 11 may comprise two recesses 30 housing permanently and respectively the two second sub-parts 20, and partially the two first sub-parts 19 (and notably their outlets 15, and possibly the associated valve 17-j) at least in the cartomizer open position.

**[0059]** As illustrated in the non-limiting example of figures 1 and 2, in the last example of embodiment and in the case where each valve 17-j is arranged in the outlet 15 of its fluid path 6-j, each first sub-part 19 may, for instance, comprise an end defining this outlet 15, comprising the valve 17-j and opposite to the reservoir 7. Furthermore, each opening element 18 may be an end of the second sub-part 20 which comprises the inlet 16 and opposite to the heating chamber 8.

**[0060]** In the case where each valve 17-j is arranged in the inlet 16 of its fluid path 6-j, each second sub-part 20 may comprise an end defining its inlet 16, comprising the valve 17-j and opposite to the heating chamber 8. More, each opening element 18 may be an end of a first sub-part 19 which comprises the outlet 15 of its fluid path 6-j and opposite to the reservoir 7.

**[0061]** For instance, and as illustrated in the non-limiting example of figures 1 and 2, the cartomizer 1 may comprise first 6-1 ( $j = 1$ ) and second 6-2 ( $j = 2$ ) fluid paths comprising respectively first 17-1 and second 17-2 valves. This arrangement allows to improve the feeding of the heating chamber 8 with the aerosol-forming precursor, or to feed the heating chamber 8 with two different aerosol-forming precursors originating respectively from two different reservoirs 7.

**[0062]** Also for instance, and as illustrated in the non-limiting example of figures 1 and 2, the second part 5 may be rotatably mounted on an external face of the first housing 9 of the first part 4 in order to be an extension of this first part 4. In this case, the electrical and control device 2 and the first 4 and second 5 parts of the cartomizer 1 are aligned with the first part 4 sandwiched between the electrical and control device 2 and the second part 5.

**[0063]** In the case where the cartomizer 1 comprises first 6-1 and second 6-2 fluid paths, their first sub-parts 19 and the axis of rotation 23 of the second part 5 may be located in a same plane, as illustrated in the non-limiting example of figures 1 and 2. In this case, each manual transition between the closed and open positions requires a combination of axial translation(s) (parallel to the axis of rotation 23) and rotations (around the axis of rotation 23). When the recesses 27 and 28 are joined by

a helical recess path, as illustrated, one of these rotations is a relative rotation of the second part 5 with respect to the first part 4. In the illustrated example this relative rotation is equal to 180°. But this relative rotation may be a complete turn (360°) or any other possible angular sector.

**[0064]** Also for instance, and as illustrated in the non-limiting example of figures 1 and 2, the heating chamber 8 may comprise an aerosol-forming precursor collecting element 31 to collect aerosol-forming precursor flowing into each fluid path 6-j (in the cartomizer open position), and the heating device 12 in contact with this aerosol-forming precursor collecting element 31. In the illustrated example the outlets of the two sub-parts 20 of the first 6-1 and second 6-2 fluid paths are coupled respectively to the two opposite ends of the aerosol-forming precursor collecting element 31.

**[0065]** For instance, this aerosol-forming precursor collecting element 31 may be a capillary element (possibly a capillary wick). This capillary element 31 can be a fiber or ceramic rod, for instance. For instance, the heating device 12 may comprise a resistive coil wound around the capillary element 31 and coupled to the above mentioned pins via lead wires.

**[0066]** Also for instance, and as illustrated in the non-limiting example of figures 1 and 2, the cartomizer 1 may comprise a pulling force element 33 configured to provide an attraction force between the first 4 and second 5 parts. This allows the second part 5 to remain precisely in a fixed position with respect to the first part 4 when the cartomizer 1 is in its open and closed positions. To this effect an attraction element can facilitate the return to the open position. But it is also possible to use a bi-stable system for maintaining the first 4 and second 5 parts stably in the closed and open positions. For instance, the attraction element can be made by one or more springs (e.g. torsion spring) and/or magnets.

**[0067]** For instance, the pulling force element 33 may be a spring-type device or a magnetic device. In this case, the spring-type device or the magnetic device is preferably inserted between the first 4 and second 5 parts to provide attraction force in the open and/or closed positions.

