Devices, Systems, and Methods for Medicament Delivery

Brief Description of the Drawings

[1] A wide variety of potential embodiments will be more readily understood through the following detailed description of certain exemplary embodiments, with reference to the accompanying exemplary drawings in which:

[2] **FIG. 1** is a perspective view of an exemplary embodiment of a system 1000;

[3] **FIG. 2** is a front view of an exemplary embodiment of a system 1000;

[4] **FIG. 3** is a side view of an exemplary embodiment of a system 1000;

[5] **FIG. 4** is a cross-sectional view taken along lines A-A of FIG. 3 of an exemplary embodiment of a system 1000 in a first operative position;

[6] **FIG. 5** is a cross-sectional view taken along lines A-A of FIG. 3 of an exemplary embodiment of a system 1000 in a second operative position;

[7] **FIG. 6** is a cross-sectional view taken along lines A-A of FIG. 3 of an exemplary embodiment of a system 1000 in a third operative position;

[8] **FIG. 7** is a cross-sectional view taken along lines A-A of FIG. 3 of an exemplary embodiment of a system 1000 in a fourth operative position;

[9] **FIG. 8** is a cross-sectional view taken along lines A-A of FIG. 3 of an exemplary embodiment of a system 1000 in a fifth operative position;

[10] **FIG. 9** is a cross-sectional view taken along lines A-A of FIG. 3 of an exemplary embodiment of a system 1000 in a sixth operative position;

[11] **FIG. 10** is a flowchart of an exemplary embodiment of a method 10000;

[12] **FIG. 11** is a perspective view of an exemplary embodiment of system 1000;

[13] **FIG. 12** is a perspective cross-sectional view taken along lines B-B of FIG. 11;

[14] **FIG. 13** is a perspective view of an exemplary embodiment of actuation stick 2200;

[15] **FIG. 14** is a cross-sectional view of an exemplary embodiment of gas venting mechanism 8000 taken along lines A-A of FIG. 3.

Definitions

[16] When the following terms are used herein, the accompanying definitions apply:

[17] **actuating portion** – that part that puts something into action.

[18] **actuation lock** – a device adapted to prevent actuation, such as, for example a pivotable, translatable, keyed, squeezable, and/or removable lock.

[19] **actuator** – a mechanism that puts something into action.

[20] **adapted to** – suitable or fit for a particular purpose.

[21] **apparatus** – a mechanism and/or device.

[22] **arm** – an elongated structural member, which need not be solely linear.

[23] **can** – is capable of, in at least some embodiments.

[24] **channel** – a conduit for one or more fluids.

[25] **compressed gas** – a substantially pressurized substance, such as helium, nitrogen, and/or carbon dioxide, etc., in a gaseous form.

[26] **comprising** – including but not limited to.

[27] **contain** – to hold within.

[28] **contents** – a contained compressed gas.

[29] **credit card** – a card (usually plastic) that assures a seller that the person using it has a satisfactory credit rating and that the issuer will see to it that the seller receives payment for the merchandise and/or services delivered. Typically measuring in size from approximately 3 to approximately 4 inches in length, such as approximately 3.40 inches, 3.375 inches, 85 millimeters, etc., and from approximately 1.75 to approximately 2.75 inches in width, such as approximately 2.10 inches, 2.2125 inches, 2.5 inches, 55 millimeters, etc.

[30] **discharge** – to release from confinement; to emit.

[31] **eject** – to expel.

[32] **escape port** – an opening for the exit of a gas.

[33] **expulsion pressure** – a force applied over an area of a liquid, the force sufficient to expel the liquid in a predetermined manner.

[34] **extend** – to move out and/or away from.

[35] **extendable** – able to move out and/or away from.

[36] **fluid** – a gas and/or liquid.

[37] **fluidly coupleable** – able to be related via a fluid.

[38] **frangible** – a device that is capable of being broken and/or penetrated to allow fluid to flow therethrough.

[39] **housing** – something that covers, protects, holds, and/or supports.

[40] **in reaction to** – responding indirectly and/or directly to.

[41] **indicate** – to show, mark, signify, denote, evidence, evince, manifest, declare, enunciate, specify, explain, exhibit, present, reveal, disclose, and/or display.

[42] **indicator** – a device and/or substance that indicates.

[43] **liquid medicament** – a medicine, medication, drug, pharmaceutical, prescriptive, antidote, anti-venom, hormone, stimulant, vasodilator, anesthetic, and/or nutritional supplement in a substantially liquid form.

[44] **may** – is allowed to, in at least some embodiments.

[45] **needle** – a hollow, slender, sharp-pointed instrument used for injection. Includes cannulas.

[46] **non-co-axial** – not having co-linear axes.

