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(54) **AEROSOL GENERATION DEVICE FOR CONTROLLABLY GENERATING AEROSOLS FOR IMPROVING SENSORY EXPERIENCE**

(57) An aerosol generation device (1) comprises a first aerosol generation assembly (2) configured for producing a first aerosol by heating a first aerosol-forming substance, and a second aerosol generation assembly (3) configured for controllably diffusing at least one second aerosol that is a scent into the surroundings, through at least one second aerosol outlet (18).

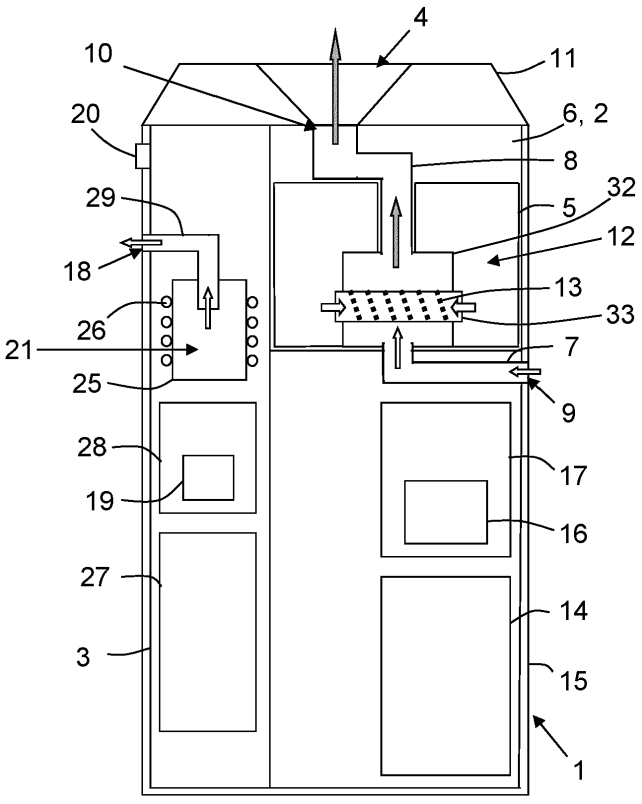

FIG.1

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Description

Field of the invention

[0001] The present invention relates to a vaping device, also called hereafter "aerosol generation device", and more precisely to a vaping device arranged for providing at least two different aerosols.

Background

[0002] Most of the aerosol generation devices, whether they are "E-vapor devices" or "T-vapor (or heat-not-burn) devices", comprise a first aerosol generation assembly comprising a first aerosol outlet (possibly defined in a mouthpiece (possibly exchangeable)) and configured for producing (by heating) a first aerosol that is delivered by this first aerosol outlet when their user inhales through this first aerosol outlet during a vaping session.

[0003] When vaping, the user inhales the aerosol specially designed to provide a pleasant sensory experience which essentially activates his taste receptors. The aerosol can be flavored to enhance the taste. When exhaling, odors and smells are also produced providing stimuli possibly interfering or complementing with the taste stimuli. Overall, the consumer experience might not be optimal, as for instance the olfactive experience might not be as pleasant or intense as expected and/or simply might not perfectly match the taste experience.

[0004] It has been proposed, notably in the patent document WO 2011109848, an aerosol generation device further comprising a second aerosol generation assembly, configured for diffusing a second aerosol (and more precisely a scent (or flavor)) in surroundings of the aerosol generation device. This aerosol generation device comprises a mouthpiece with the first outlet for delivering the first aerosol into the mouth of its user and a scent reservoir that communicates with the surroundings through a membrane. This membrane releases passively and continuously the scent into the surroundings (or environment), which allows a continuous olfactory perception of this scent by the user and then an improvement of his sensory experience.

[0005] However, the continuous and uncontrolled release of the scent into the surroundings might not be appropriate especially when this is not the right time, such as for instance when a vaping session is not taking place or when it is not allowed or else when it is disturbing for others. Moreover, the intensity of the scent at a chosen instant cannot be controlled and the scent (or flavor) cannot be easily and rapidly changed.

[0006] Therefore, an object of this invention is to propose a solution to this problem, in particular to improve and better control the vaping sensory experience.

Summary of the invention

[0007] The proposed invention provides an embodiment of an aerosol generation device comprising:

- a first aerosol generation assembly configured for producing a first aerosol by heating a first aerosol-forming substance, and
- a second aerosol generation assembly configured for diffusing at least one second aerosol into the surroundings of the aerosol generation device.

[0008] This aerosol generation device is characterized in that its second aerosol generation assembly is configured for controllably diffusing at least one second aerosol that is a scent through at least one second aerosol outlet positioned on the aerosol generation device.

[0009] As a result, it is now possible to provide an improved olfactive sensory experience in combination with the vaping experience. In particular, it is possible to control the release (or diffusion) of a scent into the user's environment, or else to decrease or increase the intensity of a scent at any time before, during or after the vaping session.

[0010] In a mode, the first aerosol generation assembly comprises a first aerosol outlet configured for releasing the first or heated aerosol. This first aerosol outlet may be formed in a permanent or exchangeable mouthpiece of the aerosol generation device.

[0011] The embodiment of aerosol generation device may comprise other aspects or features, considered separately or combined, as defined hereafter.

- In a first example of embodiment, the second aerosol generation assembly may be configured to automatically activate for diffusing the second aerosol after a chosen or predetermined number of successive user's suctions (or puffs).
- In a second example of embodiment, the second aerosol generation assembly may be configured to automatically activate for diffusing the second aerosol at the same time as the first aerosol generation assembly or after the first aerosol generation assembly has been activated for diffusing the first aerosol.
- In a third example of embodiment, the second aerosol generation assembly may be configured for being manually activated by the user for diffusing the second aerosol.
- The device may comprise an external casing housing encompassing at least a part of the second aerosol generation assembly.
- The device may comprise an external casing to which the second aerosol generation assembly may be attached.
- The second aerosol generation assembly may comprise an exchangeable cartridge comprising at least one second aerosol-forming substance, or an exchangeable cartomizer comprising a cartridge comprising at least one second aerosol-forming substance.
- The second aerosol generation assembly may com-

prise at least two second aerosol outlets. In this case, it may also comprise a controller and optionally a controllable flow path (e.g. active valves) arranged for controlling selectively access to these second aerosol outlets to control the diffusion of the second aerosol spatially and/or in intensity into the surroundings.

- In a variant the second aerosol generation assembly may comprise at least two different second aerosol-forming substances and at least two second aerosol outlets associated respectively with the second aerosol-forming substances. In this case, it may also comprise a controller and optionally a controllable flow path (e.g. active valves) arranged for controlling selectively access to the second aerosol outlets to control diffusion of different second aerosols, generated respectively from these second aerosol-forming substances, into the surroundings.
- The second aerosol generation assembly may comprise at least one porous material impregnated with a second aerosol-forming substance and arranged for releasing the second aerosol from this impregnated second aerosol-forming substance when it is heated to a temperature greater than a threshold.
- The first and second aerosol generation assemblies may have respectively first and second heaters controlled separately and arranged for heating respectively first and second aerosol-forming substances for generating respectively the first and second aerosols.
- The first and second aerosol generation assemblies may each comprise an ohmic heater such as a coil-and-wick assembly or an induction heater or a micro-electronic-mechanical-system (or MEMS) having at least one microfluidic die and a heater arranged for heating liquid to force liquid through the die.
- In a variant the first aerosol generation assembly may have a heater arranged for heating first and second aerosol-forming substances for generating respectively the first and second aerosols. For instance, the heater may be arranged for heating the first and second aerosol-forming substances respectively to first and second temperatures.
- In a variant the second aerosol generation assembly may comprise an ultrasonic vibrating element configured to change the second aerosol-forming substance into the second aerosol.
- In a variant the second aerosol generation assembly may be a vibrating mesh nebulizer or a surface wave acoustic (or SAW) nebulizer.
- The first aerosol generation assembly may comprise a controller arranged for controlling generation of the first and second aerosols.
- In a variant the first and second aerosol generation assemblies may comprise respectively first and second controllers arranged for controlling respectively generation of the first and second aerosols.
- The aerosol generation device may constitute an electronic cigarette (or e-cigarette) or a heat-not-burn aerosol generation device.

