CLAIMS:

1. A dispenser for dispensing a dose of a gaseous, gas borne or droplet substance from a substance source, the dispenser comprising:

a body for receiving a substance source, the body having a mouthpiece;

a junction member slideably arranged in the body for movement in a longitudinal axis of the body to release a dose of a substance from a substance source, the junction member comprising a socket for receiving a spout of a substance source;

a dispenser driver for moving the junction member in the longitudinal axis of the body to release a dose of a substance from a substance source, the dispenser driver comprising a pivot shaft and a cam arranged on the shaft, the dispenser driver being arranged within the body such that rotation of the pivot shaft causes the cam to rotate and apply a force to the junction member so as to move the junction member in the longitudinal axis; ~~or~~

a cam follower slideably arranged within the body, the cam follower comprising a base and a substantially rigid protrusion extending from the base, the protrusion being arranged between the dispenser driver and the junction member such that a force applied by the cam of the dispenser driver to the protrusion causes the cam follower to slideably move in the longitudinal axis of the body and apply a force to the junction member so as to release a dose of a substance from a substance source;

a dispenser cap comprising a hollow body having a lower open end engageable with the body, and an upper open end for receiving a cap closure device for closing the upper open end, the upper open end comprising an engageable portion; and

a cap closure device, comprising:

an upper cap closure portion for engaging with the upper open end of the dispenser cap to close the upper open end of the dispenser cap;

a lower cap closure portion for engaging with the engageable portion to secure the cap closure device to the dispenser cap; and

a bistable portion connecting the upper cap closure portion and the lower cap closure portion, the bistable portion being switchable between a first stable form in which the bistable portion is extended, and a second stable form in which the bistable portion is collapsed,

wherein, when the bistable portion is in the second stable form, the upper cap closure portion engages with the upper open end of the dispenser cap to close the dispenser cap;

a dose counter for indicating a number of actuations of the dispenser corresponding to a number of doses dispensed from a substance source, or a number of doses remaining in a substance source, the dose counter comprising:

a first ring member having a first indicia and being rotatable in increments about the longitudinal axis, the first indicia indicating a count;

a drive mechanism by which the dispensing of a dose from the substance source is linked to a count being made by the counter; and

a limiting member comprising a limiting mechanism,

wherein the limiting mechanism comprises an engaging portion arranged to act radially with respect to the first ring member to contact the first ring member to limit free rotation of the first ring member relative to the limiting member about the axis.

2. A dispenser according to claim 1, wherein the engaging portion comprises one or more teeth arranged to contact an inner circumferential surface of the first ring member.

3. A dispenser according to claim 1 or 2, wherein the first ring member comprises an engaging portion arranged to co-operate with the engaging portion of the limiting member to limit free rotation of the first ring member relative to the limiting member about the axis.

4. A dispenser according to claim 3, wherein the engaging portion on the first ring member comprises a plurality of teeth on an inner circumferential surface of the first ring member.

5. A dispenser according to claim 4, wherein the plurality of teeth on the inner circumferential surface of the first ring comprise ratchet teeth.

6. A dispenser according to any one of claims 2 to 5, wherein the one or more teeth of the limiting mechanism engaging portion comprises one or more triangular or ratchet-shaped teeth.

7. A dispenser according to any preceding claim, wherein the limiting mechanism comprises a guide, the guide comprising an arm spaced apart from the limiting member engaging portion in a fixed relation, the guide being configured to contact the first ring member such that the limiting member engaging portion maintains contact with the first ring member.

8. A dispenser according to claim 7, wherein the guide contacts the first ring member on an outer circumferential surface.

9. A dispenser according to any preceding claim, wherein the limiting mechanism is supported on a base having a fixed end and a floating end, the fixed end being coupled to the limiting member and the floating end being free of the limiting member, and wherein the base is flexible at the fixed end such that the floating end is moveable radially with respect to the first ring member.

10. A dispenser according to claim 9, wherein limiting member engaging portion is located at the floating end of the base.

11. A dispenser according to any preceding claim, wherein the limiting member comprises a limiting ring member coaxially arranged about the same axis as the first ring member.

12. A dispenser according to claim 11, wherein the limiting ring member comprises one or more locating recesses disposed in an upper circumferential surface for engaging with correspondingly-shaped protrusions in the hollow body of the dispenser cap for preventing rotation of the limiting ring member about the axis.

13. A dispenser according to any preceding claim, wherein the limiting mechanism is configured to provide a frictional resistance to the first ring member in a forward count direction of the first ring member, and to prevent movement of the first ring member in a reverse count direction.