**[0068]** In the case where the cartomizer 1 comprises a pulling force element 33, the user must pull apart the first 4 and second 5 parts first before starting a transition between the closed and open positions. This allows to prevent accidental rotation and activation of the cartomizer 1 with the added benefit of preventing use by a child, especially in the case where an attraction element works to maintain the first 4 and second 5 parts distant and make it hard to put them in open position.

**[0069]** As illustrated in figures 1 and 2 the third housing 34 of the electrical and control device 2 may comprise at least a controller (or control device) 35 and a user interface 36 in addition to the power source 13 (storing electrical energy).

**[0070]** For instance, the power source 13 may be a

rechargeable battery. In this case the third housing 34 may comprise an electrical connector to which a charger cable may be connected during a charging session of the rechargeable battery 13. Such a charger cable may be coupled to an (AC) adapter or to a wall socket. The charger cable and/or the (AC) adapter may belong to the aerosol generation device 3.

**[0071]** The controller 35 is electrically coupled to the power source 13 and controls operation of the cartomizer 1 (and notably its heating device 12) during a vaping session and also during a possible charging session. For instance, and as illustrated in the non-limiting example of figures 1 and 2, the controller 35 may be fixed onto a printed circuit board 37 (housed in the third housing 34).

**[0072]** Explicit use of the term "controller" should not be construed to refer exclusively to hardware capable of executing software, and may implicitly include, without limitation, digital signal processor (DSP) hardware, processor, application specific integrated circuit (ASIC), field programmable gate array (FPGA), read only memory (ROM) for storing software, random access memory (RAM), and non volatile storage. Other hardware, conventional and/or custom, may also be included. The functions of the controller 35 may be carried out through the operation of program logic, through dedicated logic, through the interaction of program control and dedicated logic, or even manually (by the user). These functions may be provided through the use of dedicated hardware as well as hardware capable of executing software in association with appropriate software.

**[0073]** The user interface 36 is coupled to the controller 35 and the power source 13 and allows the user to control at least partly the controller 35. For instance, the user interface 36 may comprise a display (such as a screen or light emitting diode (or LED)-type interface) arranged for displaying information relative to a current vaping session or a possible current charging session and for allowing the user to control the controller 35. Also for instance, the displayed information may be a current status representing the current percentage of remaining (or elapsed) vaping time (with respect to a programmed (or chosen) vaping duration) during a vaping session, or the current percentage of charge (with respect to the full charge) of the power source 13 during a possible charging session. The current percentage may be represented by the length of a straight line or by a number of parallel bars or else by a value, for instance.

**[0074]** Also for instance, and as illustrated in the non-limiting example of figures 1 and 2, the user interface 36 may be fixed partly to the printed circuit board 37 to ease and simplify its connections with the controller 35. The user interface 36 may have its own printed circuit board connected to the printed circuit board 37 by wires of flexible circuit(s) in order to be deported anywhere.

**[0075]** Also for instance, the second part 5 may comprise a puff sensor (not illustrated) intended for detecting when the user sucks in (or inhales) during a vaping session, and for informing the controller 35 each time such



a detection occurs. The puff sensor can be a flow or pressure sensor or microphone positioned in the air flow path. For instance, if the air inlet is defined in the first part 4 the puff sensor can be placed in this first part 4.

**[0076]** It should be appreciated by those skilled in the art that some block diagrams of figures 1 and 2 herein represent conceptual views of illustrative circuitry embodying the principles of the invention.

**[0077]** The description and drawings merely illustrate the principles of the invention. It will thus be appreciated that those skilled in the art will be able to devise various arrangements that, although not explicitly described or shown herein, embody the principles of the invention and are included within its spirit and scope. Furthermore, all examples recited herein are principally intended expressly to be only for pedagogical purposes to aid the reader in understanding the principles of the invention and the concepts contributed by the inventor(s) to furthering the art, and are to be construed as being without limitation to such specifically recited examples and conditions. Moreover, all statements herein reciting principles, aspects, and embodiments of the invention, as well as specific examples thereof, are intended to encompass equivalents thereof.

