CLAIMS

1. An aerosol delivery unit for selectively delivering a dose of aerosolized matter, the aerosol delivery unit comprising:

a base housing;

a canister at least partially received in the base housing, the canister containing matter to be aerosolized and including a valve stem that defines a portion of a discharge passageway extending from a discharge valve outlet of the canister to an inhalation passageway provided within the base housing;

a mouthpiece aperture in fluid communication with the inhalation passageway through which the aerosolized matter is discharged during an inhalation event; and

a desiccant chamber containing a desiccant material, the desiccant chamber being in fluid communication with the discharge passageway at least when the aerosol delivery unit is in a storage configuration.

2. The aerosol delivery unit of claim 1 wherein the valve stem includes an aperture in a side thereof, and wherein, when the valve stem is in an expanded position, the discharge passageway is in fluid communication with the desiccant chamber via the aperture in the side of the valve stem.

3. The aerosol delivery unit of claim 1 wherein the discharge passageway is in fluid communication with the desiccant chamber via a discharge orifice through which aerosolized matter passes from the discharge passageway to the inhalation passageway during use.

4. The aerosol delivery unit of claim 1 wherein the discharge passageway is in fluid communication with the desiccant chamber via a passageway formed in a valve stem block in which the valve stem of the canister is received during use.

~~5. The aerosol delivery unit of claim 1 wherein the desiccant chamber is defined at least in part by a portion of the base housing.~~

~~6. The aerosol delivery unit of claim 1, further comprising:~~

~~a desiccant housing attached to the canister, the desiccant housing and the canister collectively defining the desiccant chamber within which the desiccant material is contained.~~

~~7. The aerosol delivery unit of the preceding claim wherein the canister is removably installable in the desiccant housing and a canister seal is positioned between the desiccant housing and the canister to assist in at least partially isolating the desiccant chamber from an external environment of the aerosol delivery unit.~~

~~8. The aerosol delivery unit of one of the two preceding claims wherein the desiccant housing includes a stem seal formed integrally therewith through which the valve stem extends, the stem seal assisting in at least partially isolating the desiccant chamber from an external environment of the aerosol delivery unit.~~

~~9. The aerosol delivery unit of one of the three preceding claims wherein a valve stem block is provided in the base housing, and wherein the canister and the desiccant housing form a cartridge that is removably installable in the base housing with the valve stem engaging the valve stem block.~~

~~10. The aerosol delivery unit of the preceding claim wherein, when the cartridge is installed, the desiccant material extends from a location above a discharge orifice of the valve stem block through which the aerosolized matter is ejected during use to a location below the discharge orifice.~~

~~11. The aerosol delivery unit of any one of the preceding claims wherein the desiccant material is an annular or semi-annular molded component.~~

~~12. The aerosol delivery unit of any one of the preceding claims wherein the desiccant material is a semi-annular molded component, which partially encircles the valve stem and extends beyond a terminal end of the valve stem.~~

~~13. The aerosol delivery unit of any one of the eight preceding claims wherein the desiccant housing and the desiccant material are correspondingly shaped, and wherein each of the desiccant housing and the desiccant material extend beyond a terminal end of the valve stem.~~

~~14. The aerosol delivery unit of any one of the preceding claims wherein, apart from when the valve stem is depressed, the desiccant material is arranged to continuously remove moisture at least from the portion of the discharge passageway defined by the valve stem throughout the usable life of the matter contained in the canister.~~

~~15. The aerosol delivery unit of any one of the preceding claims wherein, when the valve stem is fully depressed, the desiccant chamber is isolated from the discharge passageway and an external environment of the aerosol delivery unit.~~

~~16~~1. A drug delivery device comprising:

a canister containing a drug formulation and having a discharge valve and a valve stem defining a valve stem passage through which the drug formulation is selectively discharged;

a desiccant housing attached to the canister with the valve stem extending through the desiccant housing; and

a desiccant material provided in the desiccant housing in fluid communication with the valve stem passage.