[47] **patient** – a receiver of a liquid medicament, such as a human, mammal, animal, etc.

[48] **piston** – a sliding piece which either is moved by, or moves against, fluid pressure.

[49] **pivotable** – capable of pivoting.

[50] **plurality** – the state of being plural and/or more than one.

[51] **predetermined** – established in advance.

[52] **puncturer** – a device adapted to penetrate using a substantially sharp and/or tapered point, tip, edge, or the like.

[53] **pusher** – a device adapted to convert fluid pressure to mechanical movement.

[54] **retract** – to pull inward.

[55] **reservoir** – a receptacle or chamber for storing and/or directing movement of a fluid.

[56] **spring** – an elastic device, such as a coil of wire, that regains its original shape after being compressed or extended.

[57] **status** – a state or condition.

[58] **substantially** – to a great extent or degree.

[59] **system** – a collection of mechanisms, devices, data, and/or instructions, the collection designed to perform one or more specific functions.

[60] **tip** – a terminal end.

[61] **transfer** – to convey from one place to another.

[62] **translatable** – capable of being transferred from one place to another and/or of being moved with respect to something else.

[63] **valve** – a device that regulates flow through a pipe and/or through an aperture by opening, closing, and/or obstructing a port and/or passageway.

[64] **vent** – to release from confinement.

[65] **vial** – a closable vessel.

Detailed Description

[66] Exposure, such as via ingestion, inhalation, and/or injection, to certain allergens, toxins, and/or other substances can cause profound reactions for some and/or all people and/or animals. For example, certain people are highly allergic to certain substances, such as peanuts, shellfish, particular drugs, certain proteins, bee venom, insect bites, etc. The allergic response to the exposure can lead to anaphylactic shock, which can cause a sharp drop in blood pressure, hives, and/or substantial breathing difficulties caused by severe airway constriction. As another example, inhalation of certain nerve agents can cause severe physiological trauma.

[67] Responding rapidly to such exposures can prevent injury and/or death. For example, in response to an exposure leading to anaphylactic shock, an injection of epinephrine (i.e., adrenaline) can provide substantial and/or complete relief from the reaction. As another example, injection of an antidote to a nerve agent can greatly reduce and/or eliminate the potential harm of the exposure. As yet another example, rapid injection of certain drugs, such as a beta blocker, blood thinner, nitroglycerine, antihistamines, insulin, and opioids, etc., can provide substantial relief from various dangerous medical conditions.

[68] Thus, certain exemplary embodiments provide systems, devices, and/or methods for rapidly injecting a medicament.

[69] Certain exemplary embodiments comprise an apparatus, comprising: a compressed gas container; a plurality of vials adapted to store a liquid medicament, each vial defining a longitudinal axis, the longitudinal axes of the plurality of vials parallel and non-co-axial, the plurality of vials fluidly coupleable to an actuating portion of a contents of the gas container; and a

plurality of pistons, each piston adapted to move within a corresponding vial from the plurality of vials, the plurality of pistons adapted to, in response to discharge of the actuating portion of the contents of the compressed gas container, transfer at least a portion of the liquid medicament from the plurality of vials and through a needle that is extendable into a patient. Certain exemplary embodiments comprise a method comprising a plurality of activities, comprising: discharging an actuating portion of a contents of a compressed gas container, the compressed gas container contained within an apparatus; in reaction to said discharging activity, moving a piston within a vial, the vial one of a plurality of vials contained within the apparatus, each vial adapted to store a liquid medicament, each vial defining a longitudinal axis, the longitudinal axes of the plurality of vials parallel and non-co-axial, the plurality of vials fluidly coupleable to a contents of the gas container; and transferring a liquid medicament from the vial and through a needle that is extendable into a patient.

[71] **FIG. 1** is a perspective view, **FIG. 2** is a front view, and **FIG. 3** is a side view, of an exemplary embodiment of a system 1000, which can comprise a housing 1100, which, in certain operative embodiments, can comprise a handheld portion 1800 separated via an actuation guard 1200 from an actuation bar 1300. Actuation guard 1200 can prevent accident activation of system 1000. Housing 1100 can be constructed of a durable material, such as stainless steel, aluminum, polycarbonate, etc., to protect a compressed gas container, medicament, injection apparatus and/or user of system 1000. The injection apparatus can be actuated by a fluid pressure, such as pressure provided by the compressed gas, which upon completion of its actuation duties can escape housing 1100 via gas escape opening, such as via status indicator 1400.

