SUMMARY

[0004] For purposes of summarizing, certain aspects, advantages, and novel features have been described herein. It is to be understood that not all such advantages may be achieved in accordance with any one particular embodiment. Thus, the disclosed subject matter may be embodied or carried out in a manner that achieves or optimizes one advantage or group of advantages without achieving all advantages as may be taught or suggested herein. The various features and items described herein may be incorporated together or separable, except as would not be feasible based on the current disclosure and what a skilled artisan would understand from it.

[0004a] According to an aspect, there is disclosed a vaporizer including: a reservoir configured to contain a liquid vaporizable material, the reservoir at least partially defined by at least one wall, the reservoir comprising a storage chamber and an overflow volume; and a collector disposed in the overflow volume, the collector comprising a capillary structure configured to retain a volume of the liquid vaporizable material in fluid contact with the storage chamber, the capillary structure comprising a microfluidic feature configured to prevent air and liquid from bypassing each other during filling and emptying of the collector, wherein the capillary structure comprises a secondary passageway comprising the microfluidic feature, and wherein the secondary passageway comprises a plurality of spaced-apart constriction points having a smaller cross-sectional area than parts of the secondary passageway between the constriction points.

[0005] Disclosed herein is a vaporizer including a reservoir configured to contain a liquid vaporizable material. The reservoir is at least partially defined by at least one wall, and the reservoir includes a storage chamber and an overflow volume. The vaporizer further includes a collector disposed in the overflow volume. The collector includes a capillary structure configured to retain a volume of the liquid vaporizable material in fluid contact with the storage chamber. The capillary structure includes a microfluidic feature configured to prevent air and liquid from bypassing each other during filling and emptying of the collector.

[0006] In an embodiment, a microfluidic gate for controlling flow of liquid vaporizable material between a storage chamber and an adjoining overflow volume in a vaporizer includes a plurality of openings connecting the storage chamber and the collector and a pinch-off point between the plurality of openings. The plurality of openings includes a first channel and a second channel. The first channel has a higher capillary drive than the second channel. Optionally, the microfluidic gate may include a rim of an aperture between the storage chamber

and the collector that is flatter on a first side facing the storage compartment than a second, more rounded, side facing the collector.

[0007] In another embodiment, a collector configured for insertion into a vaporizer cartridge includes a capillary structure configured to retain a volume of the liquid vaporizable material in fluid contact with a storage chamber of the vaporizer cartridge. The capillary structure includes a microfluidic feature configured to prevent air and liquid from bypassing each other during filling and emptying of the collector.

[0008] In optional variations, one or more of the following features may also be included in any feasible combination. For example, a primary passageway may be included to provide a fluid connection between the storage chamber and an atomizer configured to convert the liquid vaporizable material to a gas-phase state. The primary passageway may be formed through a structure of the collector.

[0009] The primary passageway may include a first channel configured to allow for the liquid vaporizable material to flow from the storage chamber toward a wicking element in the atomizer. The first channel may have a cross-sectional shape with at least one irregularity configured to allow liquid in the first channel to bypass an air bubble blocking a remainder of the first channel. The cross-sectional shape may resembles a cross. The capillary structure may include a secondary passageway that includes the microfluidic feature, and the microfluidic feature may be configured to allow the liquid vaporizable material to move along a length of the secondary passageway only with a meniscus fully covering a cross-sectional area of the secondary passageway. The cross-sectional area may be sufficiently small that, for a material from which walls of the secondary passageway are formed and a composition of the liquid vaporizable material, the liquid vaporizable material preferentially wets the secondary passageway around an entire perimeter of the secondary passageway.

[0010] The storage chamber and the collector may be configured to maintain a continuous column of the liquid vaporizable material in the collector in contact with the liquid vaporizable material in the storage chamber such that a reduction in pressure in the storage chamber relative to ambient pressure causes the continuous column of the liquid vaporizable material in the collector to be at least partially drawn back into the storage chamber. The secondary passageway may include a plurality of spaced-apart constriction points having a smaller cross-sectional area than parts of the secondary passageway between the constriction points. The constriction points may have a flatter surface directed along the secondary passageway toward the storage compartment and a rounder surface directed along the secondary passageway away from the storage compartment.