## Claims

1. Cartomizer (1) for an aerosol generation device (3), said cartomizer (1) comprising :
  - a first part (4) comprising a reservoir (7) storing an aerosol-forming precursor,
  - a second part (5) comprising a heating chamber (8) configured, when it is fed with air and aerosol-forming precursor, for heating the latter to generate an aerosol, and movable relative to said first part (4) between relative closed and open positions, and
  - at least one fluid path (6-j) defined between said reservoir (7) and said heating chamber (8) and comprising an outlet (15) in said first part (4) and an inlet (16) located in said second part (5), said outlet (15) facing said inlet (16) in said open position to allow said aerosol-forming precursor to leave said reservoir (7) to reach said heating chamber (8), and said outlet (15) being offset from said inlet (16) in said closed position to prevent said aerosol-forming precursor to reach said heating chamber (8),
 wherein said first part (4) and said second part (5) comprise respectively complementary first (25) and second (26) fastening elements arranged for holding said second part (5) attached to said first part (4) either in said closed position when they are set together in a first relative position, or in said open position when they are set together in a second relative position.
2. Cartomizer according to claim 1, wherein said second fastening element (26) comprises two bayonet mount legs, and said first fastening element (25) comprises two first bayonet mount members (27) arranged for receiving and holding respectively said bayonet mount legs (28) in said open position and two second bayonet mount members (26) arranged for receiving and holding respectively said bayonet mount legs (25) in said closed position.
3. Cartomizer according to claim 1, wherein said first fastening element (25) comprises two bayonet mount legs, and said second fastening element (26) comprises two first bayonet mount members arranged for receiving and holding respectively said bayonet mount legs (25) in said open position and two second bayonet mount members arranged for receiving and holding respectively said bayonet mount legs (25) in said closed position.
4. Cartomizer according to claim 2 or 3, wherein said first bayonet mount members (27) are distant from corresponding second bayonet mount members (28) along a direction parallel to an axis of rotation of said second part (5) in order that said first part (4) is spaced from said second part (5) in said closed position.
5. Cartomizer according to any one of claims 2 to 4, wherein said first (27) and second (28) bayonet mount members are recesses.
6. Cartomizer according to any one of claims 1 to 5, wherein it comprises at least one valve (17-j) arranged in said fluid path (6-j) and configured to be opened in said open position and closed in said closed position.
7. Cartomizer according to claim 6, wherein each valve (17-j) is arranged in the outlet (15) of its fluid path (6-j), preferably wherein said inlet (16) of each fluid path (6-j) comprises another valve.
8. Cartomizer according to claim 6 or claim 7, wherein each valve (17-j) comprises a resealable wall configured to open when it is subject to a constraint in said open position and to automatically close when said constraint disappears in said closed position, preferably wherein each fluid path (6-j) comprises an opening element (18) arranged for constraining said resealable wall in the open position to force the opening of said corresponding valve (17-j).
9. Cartomizer according to any one of claims 1 to 8, wherein each fluid path (6-j) comprises a first subpart (19) comprising said outlet (15) and protruding from said first part (4) to be housed in said second part (5) at least in said open position, and a second

sub-part (20) defined in said second part (5) and comprising said inlet (16), said first (19) and second (20) sub-parts of each fluid path (6-j) being positioned adjacent to each other in said open position and being spatially separated in said closed position. 5