Brief description of the figures

[0012] 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 and functionally illustrates a first example of embodiment of an aerosol generation device according to the invention,
- Figure 2 (FIG.2) schematically and functionally illustrates a second example of embodiment of an aerosol generation device according to the invention,
- Figure 3 (FIG.3) schematically and functionally illustrates a third example of embodiment of an aerosol generation device according to the invention,
- Figure 4 (FIG.4) schematically and functionally illustrates a fourth example of embodiment of an aerosol generation device according to the invention,
- Figure 5 (FIG.5) schematically and functionally illustrates a fifth example of embodiment of an aerosol generation device according to the invention,
- Figure 6 (FIG.6) schematically and functionally illustrates a sixth example of embodiment of an aerosol generation device according to the invention, and
- Figure 7 (FIG. 7) schematically and functionally illustrates a seventh example of embodiment of an aerosol generation device according to the invention.

Detailed description of embodiments

[0013] The invention aims at proposing an aerosol generation device 1 configured for controllably providing at least two different aerosols; one of which is released into the surroundings, to improve the overall sensory experience including the olfactive sensory experience.

[0014] In the following description of the examples of figures 1 to 6, it will be considered that the aerosol generation device 1 is an E-vapor device. So, it comprises a first aerosol-forming substance 12 that is a liquid. But an aerosol generation device 1 according to the invention could be of another type, and notably it could be a T-vapor (or heat-not-burn) device, for instance, in which the aerosol-forming substance may be formed at least in part of tobacco and/or reconstituted tobacco substrate.

[0015] Furthermore, in the following description the first aerosol-forming substance 12 (here a liquid) may comprise one or more of nicotinoid(s), cannabinoid(s), caffeine, tobacco material, organic acids, salts, flavoring, and combinations thereof, and a carrier (e.g. a liquid solvent) which may include propylene glycol, glycerin, triethyl citrate (or TEC), triacetin, trimethylene glycol, water, ethanol, and combinations thereof.

[0016] Still further, in the following description the term "aerosol" may include a suspension of substance as one or more of solid particles, liquid droplets and gas. Such a suspension may be in a gas including air.

[0017] As illustrated in figures 1 to 7, an aerosol generation device 1, according to the invention, comprises at least first 2 and second 3 aerosol generation assemblies.

[0018] The first aerosol generation assembly 2 is configured for producing a first aerosol by heating a first aerosol-forming substance 12 during a vaping session.

[0019] For instance, and as illustrated in the six non-limiting examples of figures 1 to 6 (where the aerosol generation device 1 is an e-vapor device), the first aerosol generation assembly 2 may comprise a first aerosol outlet 4 and is configured for producing the first aerosol that is intended for being delivered by this first aerosol outlet 4 when a user inhales through this first aerosol outlet 4 during a vaping session. This first aerosol is generated from the first aerosol-forming substance 12 mixed with air.

[0020] For instance, and as illustrated in the six non-limiting examples of figures 1 to 6 (where the aerosol generation device 1 is an E-vapor device), the first aerosol generation assembly 2 may comprise a cartridge (or capsule or else container (or reservoir)) 5 containing the first aerosol-forming substance 12 (here a liquid). Such a cartridge 5 may be exchangeable, in order to be manually replaced or refilled by the user when there is no more first aerosol-forming substance 12 in it. This exchangeable cartridge (or capsule) 5 can be installed manually, at least partly, into a dedicated cavity of the first aerosol generation assembly 2 or of an external casing (or body) 15 of the aerosol generation device 1 (which contains the first aerosol generation assembly 2).

[0021] As illustrated in figures 1 to 6, the first aerosol generation assembly 2 may comprise an aerosol generation unit 6, comprising a reservoir 5 containing the first aerosol-forming substance 12, an air flow channel 7, a heating chamber 32, a first heater 13, and a first aerosol channel 8. The aerosol generation unit 6 may be an exchangeable cartridge, capsule or pod. In a variant, only the reservoir 5 may be an exchangeable cartridge, capsule or pod.

[0022] The first heater 13 is arranged for aerosolizing the first aerosol-forming substance 12 in the heating chamber 32 that is also fed with air provided by the air flow channel 7 and originating from outside, in order to generate a first aerosol.

[0023] For instance, and as illustrated in the non-limiting examples of figures 1 to 6, the heating chamber 32 may comprise a transport element 33 to transport the first aerosol-forming liquid 12 from the cartridge 5 to the heating chamber 32 in the area comprising the first heater 13. For instance, this transport element 33 may be a capillary element (possibly a capillary wick or mesh) having one end or two opposite ends. For instance, the first heater 13 may comprise a resistive coil wound around the capillary element 33 and connected to internal electrodes via lead wires. This first heater 13 is supplied with electrical energy originating from a first power source 14. The transport element can be made of ceramic, mesh or fibres of filaments. The first heater 13 may not necessarily be a resistive coil but may be an ohmic heater, such as an ohmic heating track printed on a surface of the transport element or a coil-and-wick assembly, or a thin film, or a micro-electronic-mechanical-system (or MEMS) having at least one microfluidic die and a heater arranged for heating liquid to force liquid through the die, or else may be an induction heater, for instance.

[0024] The first aerosol channel 8 is in fluid communication with the heating chamber 32 to collect the vaporized substance mixed with the air that defines the first aerosol. This first aerosol channel 8 comprises an outlet 10 for delivering the first aerosol to the user when the user is inhaling. In this example the outlet 10 feeds a mouthpiece 11 comprising the first aerosol outlet 4. But in a variant (without mouthpiece) the outlet 10 of the first aerosol channel 8 could be the first aerosol outlet 4. It is recalled that the user temporarily couples the mouthpiece 11 to his mouth for inhaling the first aerosol during each puff (or draw or inhalation phase). For instance, the mouthpiece 11 may be integral with the external casing (or body) 15 of the aerosol generation device 1. But this mouthpiece 11 could be an additional part coupled to the external casing (or body) 15.

[0025] It is important to note that the cartridge (or capsule or else container (or reservoir)) 5 could be part of a cartomizer, possibly exchangeable and further comprising the first heater 13. In possible examples, e.g. heat-not-burn devices, the cartridge can be a tobacco refill inserted into a device comprising the first heater 13, as illustrated in figure 7 (described below).

[0026] Here, the first power source 14 is housed in the external casing 15 of the aerosol generation device 1.