[0011] A microfluidic gate may be positioned between the collector and the storage compartment. The microfluidic gate may include a rim of an aperture between the storage chamber and the collector that is flatter on a first side facing the storage compartment than a second, more rounded, side facing the collector. The microfluidic gate may include a plurality of openings connecting the storage chamber and the collector and a pinch-off point between the plurality of openings. The plurality of openings may include a first channel and a second channel, wherein the first channel has a higher capillary drive than the second channel. An air-liquid vaporizable material meniscus reaching the pinch-off point may be routed to the second channel due to the higher capillary drive in the first channel such that an air bubble is formed to escape into the liquid vaporizable material in the storage chamber.

[0012] The liquid vaporizable material may include one or more of propylene glycol and vegetable glycerin.

[0013] A collector may include a primary passageway providing a fluid connection between the reservoir and an atomizer configured to convert the liquid vaporizable material to a gas-phase state, wherein the primary passageway is formed through a structure of the collector. In optional variations, the capillary structure may include a secondary passageway comprising the microfluidic feature, and the microfluidic feature may be configured to allow the liquid vaporizable material to move along a length of the secondary passageway only with a meniscus fully covering a cross-sectional area of the secondary passageway. The cross-sectional area may be sufficiently small that, for a material from which walls of the secondary passageway are formed and a composition of the liquid vaporizable material, the liquid vaporizable material preferentially wets the secondary passageway around an entire perimeter of the secondary passageway. The storage chamber and the collector may be configured to maintain a continuous column of the liquid vaporizable material in the collector in contact with the liquid vaporizable material in the storage chamber such that a reduction in pressure in the storage chamber relative to ambient pressure causes the continuous column of the liquid vaporizable material in the collector to be at least partially drawn back into the storage chamber. The secondary passageway may include a plurality of spaced-apart constriction points having a smaller cross-sectional area than parts of the secondary passageway between the constriction points. The constriction points may have a flatter surface directed along the secondary passageway toward the storage compartment and a rounder surface directed along the secondary passageway away from the storage compartment.

[0014] Disclosed herein is a vaporizer cartridge including a cartridge housing, a storage chamber disposed within the cartridge housing and configured to contain a liquid vaporizable

material, an inlet configured to allow air to enter an internal airflow path within the cartridge housing, an atomizer configured to cause conversion of at least some of the liquid vaporizable material to an inhalable state, a collector as described in the preceding aspect.

[0015] In optional variations, such a vaporizer cartridge may include one or more features as described herein, such as for example a wicking element positioned within the internal airflow path and in fluid communication with the reservoir. The wicking element may be configured to draw the liquid vaporizable material from the storage chamber under capillary action. A heating element may be positioned to cause heating of the wicking element to result in conversion of at least some of the liquid vaporizable material drawn from the storage chamber to a gaseous state. The inhalable state may include an aerosol formed by condensation of at least some of the liquid vaporizable material from the gaseous state. The cartridge housing may include a monolithic hollow structure having a first, open end, and a second end opposite the first end. The collector may be insertably received within the first end of the monolithic hollow structure.

[0016] Disclosed herein is a reservoir for a cartridge usable with a vaporizer device is provided. In one embodiment, the reservoir comprises a storage chamber (e.g., a reservoir) for storing vaporizable material, as well as an overflow volume separable from the storage chamber and in communication with the storage chamber via a vent leading to a passageway in the overflow volume.

[0017] The passageway in the overflow volume may lead to a port connected to ambient air. The storage chamber or the reservoir may also include a first wick feed, and optionally a second wick feed, implemented respectively in the form of a first cavity and a second cavity going through a collector placed inside the cartridge. The collector may include one or more supporting structures which form the passageway in the overflow volume. The first and second cavities may control flow of the vaporizable material toward a wick housing configured to receive a wicking element.