14. A dispenser for dispensing a dose of a gaseous, gas borne or droplet substance from a substance source, the dispenser comprising:

a body for receiving a substance source, the body having a mouthpiece;

a junction member slideably arranged in the body for movement in a longitudinal axis of the body to release a dose of a substance from a substance source, the junction member comprising a socket for receiving a spout of a substance source;

a dispenser driver for moving the junction member in the longitudinal axis of the body to release a dose of a substance from a substance source, the dispenser driver comprising a pivot

shaft and a cam arranged on the shaft, the dispenser driver being arranged within the body such that rotation of the pivot shaft causes the cam to rotate and apply a force to the junction member so as to move the junction member in the longitudinal axis;

a cam follower slideably arranged within the body, the cam follower comprising a base and a substantially rigid protrusion extending from the base, the protrusion being arranged between the dispenser driver and the junction member such that a force applied by the cam of the dispenser driver to the protrusion causes the cam follower to slideably move in the longitudinal axis of the body and apply a force to the junction member so as to release a dose of a substance from a substance source;

a dispenser cap comprising a hollow body having a lower open end engageable with the body, and an upper open end for receiving a cap closure device for closing the upper open end, the upper open end comprising an engageable portion; and

a cap closure device, comprising:

an upper cap closure portion for engaging with the upper open end of the dispenser cap to close the upper open end of the dispenser cap;

a lower cap closure portion for engaging with the engageable portion to secure the cap closure device to the dispenser cap; and

a bistable portion connecting the upper cap closure portion and the lower cap closure portion, the bistable portion being switchable between a first stable form in which the bistable portion is extended, and a second stable form in which the bistable portion is collapsed,

wherein, when the bistable portion is in the second stable form, the upper cap closure portion engages with the upper open end of the dispenser cap to close the dispenser cap.

15. A dispenser according to any preceding claim, wherein the body comprises a guide for guiding the slideable motion of the cam follower base in the longitudinal axis, the guide being shaped to receive the base of the cam follower in a slideable engagement.

16. A dispenser according to claim 15 wherein the guide comprises one or more guide rails arranged and adapted to co-operate with one or more guide rails on the cam follower base such that the cam follower is slideable within the body.

17. A dispenser according to any preceding claim, wherein the cam follower further comprises a resiliently deformable clip disposed on a lower edge of the base for engaging with a correspondingly shaped protrusion in the body, and wherein, when the clip is engaged with the protrusion, the cam follower is retained in the longitudinal position in the body until a force is exerted on the cam follower by the cam.

18. A dispenser according to any preceding claim, further comprising a pivotally mounted closure for the mouthpiece, the closure being coupled to the dispenser driver such that pivoting of the cover causes rotation of the pivot shaft of the dispenser driver.

19. A dispenser according to any preceding claim, further comprising:

a breath actuatable valve incorporated with the junction member, for controlling the release of a gas and/or liquid comprising a substance, the valve comprising:

a flexible tube for receiving a dose of a substance, the tube extending from an inlet end connected to the junction member socket, having a location which is kinkable for closure of the valve in a ready position and moveable to a release position in which the tube is un-kinked for opening of the valve, and having an outlet end moveable for kinking/un-kinking of the tube; and

an outlet member carrying the outlet end of the flexible tube and pivotally connected to the junction member for control of kinking/un-kinking movement of the flexible tube;

the tube being kinked to an obturating extent when the pivotal outlet member is in a ready position and un-kinked when the pivotal outlet member is moved to a release position.

20. A dispenser according to claim 19, further comprising:

a sear on the outlet member to hold the outlet member in the ready position prior to inhalation;

a breath actuatable flap carried on the junction member and arranged for action of inhalation breath on it, the flap having:

a latch complementary to the sear;

the flap being arranged:

to releasably receive the pivotal outlet member for kinked closure of the flexible tube by cooperation of the latch and the sear and

to release the pivotal outlet member for un-kinking of the tube, and substance release, on inhalation, by release of the sear from the latch and movement to the release position of the outlet member.

21. A dispenser as according to claim 19 or 20, wherein the pivotal outlet member is arranged to move by the force arising from pressure in the kinked location and/or under the resilience of the kinked location itself.

22. A dispenser according to claim 19, 20 or 21, wherein the junction member, the kink tube and the pivotal outlet member are an integral plastics material injection moulding, the pivotal outlet member being pivoted to the junction member by one or more living hinges and having an outlet nozzle held by the outlet member.