[0027] For instance, the first power source 14 may be a rechargeable battery. In this case the external casing 15 may comprise an electrical connector to which a charger cable may be connected during a charging session of the first rechargeable battery 14. 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 1.

[0028] The electrical energy supplied to the first heater 13 during a vaping session is controlled by a first controller 16. This first controller (or control unit) 16 may comprise at least a processor and a memory arranged for performing operations for controlling at least the first aerosol generation assembly 2 (and notably the first heater 13) during a vaping session and also the first power source 14 during a possible charging session.

[0029] For instance, the processor may be a digital signal processor (or DSP), or an application specific integrated circuit (ASIC), or else a field programmable gate array (FPGA). More generally, the processor may comprise integrated (or printed) circuits, or several integrated

(or printed) circuits connected therebetween through wired or wireless connections. The term "integrated (or printed) circuits" refers here to any type of device capable of carrying out at least one electric or electronic operation.

[0030] Also for instance, the memory may be a random access memory (or RAM). But it may be any type of device arranged for storing program instructions for the processor.

[0031] Generally speaking, the functions of the first controller (or control unit) 16 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.

[0032] As illustrated in the non-limiting examples of figures 1 to 6, the first controller (or control unit) 16 (and notably its processor and memory) may be fixed onto a first printed circuit board (or PCB) 17 (here housed in the external casing 15).

[0033] The first controller (or control unit) 16 may also comprise, in addition to its processor and memory, an input interface, a mass memory (notably for storing intermediate data produced during its calculus and processing), and an output interface for delivering messages and instructions at least for controlling the aerosol generation assembly 2 (and notably the first heater 13) and the electronic component(s) (such as switch(es)) supplying the electrical power (stored in the first power source 14) to the first aerosol generation assembly 2.

[0034] The second aerosol generation assembly 3 is configured for controllably diffusing at least one second aerosol that is a scent into the surroundings of the aerosol generation device 1, through at least one second aerosol outlet 18 that is positioned on the aerosol generation device 1. The second aerosol outlet 18 is preferably positioned on a lateral side of the aerosol generation device (as illustrated non limitatively), or on an end opposite to the first aerosol outlet 4, such as on the bottom end of the aerosol generation device 1.

[0035] Each second aerosol outlet 18 may be defined in the external casing 15 of the aerosol generation device 1 as illustrated in the non-limiting examples of figures 1 and 3 to 6, or in an external casing (or body) 22 of the second aerosol generation assembly 3 as illustrated in the non-limiting example of figure 2.

[0036] Thanks to the control of the diffusion of the scent (or second aerosol) into the surroundings of the aerosol generation device 1, it is now possible to improve the sensory experience by properly controlling the olfactive release, e.g. to prevent releasing (or diffusing) scent in the user's environment (for instance to not disturb neighbor(s)), or else to decrease or increase the intensity of the scent at any time before, during or after a vaping session. Therefore, the sensory experience of the user and/or of the user's neighbors can be improved.

[0037] In a first example of embodiment, the second aerosol generation assembly 3 may be configured to automatically activate for diffusing the second aerosol after a chosen or predetermined number of successive user's suctions (or puffs). This allows to reproduce automatically the beginning of a cigarette smoking session, because the releasing (or diffusion) of scent only starts after the chosen or predetermined number of user's suctions (or puffs).

[0038] This number may be chosen by the user by means of a user interface of the first aerosol generation assembly 2 or of the second aerosol generation assembly 3, or may be fixed (by design) and therefore not modifiable by the user.

[0039] The automatic activation can be triggered by the first controller 16 (when the second aerosol generation assembly 3 does not comprise its own second controller 19 as illustrated in the non-limiting examples of figures 3 to 6), or by a second controller 19 of the second aerosol generation assembly 3 (as illustrated in the non-limiting examples of figures 1 and 2). In the last alternative, the second controller 19 needs to be coupled to the first controller 16 to be informed when the chosen or predetermined number of user's suctions (or puffs) has been reached.

[0040] For instance, the chosen or predetermined number may be comprised between three and eight. As an illustrative example the chosen or predetermined number may be equal to four or five. But the chosen or predetermined number may take any value as it depends notably on the flavor intensity and/or the efficiency to diffuse and/or on the user's preference, but also on the number of puffs per vaping session. For instance, if one considers an average of twelve puffs per vaping session, the scent may be diffused before reaching the middle of the vaping session.

[0041] In a second example of embodiment, the second aerosol generation assembly 3 may be configured to automatically activate for diffusing the second aerosol at the same time as the first aerosol generation assembly 2 or after the first aerosol generation assembly 2 has been activated for diffusing the first aerosol. This does not mean it is necessary that the release (or diffusion) of scent starts when the second aerosol generation assembly 3 has been activated. Indeed, the release (or diffusion) of scent may be delayed by scheduling after the activation of the second aerosol generation assembly 3.

[0042] As in the first example of embodiment, the automatic activation can be triggered by the first controller 16 (when the second aerosol generation assembly 3 does not comprise its own second controller 19 as illustrated in the non-limiting examples of figures 3 to 6), or by a second controller 19 of the second aerosol generation assembly 3 (as illustrated in the non-limiting examples of figures 1 and 2). In the last alternative, the second controller 19 needs to be coupled to the first controller 16 to be informed when the first aerosol generation assembly 2 is or has been activated.

[0043] In a third example of embodiment, the second

aerosol generation assembly 3 may be configured for being manually activated by the user. So, in this case it is the user who decides when he wants the scent to be released (or diffused) by activating the second aerosol generation assembly 3. Such an activation can be controlled by means of a dedicated button 20 that is fixed to the external casing 15 of the aerosol generation device 1 as illustrated in the non-limiting examples of figures 1 and 3, or in an external casing (or body) 21 of the second aerosol generation assembly 3 as illustrated in the non-limiting example of figure 2. In a variant, this activation can be controlled by selecting a dedicated sub menu by means of a user interface of the first aerosol generation assembly 2 (under control of its first controller 16) or of the second aerosol generation assembly 3 (under control of its second controller 19).

[0044] In an alternative, the second aerosol generation assembly 3 may be activated by a mechanical pusher using hand pressure to squeeze the container or a deformable chamber containing a second aerosol-forming substance 21, from which the second aerosol (or scent) is generated, and expel this second aerosol-forming substance 21 through a delivery nozzle such as a spray nozzle.

[0045] For instance, and as illustrated in the non-limiting examples of figures 1 and 3 to 6, the external casing 15 of the aerosol generation device 1 may house removably at least a part of the second aerosol generation assembly 3. This allows replacing the whole second aerosol generation assembly 3 or a part of the latter (3), and notably the element containing the second aerosol-forming substance 21, or else refilling this element with second aerosol-forming substance 21 when it is empty.

[0046] But in a variant illustrated in the non-limiting example of figure 2, the second aerosol generation assembly 3 may be externally attached to the external casing 15 of the aerosol generation device 1. In this variant the second aerosol generation assembly 3 comprises an external casing 22 comprising coupling means cooperating with corresponding coupling means of the external casing 15 of the aerosol generation device 1. Such a variant allows the aerosol generation device 1 to be used with or without a second aerosol generation assembly 3.