~~17~~2. The drug delivery device of the preceding claim, further comprising:

a base housing including an inhalation passageway through which the drug formulation is discharged during an inhalation event; and

a valve stem block including a discharge orifice in fluid communication with the inhalation passageway from which the drug formulation is ejected during the inhalation event after passing through the valve stem passage, and wherein the canister, the desiccant housing and the desiccant material form a cartridge that is removably installable in the base housing with the valve stem of the canister engaging the valve stem block when the cartridge is installed.

~~wherein the canister, the desiccant housing and the desiccant material form a cartridge that is removably installable in the base housing with the valve stem of the canister engaging the valve stem block when the cartridge is installed.~~

~~18~~3. The drug delivery device of the preceding claim wherein, when the cartridge is installed, the desiccant material extends from a location above the discharge orifice of the valve stem block to a location below the discharge orifice.

~~19~~4. The drug delivery device of any one of the three preceding claims wherein the valve stem of the canister includes an aperture in a side thereof, and wherein, when the valve stem is in an expanded position, the valve stem passage is in fluid communication with ~~the~~ a desiccant chamber via the aperture in the side of the valve stem.

~~20~~5. The drug delivery device of ~~any one of the four preceding claims~~claim 4 wherein the canister is removably installable in the desiccant housing and a canister seal is positioned between the desiccant housing and the canister to assist in at least partially isolating the desiccant chamber from an external environment of the drug delivery device.

~~21~~6. The drug delivery device of ~~any one of the five preceding claims~~ claim 4 or 5 wherein the desiccant housing includes a stem seal formed integrally therewith through which the valve stem extends, the stem seal assisting in at least partially isolating the desiccant chamber from an external environment of the drug delivery device.

~~22~~7. The drug delivery device of any one of the six preceding claims wherein the desiccant material is an annular or semi-annular molded component.

~~23~~8. The drug delivery device of any one of the seven preceding claims wherein the desiccant material is a semi-annular molded component, which partially encircles the valve stem and extends beyond a terminal end of the valve stem.

~~24~~9. The drug delivery device of any one of the eight preceding claims ~~claim 58~~ wherein the desiccant housing and the desiccant material are correspondingly shaped, and wherein each of the desiccant housing and the desiccant material extend beyond a terminal end of the valve stem.

~~25~~10. The drug delivery device of any one of the nine preceding claims wherein, apart from when the valve stem is depressed, the desiccant material is arranged to continuously remove moisture at least from the valve

stem passage defined by the valve stem throughout the usable life of the drug formulation contained in the canister.

~~26~~11. The drug delivery device of any one of ~~the ten preceding~~ claims 4 to 6 or any of claims 7 to 10 when dependent on claim 4 wherein, when the valve stem of the canister is fully depressed, the desiccant chamber is isolated from the valve stem passage and an external environment of the drug delivery device.

~~27~~12. ~~A~~ The drug delivery device of claim 1, further comprising:

a base housing including an inhalation passageway through which the drug formulation is discharged during an inhalation event;

a mouthpiece aperture in fluid communication with the inhalation passageway through which the aerosolized matter is discharged during an inhalation event; and

a desiccant chamber within the desiccant housing in which the desiccant material is contained, the desiccant chamber being in fluid communication with the discharge passageway at least when the aerosol delivery unit is in a storage configuration.

~~a canister assembly including a canister containing a drug formulation, a discharge valve, and a valve stem that defines a valve stem passage through which the drug formulation is selectively discharged from the canister when the discharge valve is actuated, the valve stem including an aperture in a side thereof in fluid communication with the valve stem passage for enabling the drug formulation to be discharged from the canister when the valve stem is moved from an expanded position in which the aperture is external to the canister to a depressed position; and~~

~~a seal positioned around the valve stem to cover the aperture in the side thereof when the valve stem is in the expanded position.~~

28. A method for controlling the environment within a drug delivery tract of a drug delivery apparatus, the method comprising:

discharging a dose of a drug through the drug delivery tract;

after discharging the dose, isolating at least a portion of the drug delivery tract to form an isolated environment within the drug delivery apparatus; and

desiccating the isolated environment to reduce water vapor content therein.