23. A dispenser according to any one of claims 19 to 22, wherein the flap has an integral spring acting on the junction member to bias it normally to a position in which the flap rests on an upper crown portion of the junction member.

24. A dispenser according to any one of claims 19 to 23, wherein the flap includes a finger arranged to act on the pivoted outlet member to urge it towards its open position as the flap moves under the action of inhalation breath.

25. A dispenser according to any preceding claim, wherein the bistable portion of the cap closure device comprises:

a substantially rigid separator connected to the upper cap closure portion; and

a resiliently deformable separator having first and second ends, the first end being connected to the substantially rigid separator via a resiliently deformable joint, and the second end being connected to the lower cap closure portion via a resiliently deformable joint,

wherein the resiliently deformable separator is configured to resiliently deform upon application of a force to the upper cap closure portion and lower cap closure portion so as to permit a change of form of the dispenser cap closure device between the first stable form and second stable form.

26. A dispenser according to claim 25, wherein an angle defined between an outer surface of the substantially rigid separator and the resiliently deformable separator is acute when in the second stable form, and obtuse when in the first stable form.

27. A dispenser according to any preceding claim, wherein the lower cap closure portion comprises a plurality of protrusions extending radially outwards having an upper surface for engaging with the engageable portion of the dispenser cap, and wherein a lower surface of the lower cap closure portion is engageable with a surface of a substance source when received in the dispenser.

28. A dispenser according to claim 27, wherein the engageable portion of the dispenser cap comprises a ramped portion, and wherein the ramped portion and the protrusions on the lower cap closure portion are configured such that rotation of the cap closure device causes the upper surface of the plurality of protrusions to ride along the ramped portion so as to draw the cap closure device further into the dispenser cap.

29. A dispenser according to claim 28, wherein, when the cap closure device is rotated, the riding of the upper surface of the protrusions along the ramped portion causes the lower surface of the lower cap closure portion to drive down onto a substance source when received in the dispenser.

30. A dispenser according to claim 28 or 29, wherein the ramped portion comprises a plurality of ramped portions around the circumference of a lip of the dispenser cap, the plurality of ramped portions equalling the number of plurality of protrusions on the lower cap portion of the cap closure device.

31. A dispenser according to claim 30, wherein the ramped portions are separated from one and other by a gap having a width that is greater than or equal to the width of a protrusion on the lower cap closure portion.

32. A dispenser according to any preceding claim, wherein an upper surface of the dispenser cap comprises a limiting means for preventing rotation of the cap closure device when in the second stable form.

33. A dispenser according to claim 32, wherein the limiting means comprises a plurality of teeth located on an upper surface of the dispenser cap, and wherein the dispenser cap closure device comprises a plurality of protrusions on a lower surface of the upper cap closure portion, the teeth and protrusions being configured to engage with one another so as to prevent rotation of the cap closure device when in the second stable form.

34. A dispenser according to any preceding claim, wherein the dispenser cap comprises one or more protrusions in the upper open end of the dispenser cap, the one or more protrusions being arranged to engage with a correspondingly shaped recess in the upper cap closure portion when the dispenser cap is closed by the dispenser closure device.

35. A dispenser according to any one of claims 14, or 15 to 34 when dependent on claim 14, further comprising a dose counter for indicating a number of actuations of the dispenser corresponding to a number of doses dispensed from a substance source, or a number of doses remaining in a substance source.

36. A dispenser according to claim 35, wherein the dispenser counter comprises:

a first ring member having a first indicia and being rotatable in increments about the longitudinal axis, the first indicia indicating a count;

a second ring member having second indicia, the second ring member being rotatable in increments about the same axis as the first ring member, the second indicia indicating a count;

a coupling mechanism for releasably coupling the second ring member to the first ring member, to allow the second and first ring members to rotate cooperatively when coupled and to allow independent rotating of the second ring member when not coupled;

wherein the coupling mechanism comprises first and second engagement means, the first engagement means being movable radially outwardly and radially inwardly relative to the axis.

37. A dispenser according to claim 36, comprising:

a limiting member comprising a limiting mechanism,

wherein the limiting mechanism limits free rotation of the first ring member relative to the limiting member about the axis.

38. A dispenser according to any one of claims 1 to 13, comprising:

a second ring member having second indicia, the second ring member being rotatable in increments about the same axis as the first ring member, the second indicia indicating a count;

a coupling mechanism for releasably coupling the second ring member to the first ring member, to allow the second and first ring members to rotate cooperatively when coupled and to allow independent rotating of the second ring member when not coupled;

wherein the coupling mechanism comprises first and second engagement means, the first engagement means being movable radially outwardly and radially inwardly relative to the axis.