[0047] In this variant, when the second aerosol generation assembly 3 is automatically activated by the first controller 16, additional electrical coupling means must be provided on the external casings 15 and 22 to allow the first controller 16 to send a triggering signal or command intended for activating the second aerosol generation assembly 3. But, when the operation of the second aerosol generation assembly 3 is independent of the operation of the first aerosol generation assembly 1, it is manually activated and therefore controlled by the user. So, the second aerosol generation assembly 3 comprises a dedicated button 20 fixed to its external casing 22 as illustrated in the non-limiting example of figure 2, or a dedicated sub menu that can be selected through a user interface of the second aerosol generation assembly 3 (under control of its second controller 19).

[0048] For instance, the second aerosol generation assembly 3 may comprise an exchangeable cartridge (or capsule or else container (or reservoir)) comprising at least one second aerosol-forming substance 21, or an exchangeable cartomizer comprising a cartridge comprising at least one second aerosol-forming substance 21 and possibly exchangeable.

[0049] It is recalled that for an e-vapor device a cartomizer usually comprises a body comprising at least one cartridge (or reservoir), arranged for storing an aerosol-forming substance, a heater for aerosolizing or vaporizing this aerosol-forming substance to generate an aerosol, at least one air inlet, and an aerosol outlet.

[0050] Also for instance, and as illustrated in the non-limiting example of figure 5, the second aerosol generation assembly 3 may comprise at least two second aerosol outlets 18, notably when it does not comprise its own second controller 19. In this case, the first controller 16 (or the possible second controller 19) may be arranged for selectively controlling access to these second aerosol outlets 18 to control the diffusion of the second aerosol (or scent) spatially and/or in intensity into the surroundings. To this effect, the second aerosol generation assembly 3 may comprise as many flaps or valves 23 as second aerosol outlets 18, each flap or valve 23 controlling access to a corresponding second aerosol outlet 18 and being controlled by the first controller 16 or possibly by the second controller 19. Each flap or valve 23 has at least a totally closed position, a totally opened position, and possibly at least one partially opened position.

[0051] In a variant not illustrated, the second aerosol generation assembly 3 may comprise at least two different second aerosol-forming substances 21 and at least two second aerosol outlets 18 associated respectively with these second aerosol-forming substances 21, for instance to avoid cross-contamination between the different second aerosols. In this case, the first controller 16 (or the possible second controller 19) may be arranged for controlling selectively access to these second aerosol outlets 18 to control diffusion of different second aerosols, generated respectively from the second aerosol-forming substances 21, into the surroundings. This embodiment may allow the user to select the scent or the mixing of scents to be released (or diffused). To control selectively the access to the second aerosol outlets 18, the second aerosol generation assembly 3 may comprise as many flaps or valves as second aerosol outlets 18, each flap or valve controlling access to a corresponding second aerosol outlet 18 and being controlled by the first controller 16 or possibly by the second controller 19.

[0052] But the (each) valve can be active or passive. The (each) valve can be passive (as a check valve) if enough internal pressure is created in the heating chamber to expel the scent. This internal pressure can be created by mechanical means (e.g a piston). If the reservoir is pressurized (as in a nebulizer) and linked to the outlet, the second aerosol outlet 18 can be designed as a spray

nozzle. When the reservoir is opened, e.g. by mechanical actuation such as a pusher on a check valve, the substance is sprayed into a multitude of tiny droplets of scent.

[0053] The (each) second aerosol-forming substance 21 may be a liquid (possibly with a water-based formulation) stored in a dedicated cartridge 25. But, this is not mandatory. Indeed, and as illustrated in the non-limiting example of figure 6, the second aerosol generation assembly 3 may comprise at least one porous material 24 impregnated with a second aerosol-forming substance 21 and arranged for releasing a second aerosol (or scent) from its impregnated second aerosol-forming substance 21 when it is heated to a temperature greater than a threshold.

[0054] Preferably, the porous material is a zeolite material because it has a high capacity to absorb solvent-based aerosol-forming substance and a good heat retention. In this case the solvent can be water and/or (an)other aerosol-forming agent(s), such as glycerine and/or propylene glycol (PG). By selecting the right combination of aerosol former to release at a certain temperature, it is possible to control release of the flavor (or scent or else fragrance).

[0055] For instance, the type of flavor (or scent) released by the second aerosol may be menthol, fruit, or berry, and may complement or alter the notes of the primary flavor of the first aerosol. For instance, the first aerosol can contain nicotine whereas the second aerosol does not.

[0056] The heating of the first 12 and second 21 aerosol-forming substances may be independent one from the other or shared.

[0057] In the examples illustrated in figures 1, 2, 4 and 5 the heating of the first 12 and second 21 aerosol-forming substances are independent. So, the first 2 and second 3 aerosol generation assemblies have respectively first 13 and second 26 heaters controlled separately and arranged for heating respectively the first 12 and second 21 aerosol-forming substances for generating respectively the first and second aerosols.

[0058] For instance, and as illustrated in the non-limiting examples of figures 1, 2, 4 and 5, the second heater 26 may surround a small part of the cartridge (or capsule or else container (or reservoir)) 25, comprising a second aerosol-forming substance 21, to heat the latter (21).

[0059] But in a variant not illustrated the cartridge 25 could comprise a reservoir containing the second aerosol-forming substance 21 and a heating chamber fed with the second aerosol-forming substance 21 and comprising a transport element to transport the second aerosol-forming substance 21 from its reservoir to the heating chamber in the area comprising the second heater 26. For instance, this transport element may be a capillary element (possibly a capillary wick or mesh) having at least one feeding end. For instance, the second heater 26 may comprise a resistive coil wound around the capillary element, or an ohmic heater, such as an ohmic heating track printed on a surface of the transport element or a coil-and-wick assembly, or a thin film, or a micro-electronic-mechanical-system (or MEMS) having at least one microfluidic die and a heater arranged for heating liquid to force liquid through the die, or else may be an induction heater, for instance.

[0060] The second aerosol generation assembly 3 may comprise an aerosol flow channel 29 passing through the cartridge (or capsule) 25 (or the heating chamber) to collect the generated second aerosol (or scent). This aerosol flow channel 29 has at least one ending part comprising a second aerosol outlet 18 for delivering the second aerosol into the surroundings. In the case where the second aerosol generation assembly 3 comprises N second aerosol outlet 18 (with $N > 1$), the aerosol flow channel 29 may be divided into N sub channels 30 each having an ending part comprising a second aerosol outlet 18 and each comprising a flap or valve 23 controlling its access, as illustrated in figure 5.

[0061] In the third example illustrated in figure 3, the aerosol flow channel 29 comprises preferably a flap or valve 31 controlling its access or the access to the corresponding second aerosol outlet 18. This option allows preventing/authorizing release (or diffusion) of the scent via the second aerosol outlet 18. The flap or valve 31 can be controlled by the button 20 or by the first controller 16 or else by a solenoid activated by the first controller 16.

[0062] For instance, the second heater 26 may be a coil associated with a susceptor or a resistive coil heater. In the first alternative, the coil is arranged for generating an electromagnetic field when it is supplied with an electrical current, and the susceptor is arranged for transforming this electromagnetic field into heat. In a variant of embodiment (not illustrated) the second heater 26 could be located inside the cartridge (or capsule) 25.

[0063] The second heater 26 is supplied with electrical energy originating from the first power source 14 (as illustrated in figures 4 and 5), or from a second power source 27 of the second aerosol generation assembly 3 (as illustrated in figures 1 and 2).

[0064] In the first example illustrated in figure 1, the second power source 27 is housed in the external casing 15 of the aerosol generation device 1. In the second example illustrated in figure 2, the second power source 27 is housed in the external casing 22 of the second aerosol generation assembly 3.