[0018] The wicking element positioned in the wick housing or the wicking element housing may be configured to absorb the vaporizable material traveling through the first and second wick feeds such that, in thermal interaction with an atomizer, the vaporizable material absorbed in the wicking element is converted to at least one of vapor or aerosol and flowing through an exit tunnel structure formed through the collector and the storage chamber to reach an opening in the mouthpiece. The mouthpiece may be formed proximate to the storage chamber.

[0019] The collector may have a first end and a second end. The first end may be coupled to the opening in the mouthpiece and the second end, opposite to the first end, may be

configured to house a wick or wicking element. A wick housing in accordance with certain embodiments may include a set of prongs projecting outward from the second end to at least partially receive the wicking element, and one or more compression ribs positioned in the proximity of the first or second wick feeds and extending from the second end of the collector to compress the wicking element.

[0020] In yet another embodiment, a vent may be provided to maintain an equilibrium pressure state in the cartridge's storage chamber and to prevent pressure in the storage chamber from increasing to a point that would cause the vaporizable material to flood the wick housing. The equilibrium pressure state may be maintained by way of establishing a liquid seal at the opening of the vent positioned at a point where the storage chamber communicates with a passageway in an overflow volume in the cartridge. The liquid seal is established and maintained at the vent by maintaining sufficient capillary pressure for the vaporizable material menisci to be formed at a portion of the vent leading to the passageway in the overflow volume.

[0021] The capillary pressure for the vaporizable material menisci may be controlled by, for example, venting structures that form a primary channel and a secondary channel that effectively construct a fluidic valve to control at least a pinch-off point at one of the primary channel or the secondary channel. Depending on implementation, the primary channel and the secondary channel may have tapered geometries such that, as the menisci continue to recede, a capillary drive of the primary channel decreases at a greater rate than that of the capillary drive of the secondary channel. A gradual reduction in the capillary drives of the primary and the secondary channels reduces the partial headspace vacuum maintained in the storage chamber.

[0022] In yet another embodiment, the drain pressure of the primary channel drops below the drain pressure of the secondary channel as a result of the gradual reduction in the capillary drives of the primary and the secondary channels in relation to one another. The meniscus in the primary channel continues to drain when the drain pressure of the primary channel changes, while the meniscus in the secondary channel remains static. The drain pressure involving receding contact angle of the primary channel may drop below the flooding pressure involving advancing contact angle of the secondary channel, causing the primary and secondary channels to fill with vaporizable material.

[0023] Accordingly, in response to an increased pressure state inside the storage chamber, vaporizable material flows into the collector's passageway (i.e., the overflow volume) through the vent, wherein the vent is constructed to maintain a liquid seal at the pinch-off point, desirably, at all times. In certain embodiments, the vent is constructed to promote a liquid seal

at the opening from which vaporizable material flows between the reservoir's storage chamber and the collector's passageway in the overflow volume.

[0024] In yet another embodiment, one or more wick feed channels may be implemented to control the direct flow of the vaporizable material toward the wick. A first wick feed channel may be formed through the collector positioned in the overflow volume and independent of the primary and secondary channels of the control valve noted above. The collector may include a supporting structure that forms the first channel or additional wick feed channels. The wick may be positioned in the wick housing such that the wick is configured to absorb the vaporizable material traveling through the first channel. Depending on implementation, the first channel may have a cross shaped cross-section or have a partial dividing wall. The shape of the first channel may provide for one or more non-primary sub-channels and one or more primary sub-channels that are larger in diameter in comparison to the non-primary sub-channels.

[0025] Depending on implementation, when a primary sub-channels or non-primary sub-channel is restricted or plugged (e.g., due to air bubble formation), vaporizable material may travel through an alternate sub-channel or primary channel. In a cross-shaped wick feed, a primary sub-channel may extend through the center of the cross-shaped wick feed. When the primary sub-channel is restricted due to the formation of a gas bubble in a portion of the primary sub-channel, vaporizable material flows through at least one of the non-primary sub-channels.