29. The method of the preceding claim wherein discharging the dose of the drug includes discharging a moisture sensitive formulation through the drug delivery tract, and wherein desiccating the isolated environment substantially prevents the accumulation of drug residue within the at least a portion of the drug delivery tract throughout operation of the drug delivery apparatus.

30. The method of any one of the two preceding claims wherein discharging the dose of the drug includes discharging a drug formulation through a discharge valve of an aerosol canister into the drug delivery tract.

31. The method of the preceding claim wherein isolating the at least a portion of the drug delivery tract includes sealing the at least a portion of the drug delivery tract at or downstream of a discharge orifice through which the drug formulation is dispersed after being discharged through the discharge valve of the aerosol canister.

32. The method of any one of the preceding two claims wherein discharging the dose of a drug through the drug delivery tract results from manual or automated actuation of the aerosol canister, and wherein

isolating the at least a portion of the drug delivery tract is coordinated with such actuation of the aerosol canister.

33. The method of the preceding claim, further comprising:

unsealing the at least a portion of the drug delivery tract; and

discharging a subsequent dose of the drug through the drug delivery tract,

wherein unsealing the at least a portion of the drug delivery tract is coordinated with actuation of the aerosol canister such that the delivery tract is completely unobstructed as the drug formulation passes through the drug delivery tract.

34. The method of any one of the six preceding claims wherein the at least a portion of the drug delivery tract is isolated and desiccated between each delivery of the drug to a user.

35. The method of any one of the seven preceding claims wherein desiccating the isolated environment includes desiccating the isolated environment to maintain a water vapor content therein at a level lower than that of the environment surrounding the drug delivery apparatus.

36. An aerosol delivery unit for selectively delivering a dose of aerosolized matter, the aerosol delivery unit comprising:

a base housing;

a canister at least partially received in the base housing, the canister containing matter to be aerosolized and including a valve stem that defines a portion of a discharge passageway extending from a discharge valve outlet of the canister to an inhalation passageway provided within the base housing;

~~a mouthpiece aperture in fluid communication with the inhalation passageway through which the aerosolized matter is discharged during an inhalation event;~~

~~a desiccant chamber containing a desiccant material, the desiccant chamber being in fluid communication with the discharge passageway at least when the aerosol delivery unit is in a storage configuration; and~~

13. The drug delivery device of claim 12, wherein the desiccant housing and the canister collectively define the desiccant chamber within which the desiccant material is contained.

14. The drug delivery device of claim 12, further comprising:

a seal member movable between a closed position, in which the seal member covers a discharge outlet of the discharge passageway to isolate the discharge passageway from the inhalation passageway, and an open position, in which the discharge outlet is in fluid communication with the inhalation passageway to allow the aerosolized matter to pass from the discharge passageway into the inhalation passageway for delivery to a user through the mouthpiece aperture.

~~37. The aerosol delivery unit of the preceding claim wherein the valve stem includes an aperture in a side thereof and the discharge passageway is in fluid communication with the desiccant chamber via the aperture in the side of the valve stem.~~

~~38. The aerosol delivery unit of the preceding claim, further comprising:~~

~~a desiccant housing attached to the canister, the desiccant housing and the canister collectively defining the desiccant chamber within which the desiccant material is contained.~~

39. The aerosol delivery unit of claim 36 wherein the valve stem includes an aperture in a side thereof, and the aerosol delivery unit further comprising a supplemental seal member blocking the aperture when the valve stem is in an expanded position.

40. The aerosol delivery unit of claim 36 wherein the canister is movable from an initial position to a discharge position to actuate a valve member to deliver the dose of aerosolized matter, and wherein the seal member is arranged relative to the canister to move in direct correlation with movement of the canister.