[0065] For instance, the second power source 27 may be a rechargeable battery. In this case, and in the first example, the external casing 15 may comprise another electrical connector to which another charger cable may be connected during a charging session of the second rechargeable battery 27. Such another charger cable may be coupled to another (AC) adapter or to another wall socket. The other charger cable and/or the other (AC) adapter may belong to the aerosol generation device 1.

[0066] In the second example, the external casing 22 may comprise an electrical connector to which a charger cable may be connected during a charging session of

the second rechargeable battery 27. Such a charger cable may be coupled to an (AC) adapter or to a wall socket. This charger cable and/or this (AC) adapter may belong to the aerosol generation device 1.

[0067] In a variant, the first 16 and second 27 power sources may be charged together during the same charging session, via a single electrical connector of the external casing 15.

[0068] In the first and second examples illustrated in figures 1 and 2, the electrical energy supplied to the second heater 26 may be controlled by the first controller 16 or the second controller 19.

[0069] The second controller (or control unit) 19 may comprise at least a processor and a memory arranged for performing operations for controlling at least the second aerosol generation assembly 3 (and notably the second heater 26) and also the second power source 27 during a possible charging session. For instance, this processor may be a digital signal processor (or DSP), or an application specific integrated circuit (ASIC), or else a field programmable gate array (FPGA). More generally, this processor may comprise integrated (or printed) circuits, or several integrated (or printed) circuits connected therebetween through wired or wireless connections. Also for instance, this memory may be a random access memory (or RAM). But it may be any type of device arranged for storing program instructions for the associated processor.

[0070] As illustrated in the non-limiting examples of figures 1 and 2, the second controller (or control unit) 19 (and notably its processor and memory) may be fixed onto a second printed circuit board (or PCB) 28 (housed in the external casing 15 or 22).

[0071] The second controller (or control unit) 19 may also comprise, in addition to its processor and memory, an input interface, a mass memory (notably for storing intermediate data produced during its calculus and processing), and an output interface for delivering messages and instructions at least for controlling the second aerosol generation assembly 3 (and notably the possible second heater 26) and the electronic component(s) (such as switch(es)) supplying the electrical power (stored in the second power source 27).

[0072] In the third and sixth examples illustrated in figures 3 and 6 the first 12 and second 21 aerosol-forming substances have a shared heating. So, only the first aerosol generation assembly 2 has a first heater 13 arranged for heating the first 12 and second 21 aerosol-forming substances for generating respectively the first and second aerosols. This allows to simplify the second aerosol generation assembly 3 because the latter (3) does not need to comprise a second heater.

[0073] In these third and sixth examples the first heater 13 may be arranged for heating the first 12 and second 21 aerosol-forming substances respectively to first and second temperatures. But this is not mandatory.

[0074] In the third example illustrated in figure 3 the second aerosol generation assembly 3 comprises a cartridge (or capsule or else container (or reservoir)) 25 comprising a second aerosol-forming substance 21 and set in the vicinity of the first heater 13 to allow heating of this second aerosol-forming substance 21 to a temperature that is sufficient for inducing generation of a second aerosol (or scent).

[0075] In the sixth example illustrated in figure 6 the second aerosol generation assembly 3 comprises a porous material 24 impregnated with a second aerosol-forming substance 21 and set in the vicinity of the first heater 13 to allow heating of this impregnated second aerosol-forming substance 21 to a temperature that is greater than the threshold and therefore sufficient for inducing generation of a second aerosol (or scent).

[0076] In another variant of embodiment, the second aerosol generation assembly 3 may comprise an ultrasonic vibrating element configured to change the second aerosol-forming substance 21 into the second aerosol. For instance, the ultrasonic vibrating element may be a vibrating mesh nebulizer (such as the one described below) or a surface acoustic wave (or SAW) nebulizer.

[0077] A non-limitative example of T-vapor (or heat-not-burn) device 1 according to the invention is illustrated in figure 7. As illustrated, the external casing 15 comprises an internal chamber 35 in which a consumable 36 comprising the first aerosol-forming substance 12 can be introduced. For instance, this consumable 36 may be a tobacco stick. In this case the first aerosol-forming substance 12 comprises tobacco and/or reconstituted tobacco material. For instance, the substance comprises homogenized tobacco material (i.e. reconstituted tobacco such as cast sheet, tobacco paper or laminated tobacco sheet) and one or more of tobacco lamina, cellulose fibre or flavor. But the invention is not limited to this type of consumable 36. Also as illustrated, the consumable 36 may comprise a filter 37, downstream of the first aerosol-forming substance 12. In the non-limiting example of figure 7, the consumable 36 is partly inserted into the internal chamber 35. But in a variant it could be fully inserted into the internal chamber 35.

[0078] The first aerosol-forming substance 12 is heated by the first heater 13 that is supplied with electrical energy originating from the power source 14, in this non-limiting example. In the non-limiting example illustrated in figure 7 the first heater 13 surrounds the internal chamber 35, and therefore a part of the consumable 36 (and more precisely its first aerosol-forming substance 12) to heat the latter (12). For instance, the first heater 13 may be a thin film heater wrapped around the outer surface of the internal chamber 35 to heat its side walls and at least a part of its internal volume (which therefore defines a heating chamber). But in a variant (not illustrated) the first heater 13 could be a coil associated with a susceptor or a resistive coil heater. In other variants of embodiment (not illustrated) the first heater 13 could be located inside the consumable 36 or inside the internal chamber 35.

[0079] For instance, and as illustrated, the second aerosol generation assembly 3 may comprise a cartridge 25

comprising a reservoir containing the second aerosol-forming substance 21 and a nebulizer 40, for instance. For instance, the nebulizer 40 may be a mesh nebulizer comprising a piezo electric element 38 intended for oscillating a mesh 39 to pump the second aerosol-forming substance (here a liquid) 21 through this mesh 39. In this case the size of the droplets is about twice the size of the holes of the mesh 39. But the nebulizer 40 could be a jet nebulizer or an ultrasonic nebulizer. It is recalled that a jet nebulizer is based on a pressure container and a valve opening and closing, and requires a pressurized cartridge containing the second aerosol-forming substance 21. It is also recalled that an ultrasonic nebulizer has a transducer intended for oscillating the second aerosol-forming liquid 21 to change it to the second aerosol.

[0080] In a variant, the nebulizer 40 could be replaced with a scent diffuser based on a porous substrate containing scent oil (or second aerosol-forming substance 21) and activated by an activating mechanism.

[0081] In another variant, the nebulizer 40 could be replaced by a micro-electronic-mechanical-system (or MEMS) having at least one microfluidic die and a heater arranged for heating liquid to force liquid through the die.

[0082] In another variant, the nebulizer 40 could be replaced by a surface acoustic wave (or SAW) nebulizer.

[0083] It should be appreciated by those skilled in the art that some block diagrams of figures 1 to 7 herein represent conceptual views of illustrative elements embodying the principles of the invention.

[0084] 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. Aerosol generation device (1) comprising i) a first aerosol generation assembly (2) configured for producing a first aerosol by heating a first aerosol-forming substance, and ii) a second aerosol generation assembly (3) configured for diffusing at least one second aerosol into the surroundings of said aerosol generation device (1), wherein said second aerosol generation assembly (3) is configured for controllably diffusing at least one second aerosol that is a scent through at least one second aerosol outlet (18) positioned on said aerosol generation device (1).