[0026] In some embodiments, the collector may have a first end and a second end, the first end facing the storage chamber and the second end facing away from the storage chamber and being configured to include the wick housing. A second wick feed may be implemented in the form of a second channel to allow for the vaporizable material stored in the storage chamber to flow toward the wick simultaneously as the vaporizable material flows through the first wick feed. The second wick feed may have a cross-shaped cross-sectional.

[0027] In accordance with one or more embodiments, a reservoir for a cartridge usable with a vaporizer device may comprise a storage chamber configured to contain vaporizable material. The reservoir may be in an operational relationship with an atomizer configured to convert the vaporizable material from a liquid phase to a vapor or aerosol phase for inhalation by a user of the vaporizer device. The cartridge may also include an overflow volume for retaining at least some portion of the vaporizable material, for example, when one or more factors cause the vaporizable material in the reservoir chamber to travel into the overflow volume in the cartridge.

[0028] The one or more factors may include the cartridge being exposed to a pressure state, which is different than an earlier ambient pressure state (e.g., by going from a first pressure state to a second pressure state). In some aspects, the overflow volume may include a passageway that connects to an opening or air control port leading to the exterior of the cartridge (i.e., to ambient air). The passageway in the overflow volume may also be in communication with the reservoir chamber such that the passageway may act as an air vent to allow equalization of pressure in the reservoir chamber. In response to a negative pressure event in the cartridges ambient environment, vaporizable material may be drawn from the reservoir chamber to the atomizer and converted to vapor or aerosol phases, reducing the volume of the vaporizable material remaining in the reservoir's storage chamber.

[0029] The storage chamber may be coupled to the overflow volume by way of one or more openings between the storage chamber and the overflow volume, for example, such that the one or more openings lead to one or more passageways through the overflow volume. The flow of the vaporizable material into the passageway via the opening may be controllable by way of capillary properties of a fluidic vent leading to the one or more passageways or the capillary properties of the passageways themselves. Furthermore, the flow of the vaporizable material into the one or more passageways may be reversible, allowing for the vaporizable material to be displaced from the overflow volume back into the reservoir chamber.

[0030] In at least one embodiment, flow of the vaporizable material may be reversed, in response to change in pressure state (e.g., when a second pressure state in the cartridge reverts back to a first pressure state). The second pressure state may be associated with a negative pressure event. A negative pressure event may be the result of a drop in ambient pressure relative to that of one or more volumes of air retained within the reservoir chamber or other part of the cartridge. Alternatively, a negative pressure event may result from the compression of an internal volume of the cartridge due to mechanical pressure on one or more outer surfaces of the cartridge.

[0031] A heating element may include a heating portion and at least two legs. The heating portion may include at least two tines spaced apart from one another. The heating portion may be preformed to define an interior volume configured to receive the wicking element such that the heating portion secures at least a portion of the wicking element to the heating element. The heating portion may be configured to contact at least two separate surfaces of the wicking element. The at least two legs may be coupled to the at least two tines and spaced apart from the heating portion. The at least two legs may be configured to electrically communicate with a power source. Power is configured to be supplied to the heating portion from the power

source to generate heat, thereby vaporizing the vaporizable material stored within the wicking element.

[0032] In some embodiments, the at least two legs includes four legs. In some embodiments, the heating portion is configured to contact at least three separate surfaces of the wicking element.

[0033] In some embodiments, the at least two tines includes a first side tine portion, a second side tine portion opposing the first side tine portion, and a platform tine portion connecting the first side tine portion with the second side tine portion. The platform tine portion may be positioned approximately perpendicular to a portion of the first side tine portion and the second side tine portion. The first side tine portion, the second side tine portion, and the platform tine portion defines the interior volume in which the wicking element is positioned. In some embodiments, the at least two legs are located away from the heating portion by a bridge.

[0034] In some embodiments, each of the at least two legs includes a cartridge contact positioned at an end of each of the at least two legs. The cartridge contact may electrically communicate with the power source. The cartridge contact may be angled and extend away from the heating portion.