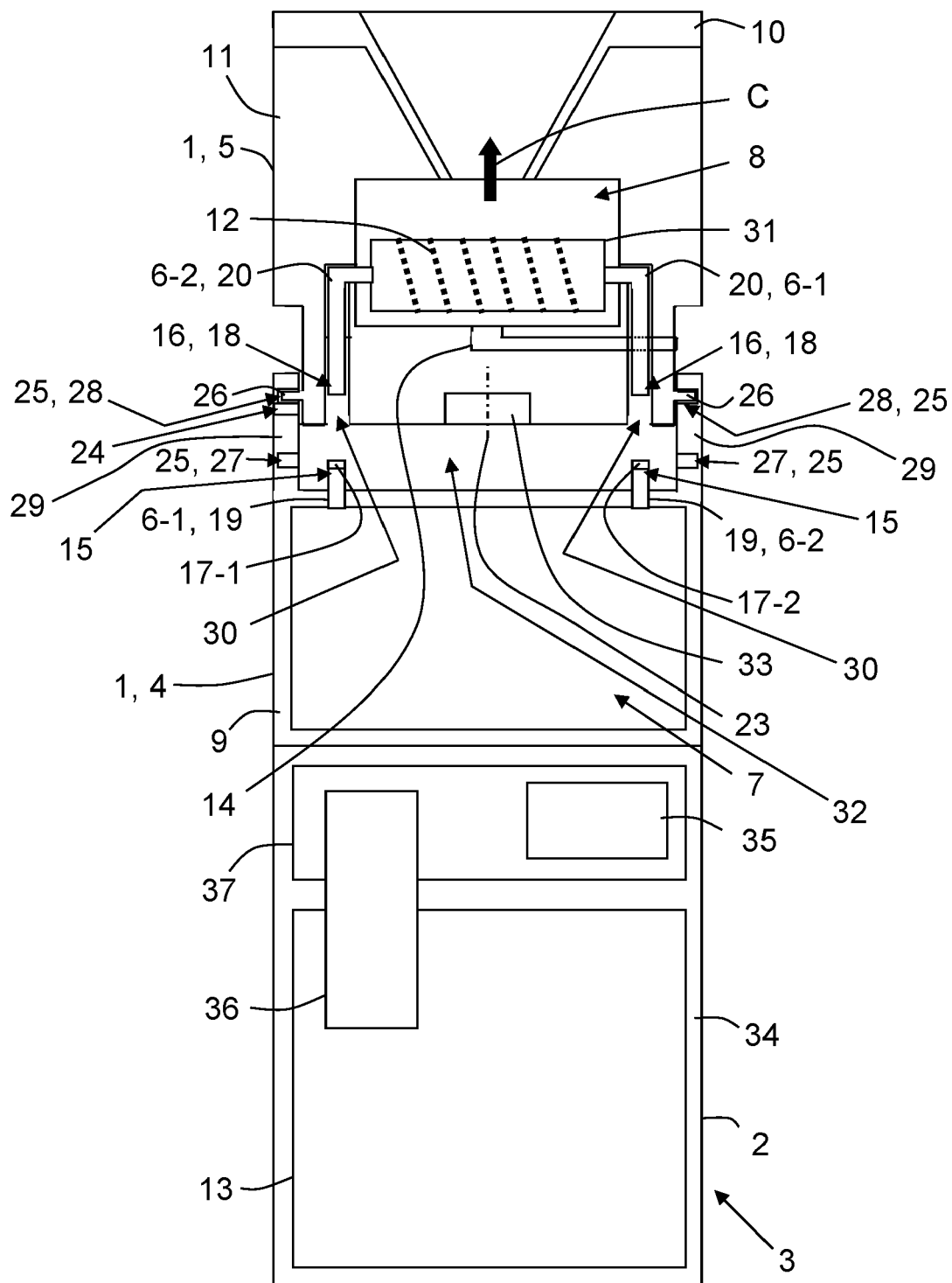
10. Cartomizer according to the combination of claims 7 to 9, wherein each first sub-part (19) comprises an end defining its outlet (15) and comprising said valve (17-j), and each opening element (18) is an end of a second sub-part (20) which comprises said inlet (16). 10
11. Cartomizer according to any one of claims 6 to 10, wherein it comprises first (6-1) and second (6-2) fluid paths comprising respectively first (17-1) and second (17-2) valves. 15
12. Cartomizer according to any one of claims 1 to 11, wherein said second part (5) is rotatably mounted on an external face of a housing (9) of said first part (4) in order to be an extension of said first part (4). 20
13. Cartomizer according to claim 9 or 10 taken in combination with claims 11 and 12, wherein said first sub-parts (19) of said first (6-1) and second (6-2) fluid paths and an axis of rotation of said second part (5) are located in a same plane. 25
14. Cartomizer according to any one of claims 1 to 13, wherein it comprises a pulling force element (33) configured to provide an attraction force between said first (4) and second (5) parts. 30
15. Aerosol generation device (3) comprising an electrical and control device (2), wherein it further comprises a cartomizer (1) according to any one of the preceding claims, mechanically and electrically coupled to said electrical and control device (2). 35