2. An aerosol generation device according to claim 1, wherein said second aerosol generation assembly (3) is configured to automatically activate for diffusing said second aerosol after a chosen or predetermined number of successive user's suctions.

3. An aerosol generation device according to claim 1, wherein said second aerosol generation assembly (3) is configured to automatically activate for diffusing said second aerosol at the same time as said first aerosol generation assembly (2) or after said first aerosol generation assembly (2) has been activated for diffusing said first aerosol.

4. An aerosol generation device according to claim 1, wherein said second aerosol generation assembly (3) is configured for being manually activated by said user for diffusing said second aerosol.

5. An aerosol generation device according to any one of claims 1 to 4, wherein it comprises an external casing (15) housing encompassing at least a part of said second aerosol generation assembly (3).

6. An aerosol generation device according to any one of claims 1 to 4, wherein it comprises an external casing (15) to which said second aerosol generation assembly (3) is attached.

7. An aerosol generation device according to claim 5 or 6, wherein said second aerosol generation assembly (3) comprises an exchangeable cartridge (25) comprising at least one second aerosol-forming substance, or an exchangeable cartomizer comprising a cartridge comprising at least one second aerosol-forming substance.

8. An aerosol generation device according to any one of claims 1 to 7, wherein said second aerosol generation assembly (3) comprises at least two second aerosol outlets (18), and wherein it comprises a controller (16, 19) arranged for controlling selectively access to said second aerosol outlets (18) to control the diffusion of said second aerosol spatially and/or in intensity into said surroundings.

9. An aerosol generation device according to any one of claims 1 to 7, wherein said second aerosol generation assembly (3) comprises at least two different second aerosol-forming substances and at least two second aerosol outlets (18) associated respectively with said second aerosol-forming substances, and wherein it comprises a controller (16, 19) arranged for controlling selectively access to said second aerosol outlets (18) to control diffusion of different sec-

ond aerosols, generated respectively from said second aerosol-forming substances, into said surroundings.

10. An aerosol generation device according to any one of claims 1 to 9, wherein said second aerosol generation assembly (3) comprises at least one porous material (24) impregnated with a second aerosol-forming substance and arranged for releasing said second aerosol from said impregnated second aerosol-forming substance when it is heated to a temperature greater than a threshold.

11. An aerosol generation device according to any one of claims 1 to 10, wherein said first (2) and second (3) aerosol generation assemblies have respectively first (13) and second (26) heaters controlled separately and arranged for heating respectively first and second aerosol-forming substances for generating respectively said first and second aerosols.

12. An aerosol generation device according to any one of claims 1 to 10, wherein said first aerosol generation assembly (2) has a heater (13) arranged for heating first and second aerosol-forming substances for generating respectively said first and second aerosols.

13. An aerosol generation device according to claim 12, wherein said heater (13) is arranged for heating said first and second aerosol-forming substances respectively to first and second temperatures.

14. An aerosol generation device according to any one of claims 1 to 9, wherein said second aerosol generation assembly (3) comprises an ultrasonic vibrating element configured to change said second aerosol-forming substance into said second aerosol.

15. An aerosol generation device according to any one of claims 1 to 14, wherein said first aerosol generation assembly (2) comprises a controller (16) arranged for controlling generation of said first and second aerosols, or said first (2) and second (3) aerosol generation assemblies comprise respectively first (16) and second (19) controllers arranged for controlling respectively generation of said first and second aerosols.