[72] A status of a system 1000 can be determined via status indicator 1400, which can provide a view, such as via a UV blocking, photo-sensitive, and/or translucent window, into an interior of housing 1100. Viewable through the

window can be a status of medicament carried by housing 1100, a location of a needle and/or injection apparatus for the medicament, and/or an activation status of system 1000. For example, if the medicament has aged to the point of discoloration, which aging might or might not render the medication useless, harmful, etc., status indicator 1400 can allow that situation to be determined. In certain exemplary embodiments, gas can escape housing 1100 via status indicator 1400 and/or another opening in housing 1100.

[73] Certain exemplary embodiments of system 1000 can provide a compact medicament delivery mechanism that can efficiently and/or rapidly deliver a prescribed dose. The length (L) and width (W) of system 1000 can be similar to that of a credit card, and the thickness (T) can be less than one inch. Thus, certain exemplary embodiments of system 1000 can provide a conveniently carried, easy-to-use, easy to activate drug delivery apparatus that can require little to no training to safely carry, use, and/or dispose of.

[74] To assist a user in positioning system 1000 in a correct orientation for injection, system 1000 and/or housing 1100 can provide various tactile clues. For example, a top 1110 of housing 1100 can be rounded, and a bottom 1120 of actuation bar 1300 of housing 1100 can be flat. Other tactile clues are also possible, such as bulges, ribs, grooves, gaps, roughened surfaces, indentations, etc.

[75] **FIG. 4** is a cross-sectional view taken along lines A-A of **FIG. 3** of an exemplary embodiment of a system 1000 in a first operative position. **FIGs. 5, 6, 7, 8, and 9** show system 1000 of **FIG. 4** in second, third, fourth, fifth, and sixth operative positions, respectively.

[76] System 1000 can comprise a housing 1100, handheld portion 1800, actuation guard 1200, and/or actuation bar 1300. System 1000 can comprise system actuator 2000, gas reservoirs 3000, medicament actuator 4000, medicament storage assembly 5000, medicament carrier 9000, needle assembly 6000, use indicator 7000, and/or gas vent mechanism 8000, etc.

[77] Upon removal, release, rotation, and/or relocation of actuation guard 1200, system actuator 2000 can be adapted to rapidly discharge an actuating portion of a contents of a compress gas container. For example, system actuator 2000 can comprise a compressed gas container 2400, which initially can contain a compressed gas 2500, an actuating portion of which can be released from container 2400 by penetration of a gas port 2600 via a point of a puncturer 2700. Upon removal and/or relocation of actuation guard 1200, actuation bar 1300 can be moved closer to and/or in contact with handheld portion 1800. Upon removal and/or relocation of actuation guard 1200, gas container 2400 can be brought into contact with puncturer 2700 via extension of a pre-compressed spring 2300 and/or movement of a actuation stick 2200. Thus, actuation guard 1200 can prevent accident activation of system 1000 and/or unintended discharge of an actuating portion of the contents 2500 of gas container 2400.

[78] Once gas port 2600 has been punctured, an actuating portion of compressed gas 2500 can escape from container 2400 and flow via gas reservoirs 3000, such as gas channel 3100. The flowing gas can meet and/or apply gas pressure to medicament actuator 4000, which can comprise a pusher 4100, which can travel within a sleeve 1500 defined by walls 1520. Sleeve 1500 can be constructed of metal, stainless steel, aluminum, plastic, polycarbonate, etc. Seals 4200, such as o-rings, can resist gas leakage, such as past pusher 4100 and/or out of housing 1100. Thus, pusher 4100 can function as a piston traveling within a cylinder, although it is not necessarily required that the cross-sectional shape of sleeve 1500 be round.

[79] Medicament actuator 4000 can interface with medicament storage assembly 5000. For example, medicament actuator 4000 can comprise a plurality of plungers 4300, each of which can be capped with a piston 4400 which can sealingly slide and/or move within a corresponding vial 5100 containing a liquid medicament 5200. For example, in response to pressure applied by an actuating portion of the contents 2500 of compressed gas container 2400, pusher 4100 can cause plungers 4300 and/or pistons 4400 to simultaneously move. The number of corresponding sets of plungers 4300, pistons 4400,

and/or vials 5100 can be 2, 3, 4, 5, 6, or more. Pistons 4400 can be constructed of a resilient, durable, and/or sealing material, such as a rubber. Each plunger 4300 from the plurality of plungers can define a longitudinal axis, the longitudinal axes (e.g., axes 4310, 4320, 4330, 4340) of the plurality of plungers parallel, non-coaxial, and/or co-planar.

[80] Each vial 5100 from the plurality of vials can be substantially cylindrical with a substantially round and/or substantially elliptical cross-sectional shape. Thus, each vial 5100 can define a longitudinal axis, the longitudinal axes of the plurality of vials parallel, non-coaxial, and/or co-planar. The longitudinal axis of each vial can be co-axial with the longitudinal axis of its corresponding plunger.