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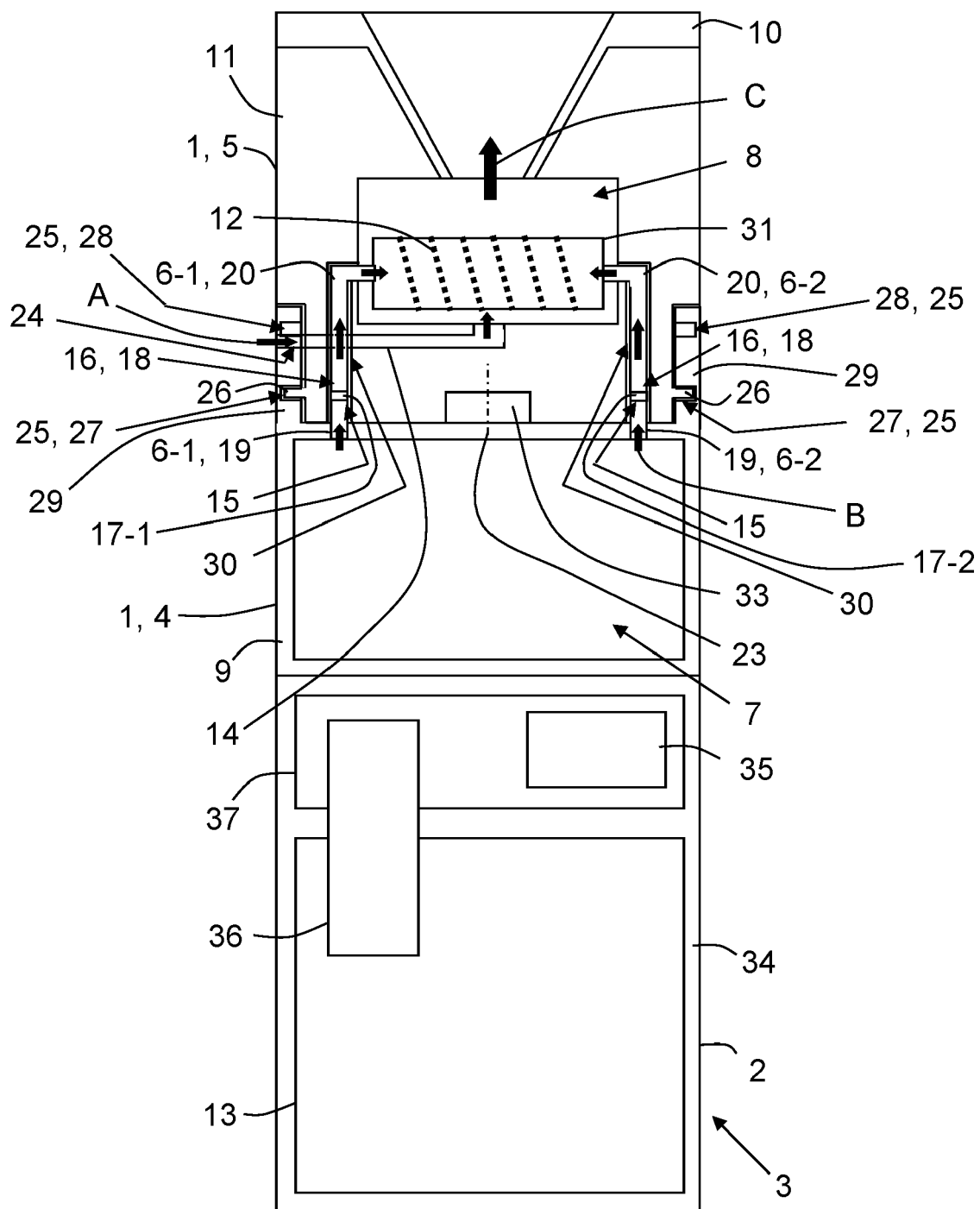


FIG.2



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| DOCUMENTS CONSIDERED TO BE RELEVANT                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                              |                                                           |
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| Category                                                                                                                                                                                                                                               | Citation of document with indication, where appropriate, of relevant passages                                                                                                                                                                       | Relevant to claim                                                                                                                                                                                                                                                            | CLASSIFICATION OF THE APPLICATION (IPC)                   |
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| Place of search<br>Munich                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                     | Date of completion of the search<br>11 May 2021                                                                                                                                                                                                                              | Examiner<br>Fernández Cuenca, B                           |
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