[0035] In some embodiments, the at least two tines includes a first pair of tines and a second pair of tines. In some embodiments, the tines of the first pair of tines are evenly spaced from one another. In some embodiments, the tines of the first pair of tines are spaced apart by a width. In some embodiments, the width is greater at an inner region of the heating element adjacent the platform tine portion than the width at an outer region of the heating element adjacent an outer edge of the first side tine portion opposite the inner region.

[0036] In some embodiments, the vaporizer device is configured to measure a resistance of the heating element at each of the four legs to control a temperature of the heating element. In some embodiments, the heating element includes a heat shield configured to insulate the heating portion from a body of the vaporizer device.

[0037] In some embodiments, the vaporizer device further includes a heat shield configured to surround at least a portion of the heating element and insulate the heating portion from a body of a wick housing configured to surround at least a portion of the wicking element and the heating element.

[0038] In some embodiments, the heating portion is folded between the heating portion and the at least two legs to isolate the heating portion from the at least two legs. In some embodiments, the heating portion further includes at least one tab that extends from a side of the at least two tines to allow for easier entry of the wicking element to the interior volume of

the heating portion. In some embodiments, the at least one tab extends away from the interior volume at an angle.

[0039] In some embodiments, the at least two legs includes a capillary feature. The capillary feature may cause an abrupt change in capillary pressure to thereby prevent the vaporizable material from flowing beyond the capillary feature. In some embodiments, the capillary feature comprises one or more bends in the at least two legs. In some embodiments, the at least two legs extend at an angle towards the interior volume of the heating portion, the angled at least two legs defining the capillary feature.

[0040] In some embodiments, a vaporizer device includes a reservoir containing vaporizable material, a wicking element in fluid communication with the reservoir, and a heating element. The heating element includes a heating portion and at least two legs. The heating portion may include at least two tines spaced apart from one another. The heating portion may be preformed to define an interior volume configured to receive the wicking element such that the heating portion secures at least a portion of the wicking element to the heating element. The heating portion may be configured to contact at least two separate surfaces of the wicking element. At least two legs may be coupled to the at least two tines and spaced apart from the heating portion. The at least two legs may be configured to electrically communicate with a power source. Power is configured to be supplied to the heating portion from the power source to generate heat, thereby vaporizing the vaporizable material stored within the wicking element.

[0041] Disclosed herein is method of forming an atomizer assembly for a vaporizer device which include securing a wicking element to an interior volume of a heating element. The heating element may include a heating portion comprising at least two tines spaced apart from one another, and at least two legs spaced from the heating portion. The legs may be configured to electrically communicate with a power source of the vaporizer device. The heating portion is configured to contact at least two surfaces of the wicking element. The method may also include coupling the heating element to a wick housing configured to surround at least a portion of the wicking element and the heating element. The securing may also include sliding the wicking element into the interior volume of the heating element.

[0042] In some embodiments, a vaporizer device includes a heating portion comprising one or more heater traces integrally formed and spaced apart from one another, the one or more heater traces configured to contact at least a portion of a wicking element of the vaporizer device, a connecting portion configured to receive power from a power source and direct the power to the heating portion, and a plating layer having a plating material that is different from a material of the heating portion. The plating layer may be configured to reduce contact

resistance between the heating element and the power source, thereby localizing heating of the heating element to the heating portion.

[0043] In certain embodiments of the current subject matter, challenges associated with condensate collecting along one or more internal channels and outlets (e.g., along a mouthpiece) of some vaporizer devices can be addressed by inclusion of one or more of the features described herein or comparable/equivalent approaches as would be understood by one of ordinary skill in the art. Aspects of the current subject matter relate to systems and methods for capturing vaporizable material condensate in a vaporizer device.

[0044] In some variations, one or more of the following features may optionally be included in any feasible combination.