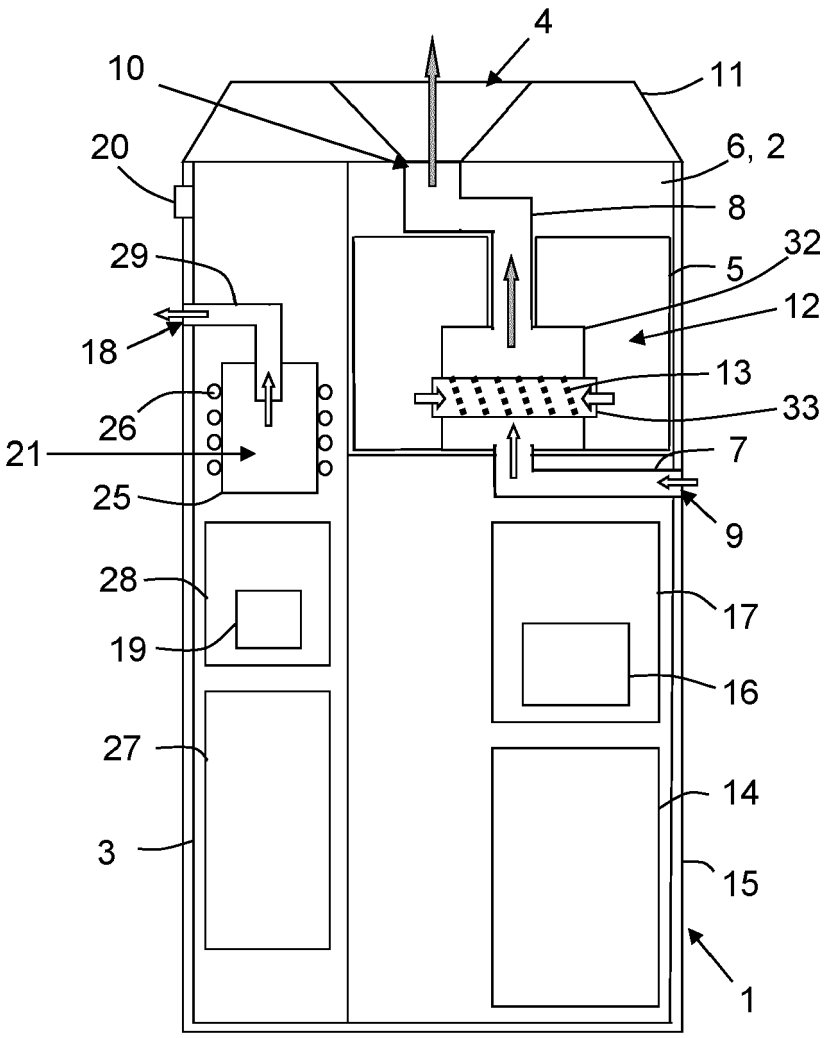

FIG.1

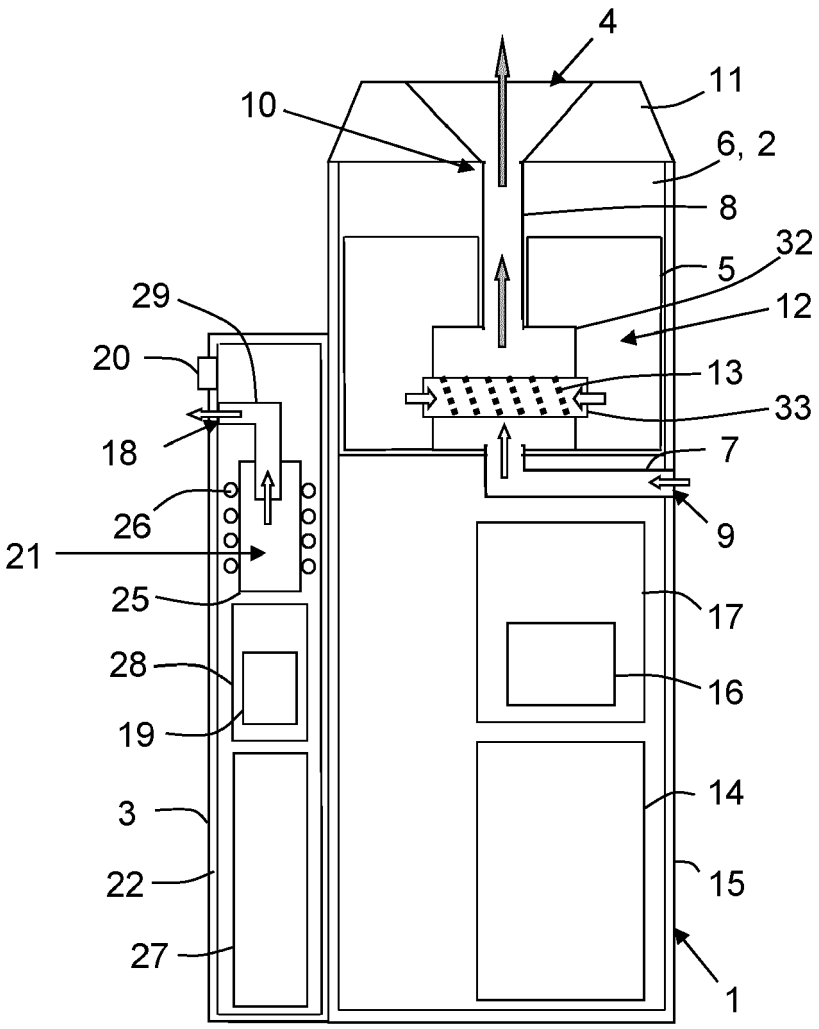

FIG.2

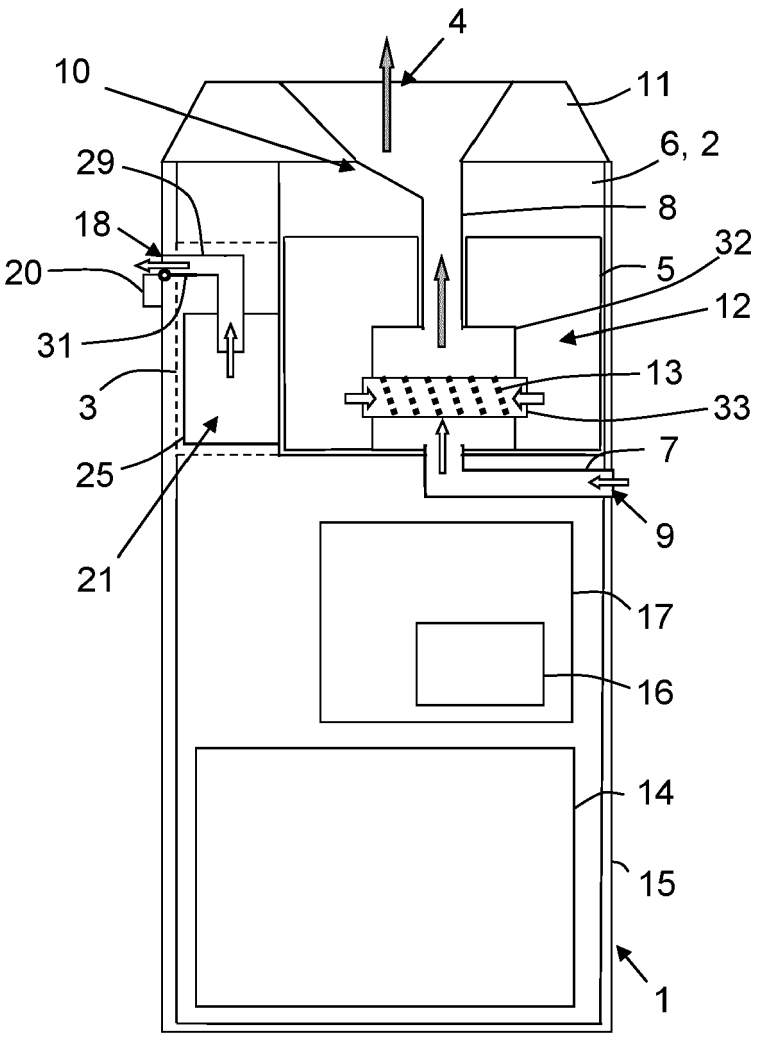

FIG.3

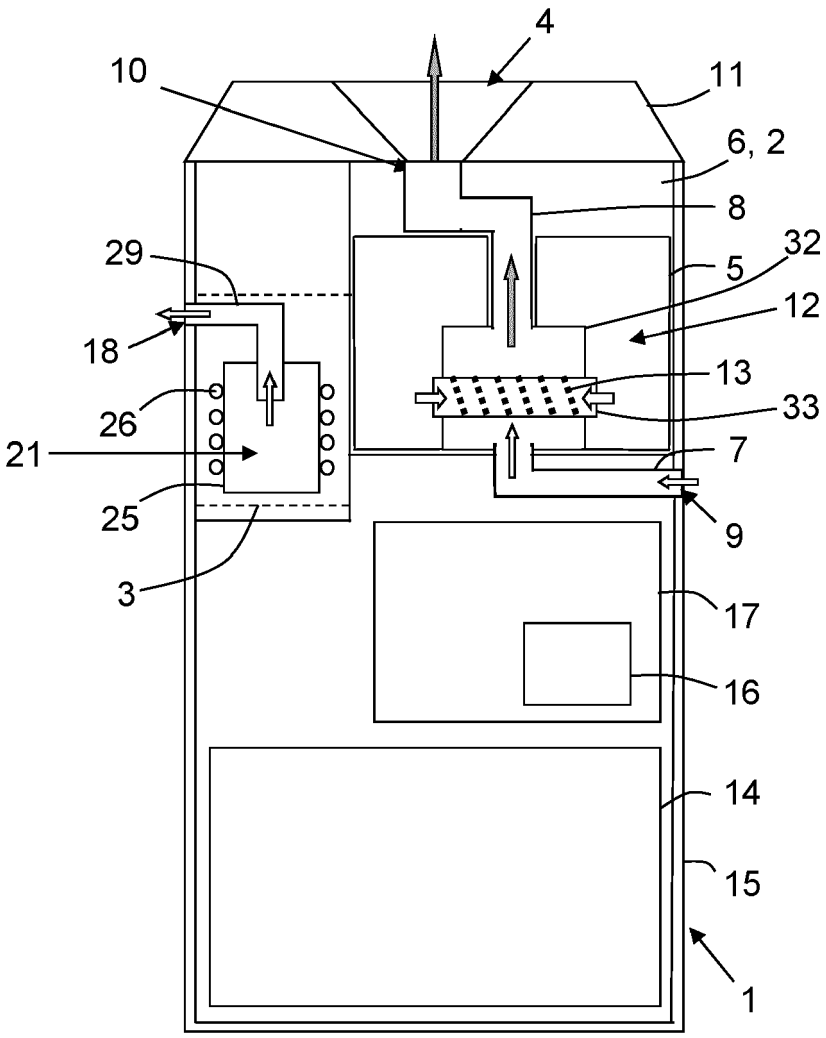

FIG.4

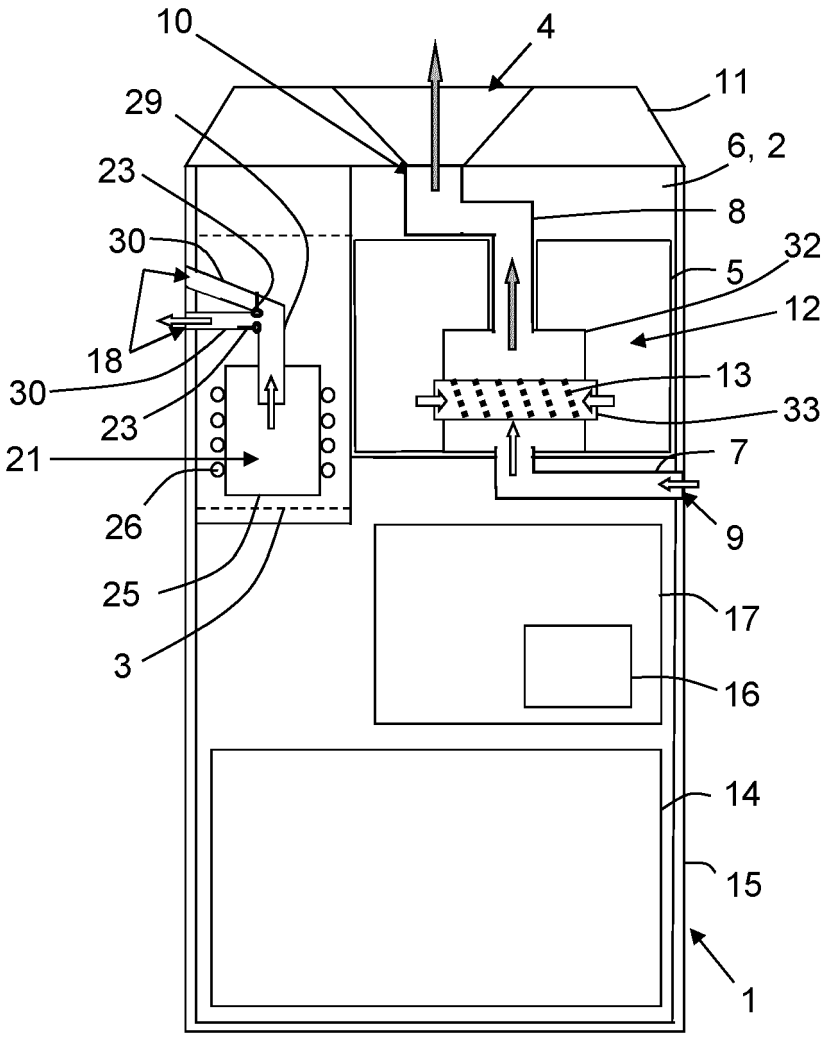

FIG.5

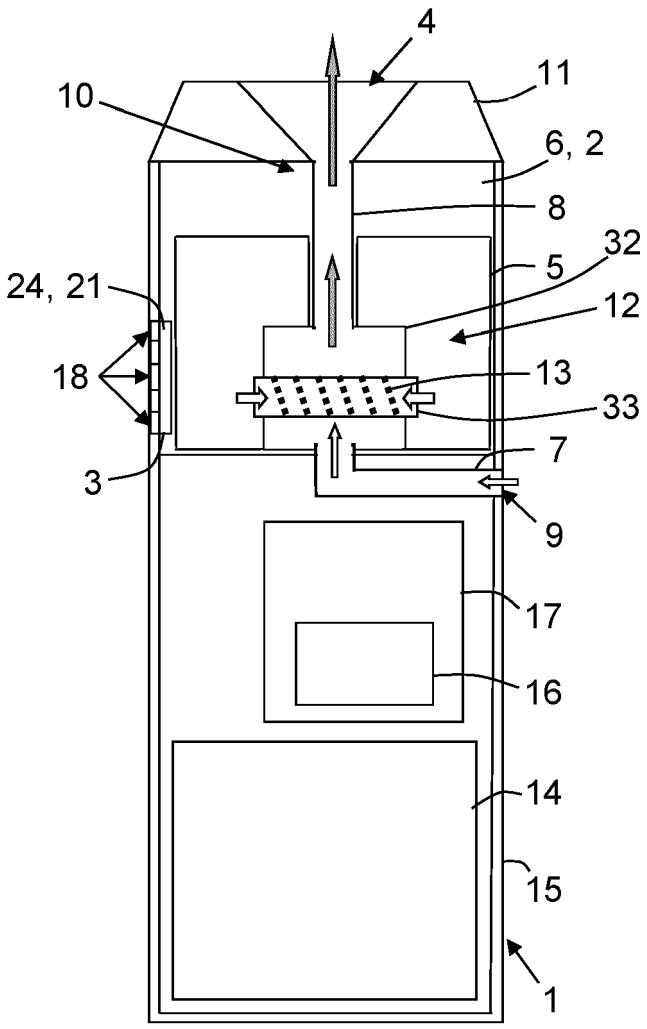

FIG.6