41. The aerosol delivery unit of the preceding claim wherein the unit is configured such that movement of the canister from the initial position to the discharge position is amplified to move at least a portion of the seal member a distance greater than a travel distance of the canister between the initial position and the discharge position.

42. The aerosol delivery unit of claim 36 wherein the seal member includes a static portion and a movable portion, the static portion being coupled to the valve stem of the canister and defining a portion of the discharge passageway, and the movable portion interfacing with the static portion when the seal member is in the closed position to isolate the discharge passageway from the inhalation passageway.

43. The aerosol delivery unit of claim 36, further comprising:

at least one linkage operatively coupled to the seal member to assist in moving the seal member from the closed position to the opened position when the canister is actuated.

~~44. The aerosol delivery unit of the preceding claim wherein movement of the linkage is driven by movement of the canister between an initial position and a discharge position.~~

~~45. The aerosol delivery unit of claim 36, further comprising:~~

~~a mouthpiece cap for selectively covering the mouthpiece aperture and preventing access to the inhalation passageway, and being operatively coupled to the seal member to move the seal member from the closed position to the open position when the mouthpiece cap is moved away from the mouthpiece aperture.~~

~~46. The aerosol delivery unit of claim 36, further comprising:~~

~~a mouthpiece cap for selectively covering the mouthpiece aperture and preventing access to the inhalation passageway, and wherein movement of the seal member from the closed position to the open position is controlled by manipulating the mouthpiece cap.~~

~~47. The aerosol delivery unit of claim 36, further comprising:~~

~~a mouthpiece cap for selectively covering the mouthpiece aperture and preventing access to the inhalation passageway, the mouthpiece cap including the seal member.~~

~~48. The aerosol delivery unit of claim 36, further comprising:~~

~~a biasing element arranged to urge the seal member toward the closed position.~~

~~49. The aerosol delivery unit of the preceding claim wherein the biasing element comprises one of the following:~~

~~a resilient band that spans across a portion of the seal member;~~

~~a torsional spring;~~

~~a leaf spring; or~~

~~a coil spring.~~

~~50. The aerosol delivery unit of claim 36 wherein seal member comprises a resilient compressible material that is configured to deform elastically to move from the closed position to the open position.~~

~~51. The aerosol delivery unit of claim 36, further comprising:~~

~~a desiccant housing coupled to an end of the canister, the desiccant housing defining, at least in part, the desiccant chamber and forming a portion of a cartridge which is removable from the base housing.~~

~~52. The aerosol delivery unit of claim 36, further comprising:~~

~~a desiccant housing provided within the base housing of the aerosol delivery unit, the desiccant housing defining the desiccant chamber and being configured to remain within the base housing when the canister is removed therefrom.~~

~~53. The aerosol delivery unit of claim 36 wherein the base housing includes a desiccant housing portion that defines the desiccant chamber.~~

~~54. The aerosol delivery unit of claim 36, further comprising:~~

~~a movable gate providing access from the desiccant chamber to the discharge passageway when the canister is installed in the base housing and preventing access from the desiccant chamber to the discharge passageway when the canister is removed from the base housing.~~

~~55. The aerosol delivery unit of claim 36, further comprising:~~

~~a power source; and~~

an actuator coupled to the power source for moving the canister from an initial position to a discharge position to deliver the dose of aerosolized matter, and

wherein movement of the seal member is coordinated with movement of the canister.

56. The aerosol delivery unit of the preceding claim wherein the seal member is electromechanically controlled to move between the closed position and the open position physically independent of the movement of the canister but in coordination therewith.

57. The aerosol delivery unit of claim 36 wherein the aerosol delivery unit is provided in the form of one of the following:

a press-and-breath inhaler;

a mechanical breath actuated inhaler; or

an electromechanical breath actuated inhaler.