39. A dispenser according to claim 37 or 38 wherein the coupling mechanism comprises a deflector to deflect the first engagement means radially outwardly.

40. A dispenser according to claim 39 wherein the first engagement means is deflected radially outwardly after a predetermined degree of rotation of the second ring member, the predetermined amount of rotation of the second ring member being less than a full rotation of the second ring member about the axis.

41. A dispenser according to claim 38, 39 or 40, wherein the first engagement means is connected to, or integral with, the second ring member.

42. A dispenser according to any one of claims 39 to 41 wherein the first engagement means comprises an arm having a slot and a contact end, preferably the first engagement means comprises four arms each having a slot and a contact end.

43. A dispenser according to claim 42 wherein the contact end comprises an upwardly extending component that contacts the deflector.

44. A dispenser according to any one of claims 38 to 43 wherein the second engagement means is connected to, or integral with, the first ring member.

45. A dispenser according to any one claims 38 to 44 wherein the second engagement means comprises a plurality of protrusions.

46. A dispenser according to claim 45 wherein the protrusions are equally spaced apart.

47. A dispenser according to claim 45 or 46 wherein, when the first engagement means is moved radially outwardly, the first engagement means engages with one of the protrusions.

48. A dispenser according to claim 47, wherein, when the first engagement means engages with one of the protrusions, the first ring member overcomes frictional resistance of the limiting mechanism in a forward count direction and the first ring member rotates in the forward count direction.

49. A dispenser according to any one of claims 39 to 48, wherein the deflector is connected to, or integral with the limiting member.

50. A dispenser according to any one of claims 38 to 49, wherein the first ring member comprises a display cover element for obscuring a view of the second indicia.

51. A dispenser according to any one of claims 37 to 49, comprising a drive mechanism for rotating the second ring member, and wherein at least part of the drive mechanism is integral with the second ring member.

52. A dispenser according to claim 51, wherein the drive mechanism comprises a pawl-and-teeth mechanism.

53. A dispenser according to claim 52, wherein the pawl-and-teeth mechanism comprises:

a first and second pawl engageable with a plurality of teeth, and

wherein each of the first and second pawls comprise a driving engagement face for engaging in a driving engagement with one of the plurality of teeth, and a sliding engagement face for sliding over one of the plurality of teeth.

54. A dispenser according to claim 53, wherein each of the first and second pawls is arranged such that:

the first pawl engages in a driving engagement with one of the plurality of teeth during a count stroke of the drive mechanism, and

the second pawl engages in a driving engagement with one of the plurality of teeth during a return stroke of the drive mechanism.

55. A dispenser according to claim 53 or 54, wherein each of the first and second pawls is arranged such that:

the second pawl rides over one of the plurality of teeth during a count stroke of the drive mechanism, and

the first pawl rides over one of the plurality of teeth during the return stroke of the drive mechanism.

56. A dispenser according to any one of claims 53 to 55, wherein

the first and second pawls are integral with the second ring member, and

the plurality of teeth are disposed on a counter driver, the counter driver being coupleable to the junction member and arranged to be reciprocally moveable within a bore of the second ring member, and

wherein the pawl-and-teeth mechanism is configured such that reciprocal movement of the counter driver within the bore of the second ring member causes rotational movement of the second ring member.

57. A dispenser according to claim 56, wherein the drive mechanism comprises third and fourth pawls engageable with the plurality of teeth, the third and fourth pawls being integral with the first ring member on a surface radially opposing the first and second pawls.

58. A dispenser according to claim 56 or 57, wherein the body comprises a counter driver guide configured to guide the counter driver in the body so as to prevent rotation of the counter driver in the longitudinal axis.

59. A dispenser according to claim 58, wherein the counter driver guide comprises a protrusion extending from the body, the protrusion being configured and shaped so as to co-operate with a correspondingly shaped notch in the counter driver.

60. A dispenser according to any one of claims 56 to 59, wherein the junction member comprises one or more slots, and the counter driver comprises one or more protrusions for engaging with the junction member so as to couple the junction member and counter driver.

61. A dispenser according to any one of claims 1 to 13 or 36 to 60, wherein said first indicia comprises one or more of: numbers, colours, letters and symbols.

62. A dispenser according to any one of claims 36 or 38 to 60, wherein said second indicia comprises one or more of: numbers, colours, letters and symbols.

63. A dispenser according to claim 61 or 62 wherein said second indicia comprise a first row of numbers, and said first indicia comprise a second and a third row of numbers.