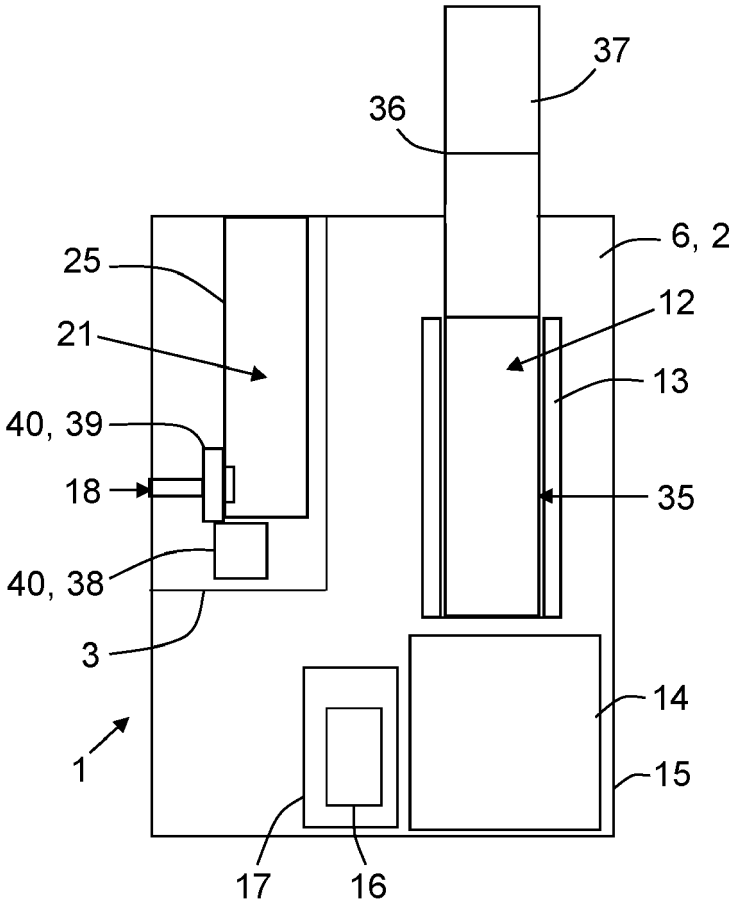

FIG.7

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Application Number
EP 21 20 9839

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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	6 April 2022	Cardan, Cosmin

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