[0045] Disclosed herein is a cartridge for a vaporizer device. The cartridge may include a reservoir including a reservoir chamber defined by a reservoir barrier. The reservoir may be configured to contain a vaporizable material in the reservoir chamber. The cartridge may include a vaporization chamber in communication with the reservoir and may include a wicking element configured to draw the vaporizable material from the reservoir chamber to the vaporization chamber to be vaporized by a heating element. The cartridge may include an airflow passageway that extends through the vaporization chamber. The cartridge may include at least one capillary channel adjacent the airflow passageway. Each capillary channel of the at least one capillary channel may be configured to receive a fluid and direct the fluid from a first location toward a second location via capillary action.

[0046] In one embodiment, each capillary channel of the at least one capillary channel may taper in size. The taper in size may result in an increase in capillary drive through each capillary channel of the at least one capillary channel. Each capillary channel of the at least one capillary channel may be formed by a groove defined between a pair of walls. The at least one capillary channel may fluidly communicates with a wick. The first location may be adjacent an end of the airflow passageway and a mouthpiece. The at least one capillary channel may collect a fluid condensate.

[0047] In an embodiment, a vaporizer device may include a vaporizer body including a heating element configured to heat a vaporizable material. The vaporizer device may include a cartridge configured to be releasably coupled to the vaporizer body. The cartridge may include a reservoir including a reservoir chamber defined by a reservoir barrier. The reservoir may be configured to contain the vaporizable material in the reservoir chamber. The cartridge may include a vaporization chamber in communication with the reservoir and may include a wicking element configured to draw the vaporizable material from the reservoir chamber to the vaporization chamber to be vaporized by the heating element. The cartridge may include an

airflow passageway that extends through the vaporization chamber. The cartridge may include at least one capillary channel adjacent the airflow passageway. Each capillary channel of the at least one capillary channel may be configured to receive a fluid and direct the fluid from a first location toward a second location via capillary action.

[0048] Each capillary channel of the at least one capillary channel may taper in size. The taper in size may result in an increase in capillary drive through each capillary channel of the at least one capillary channel. Each capillary channel of the at least one capillary channel may be formed by a groove defined between a pair of walls. The at least one capillary channel may fluidly communicates with a wick. The first location may be adjacent an end of the airflow passageway and a mouthpiece. The at least one capillary channel may collect a fluid condensate.

[0049] Disclosed herein is a method of a cartridge of a vaporization device which include collecting a condensate in a first capillary channel of at least one capillary channel of the cartridge. Each of the at least one capillary channel may be configured to receive a fluid and direct the fluid from a first location toward a second location via capillary action. The cartridge may include a reservoir including a reservoir chamber defined by a reservoir barrier. The reservoir may be configured to contain a vaporizable material in the reservoir chamber. The cartridge may include a vaporization chamber in communication with the reservoir and may include a wicking element configured to draw the vaporizable material from the reservoir chamber to the vaporization chamber to be vaporized by a heating element. The cartridge may include an airflow passageway that may extend through the vaporization chamber. The at least one capillary channel may be adjacent the airflow passageway. The method may include directing the collected condensate towards the vaporization chamber and along the first capillary channel.

[0050] The method may include vaporizing, at the vaporization chamber, the collected condensate. The first capillary channel may taper in size. Each capillary channel of the at least one capillary channel may be formed by a groove defined between a pair of walls. The at least one capillary channel may fluidly communicates with a wick. The first location may be adjacent an end of the airflow passageway and a mouthpiece.

[0051] The details of one or more variations of the subject matter described herein are set forth in the accompanying drawings and the description below. Other features and advantages of the subject matter described herein will be apparent from the description and drawings, and from the claims. The disclosed subject matter is not, however, limited to any particular embodiment disclosed.

BRIEF DESCRIPTION OF THE DRAWINGS

[0052] The accompanying drawings, which are incorporated in and constitute a part of this specification, show certain aspects of the subject matter disclosed herein and, together with the description, help explain some of the principles associated with the disclosed implementations as provided below.