58. An aerosol delivery unit for selectively delivering a dose of aerosolized matter, the aerosol delivery unit comprising:

a base housing;

a canister at least partially received in the base housing, the canister containing matter to be aerosolized and including a valve stem that defines at least a portion of a discharge passageway extending from a discharge valve outlet of the canister to an inhalation passageway provided within the base housing;

a mouthpiece aperture in fluid communication with the inhalation passageway through which the aerosolized matter is discharged during an inhalation event; and

a mouthpiece cap for selectively preventing access to the inhalation passageway, and wherein a desiccant chamber containing a desiccant material is provided within the mouthpiece cap.

~~59. The aerosol delivery unit of the preceding claim wherein the mouthpiece cap includes a seal which is configured to close upon removing the mouthpiece cap and to isolate the desiccant material in the desiccant chamber from an external environment.~~

~~60. The aerosol delivery unit of the preceding claim wherein the seal is arranged within the mouthpiece cap and a protrusion is provided within the inhalation passageway to displace the seal to bring the desiccant chamber into fluid communication with the discharge passageway when the mouthpiece cap is installed to prevent access to the inhalation passageway.~~

~~61. The aerosol delivery unit of one of the two preceding claims wherein the seal is a split seal valve, an umbrella valve or other seal valve that is configured to close upon removing the mouthpiece cap and open when the mouthpiece cap is installed.~~

~~62. The aerosol delivery unit of claim 59 wherein the seal is provided by a spring-biased element that is actuated in a direction opposite a bias applied by a spring thereof when the mouthpiece cap closes the mouthpiece aperture to expose the desiccant material to the discharge passageway.~~

~~63. The aerosol delivery unit of any one of the five preceding claims wherein the aerosol delivery unit is provided in the form of one of the following:~~

~~a press-and-breath inhaler;~~

~~a mechanical breath actuated inhaler; or~~

~~an electromechanical breath actuated inhaler.~~

64. A drug delivery unit for selectively delivering a drug through a drug delivery tract to a user, the drug delivery unit comprising:

means for isolating at least a portion of the drug delivering tract when not actively discharging the drug from the drug delivery unit; and

means for desiccating the at least a portion of the drug delivering tract to reduce water vapor content therein.

65. The drug delivery unit of the preceding claim wherein the drug delivery unit includes an aerosol canister assembly including a canister containing a drug formulation and a discharge valve for selectively discharging the drug formulation from the canister, and wherein the drug delivery tract is downstream of an outlet of the discharge valve.

66. An aerosol delivery unit for selectively delivering a dose of aerosolized matter from a canister having a discharge valve, the aerosol delivery unit comprising:

means for isolating a discharge passageway that extends from the discharge valve of the canister from an inhalation passageway of the aerosol delivery unit through which the aerosolized matter is discharged during an inhalation event; and

means for removing moisture from the isolated discharge passageway.

67. A method of operation of an aerosol delivery unit, the method comprising:

discharging a dose of aerosolized matter through an inhalation passageway that is in fluid communication with a discharge passageway extending from an outlet of an aerosol canister discharge valve toward the inhalation passageway, the discharge passageway terminating in a discharge orifice through which the aerosolized matter passes from the discharge passageway to the inhalation passageway;

thereafter, sealing the discharge passageway at or downstream of the discharge orifice to isolate the discharge passageway from the inhalation passageway and an environment external to the aerosol delivery unit, and

prior to discharging another dose of aerosolized matter through the inhalation passageway, unsealing the discharge passageway to provide fluid communication between the discharge passageway and the inhalation passageway,

wherein unsealing the discharge passageway occurs in direct coordination with a release of the aerosolized matter from the aerosol canister discharge valve.

68. The method of the preceding claim, further comprising:

temporarily storing the aerosol delivery unit with the discharge passageway isolated from the inhalation passageway.

69. The method of the preceding claim, further comprising:

at least while temporarily storing the aerosol delivery unit, exposing the discharge passageway to a desiccant material.