64. A dispenser according to claim 63 wherein said first row of numbers represents units digits, said second row represents tens digits, and said third row represents hundreds digits.

65. A dispenser according to claim 63 or 64 wherein said first row of numbers comprises repeated sets of integers.

66. A dispenser according to any one of claims 63 to 65 wherein said second row of numbers comprises repeated sets of integers and said third row of numbers comprises a set of integers.

67. A dispenser according to any one of the claims 61 to 66 wherein said indicia are printed, cut out from, embossed, moulded, adhered, incorporated, and/or painted on said first and second ring members.

68. A dispenser for dispensing a dose of a gaseous, gas borne or droplet substance from a substance source, the dispenser comprising:

a body for receiving a substance source, the body having a mouthpiece;

a junction member slideably arranged in the body for movement in a longitudinal axis of the body to release a dose of a substance from a substance source, the junction member comprising a socket for receiving a spout of a substance source;

a dispenser driver for moving the junction member in the longitudinal axis of the body to release a dose of a substance from a substance source, the dispenser driver comprising a pivot shaft and a cam arranged on the shaft, the dispenser driver being arranged within the body

such that rotation of the pivot shaft causes the cam to rotate and apply a force to the junction member so as to move the junction member in the longitudinal axis;

a cam follower slideably arranged within the body, the cam follower comprising a base and a substantially rigid protrusion extending from the base, the protrusion being arranged between the dispenser driver and the junction member such that a force applied by the cam of the dispenser driver to the protrusion causes the cam follower to slideably move in the longitudinal axis of the body and apply a force to the junction member so as to release a dose of a substance from a substance source;

a dose counter for indicating a number of actuations of the dispenser corresponding to a number of doses dispensed from a substance source, or a number of doses remaining in a substance source, the dose counter comprising:

a first ring member having a first indicia and being rotatable in increments about an axis, the first indicia indicating a count;

a drive mechanism by which the dispensing of a dose from the substance source is linked to a count being made by the counter; and

a limiting member comprising a limiting mechanism,

wherein the limiting mechanism comprises an engaging portion arranged to act radially with respect to the first ring member to contact the first ring member to limit free rotation of the first ring member relative to the limiting member about the axis.

~~68~~69. A dispenser according to claim ~~67~~68, wherein the limiting mechanism is as defined in any one of claims 2 to 13.

~~69~~70. A dispenser according to claim ~~67~~68 or claim 69, wherein the body is as defined in claim 15 or 16 and/or the cam follower is as defined in claim 17.

~~70~~71. A dispenser for dispensing a dose of a gaseous, gas borne or droplet substance from a substance source, the dispenser comprising:

a body for receiving a substance source, the body having a mouthpiece;

a dispenser cap comprising a hollow body having a lower open end engageable with the body, and an upper open end for receiving a cap closure device for closing the upper open end, the upper open end comprising an engageable portion; and

a cap closure device, comprising:

an upper cap closure portion for engaging with the upper open end of the dispenser cap to close the upper open end of the dispenser cap;

a lower cap closure portion for engaging with the engageable portion to secure the cap closure device to the dispenser cap; and

a bistable portion connecting the upper cap closure portion and the lower cap closure portion, the bistable portion being switchable between a first stable form in which the bistable portion is extended, and a second stable form in which the bistable portion is collapsed,

wherein, when the bistable portion is in the second stable form, the upper cap closure portion engages with the upper open end of the dispenser cap to close the dispenser cap;

a dose counter for indicating a number of actuations of the dispenser corresponding to a number of doses dispensed from a substance source, or a number of doses remaining in a substance source, the dose counter comprising:

a first ring member having a first indicia and being rotatable in increments about an axis, the first indicia indicating a count;

a drive mechanism by which the dispensing of a dose from the substance source is linked to a count being made by the counter; and

a limiting member comprising a limiting mechanism,

wherein the limiting mechanism comprises an engaging portion arranged to act radially with respect to the first ring member to contact the first ring member to limit free rotation of the first ring member relative to the limiting member about the axis.

~~71~~72. A dispenser according to claim ~~70~~71, wherein the limiting mechanism is as defined in any one of claims 2 to 13.

~~72~~73. A dispenser according to claim ~~70~~ 71 or ~~71~~72, wherein the dispenser cap and dispenser cap closure device are as defined in any one of claims 25 to 34.

~~73~~74. A dispenser according to any preceding claim, further comprising a substance source.

~~74~~75. A dispenser according to claim ~~73~~74, wherein the substance source is a pressurised metered-dose inhaler (pMDI).