[0053] FIG. 1 illustrates a block diagram of an example vaporizer device, in accordance with one or more implementations;

[0054] FIG. 2A illustrates a planar view of an example vaporizer body and insertable vaporizer cartridge, in accordance with one or more implementations;

[0055] FIG. 2B shows a perspective view of the vaporizer device of FIG. 2A, in accordance with one or more implementations;

[0056] FIG. 2C shows a perspective view of the cartridge of FIG. 2A, in accordance with one or more implementations;

[0057] FIG. 2D shows another perspective view of the cartridge of FIG. 2C, in accordance with one or more implementations;

[0058] FIG. 2E illustrates a diagram of a reservoir system configured for a vaporizer cartridge and/or vaporizer device for improving airflow in the vaporizer device, in accordance with one or more implementations;

[0059] FIG. 2F illustrates a diagram of a reservoir system configured for a vaporizer cartridge or vaporizer device for improving airflow in the vaporizer device, in accordance with another implementation;

CLAIMS

1. A vaporizer comprising:

a reservoir configured to contain a liquid vaporizable material, the reservoir at least partially defined by at least one wall, the reservoir comprising a storage chamber and an overflow volume; and

a collector disposed in the overflow volume, the collector comprising a capillary structure configured to retain a volume of the liquid vaporizable material in fluid contact with the storage chamber, the capillary structure comprising a microfluidic feature configured to prevent air and liquid from bypassing each other during filling and emptying of the collector, wherein the capillary structure comprises a secondary passageway comprising the microfluidic feature, and wherein the secondary passageway comprises a plurality of spaced-apart constriction points having a smaller cross-sectional area than parts of the secondary passageway between the constriction points.

2. The vaporizer of claim 1, further comprising a primary passageway providing a fluid connection between the storage chamber and an atomizer configured to convert the liquid vaporizable material to a gas-phase state.

3. The vaporizer of claim 2, wherein the primary passageway is formed through a structure of the collector.

4. The vaporizer of any of claims 2 or 3, wherein the primary passageway comprises a first channel configured to allow for the liquid vaporizable material to flow from the storage chamber toward a wicking element in the atomizer, the first channel having a cross-sectional shape with at least one irregularity configured to allow liquid in the first channel to bypass an air bubble blocking a remainder of the first channel.

5. The vaporizer of claim 4, wherein the cross-sectional shape resembles a cross.

6. The vaporizer of any preceding claim, wherein the microfluidic feature is configured to allow the liquid vaporizable material to move along a length of the secondary passageway only with a meniscus fully covering a cross-sectional area of the secondary passageway.

7. The vaporizer of claim 6, wherein the cross-sectional area is sufficiently small that, for a material from which walls of the secondary passageway are formed and a composition of the liquid vaporizable material, the liquid vaporizable material preferentially wets the secondary passageway around an entire perimeter of the secondary passageway.

8. The vaporizer of any preceding claim, wherein the storage chamber and the collector are configured to maintain a continuous column of the liquid vaporizable material in the collector in contact with the liquid vaporizable material in the storage chamber such that a reduction in pressure in the storage chamber relative to ambient pressure causes the continuous column of the liquid vaporizable material in the collector to be at least partially drawn back into the storage chamber.

9. The vaporizer of any preceding claim, wherein the constriction points have a flatter surface directed along the secondary passageway toward the storage chamber and a rounder surface directed along the secondary passageway away from the storage chamber.

10. The vaporizer of any preceding claim, further comprising a microfluidic gate between the collector and the storage chamber, the microfluidic gate comprising a rim of an aperture between the storage chamber and the collector that is flatter on a first side facing the storage chamber than a second, more rounded, side facing the collector.

11. The vaporizer of claim 10, wherein the microfluidic gate comprises a plurality of openings connecting the storage chamber and the collector and a pinch-off point between the plurality of openings, the plurality of openings comprising a first channel and a second channel, wherein the first channel has a higher capillary drive than the second channel.

12. The vaporizer of claim 11, wherein a meniscus of a liquid vaporizable material-air interface reaching the pinch-off point is routed to the second channel due to the higher capillary drive in the first channel such that an air bubble is formed to escape into the liquid vaporizable material in the storage chamber.

13. The vaporizer of any preceding claim, wherein the liquid vaporizable material comprises one or more of propylene glycol and vegetable glycerin.