[81] Each vial can be capped at one end with a frangible 5300, which can be burst when piston 4400 generates sufficient pressure upon medicament 5200, thereby allowing at least a portion of medicament 5200 to flow out of vial 5100 and into medicament carrier 9000. Thus, the plurality of vials can be fluidly coupleable to the actuating portion of the contents 2500 of gas container 2400.

[82] Medicament carrier 9000 can hold each of vials 5100 and can travel within sleeve 1500. Medicament carrier 9000 can comprise a plurality of channels 9200 adapted to receive medicament 5200 as it exits its respective vial 5100, and direct medicament 5200 to a common conduit 9300. Medicament carrier 9000 can interface with needle assembly 6000 and/or use indicator 7000.

[83] From common conduit 9300, medicament 5200 can enter needle assembly 6000, such as into a single needle 6100 via which medicament can approach needle tip 6200. As medicament actuator 4000 and/or medicament carrier 9000 are driven toward actuator bar 1300, needle tip 6200 can penetrate an end 6400 of needle sheath 6300 and exit actuator bar 1300 at needle port 1340.

[84] Referring to **FIG. 5**, upon movement of actuation bar 1300 closer to handheld portion 1800, sheath seat 1330 can come in contact with sheath tip 6400,

thereby causing sheath 6300 to buckle and/or crumble. As actuator bar 1300 comes in contact with handheld portion 1800, bar stop 1320 can approach medicament carrier stop 9400, while carrier spring 1600 is compressed.

[85] Referring to **FIG. 6**, as at least a portion of contents 2500 of gas container 2400 escapes, it can flow through channel 3100. The gas, which can still be relatively pressurized, can begin to accumulate behind pusher 4100 to form an expanding gas chamber 3200 and to cause medicament actuator 4000, medicament storage assembly 5000, and medicament carrier 9000 to slide together within sleeve 1500. As medicament actuator 4000, medicament storage assembly 5000, and medicament carrier 9000 slide closer to actuator bar 1300, spring 1600 becomes increasingly compressed between bar stop 1320 and medicament carrier stop 9400. As medicament actuator 4000, medicament storage assembly 5000, and medicament carrier 9000 slide closer to actuator bar 1300, needle tip 6200 can extend further from actuator bar 1300 and sheath 6300 can become further compressed and/or deformed. At its ultimate extension point, needle tip 6200 can extend from housing 1100 from approximately 0.25 millimeters to approximately 20 millimeters, including all values and subranges therebetween, such as up to approximately 2 millimeters, greater than approximately 5 millimeters, from approximately 5.13 millimeters to approximately 9.98 millimeters, etc.

[86] Referring to **FIG. 7**, as gas chamber 3200 continues to expand, medicament carrier 9000 can be driven until medicament carrier stop 9400 contacts actuator bar stop 1300 thereby resisting further travel of medicament carrier 9000. At that point, additional expansion of gas chamber 3200 can cause medicament actuator 4000, pusher bar 4100, plungers 4300, and/or pistons 4400 to initiate travel with respect to medicament storage assembly 5000, thereby generating an expulsion pressure in vials 5100, and/or thereby rupturing frangibles 5300 and allowing medicament 5200 to enter medicament carrier 9000, and begin flowing through medicament channels 9200, medicament conduit 9300, needle 6100, and/or out needle tip 6200 and into a patient. Alternatively, frangibles 5300 can be replaced and/or augmented by a frangible located at or near where medicament conduit 9300 couples to needle

6100. Frangibles 5300 can be constructed of a thin, taught, resilient, durable, and/or sealing material potentially having a predetermined yield strength, such as a rubber, such as chromo butyl rubber, and/or of a relatively brittle material potentially having a predetermined yield strength, such as ceramic, certain plastics, such as polystyrene, etc.

[87] As medicament carrier stop 9400 contacts actuator bar stop 1300, medicament carrier hooks 9600 can engage with engagement receivers 7100 in use indicator 7000.

[88] Referring to **FIG. 8**, as gas chamber 3200 continues to expand, medicament actuator 4000, pusher bar 4100, plungers 4300, and/or pistons 4400 can continue moving until they complete their travel within medicament storage assembly 5000, thereby expelling a predetermined dose of medicament 5200 from vials 5100, out of needle assembly 6000, external to housing 1100, and/or into the patient. As gas chamber 3200 reaches its maximum size, medicament actuator 4000, pusher bar 4100, plungers 4300, and/or pistons 4400 can continue moving until they complete their travel with respect to medicament carrier 9000, thereby causing gas release actuator 9700 to engage with gas release valve 8200. Engagement of gas release actuator 9700 with gas release valve 8200 can cause within gas chamber 3200 to exit gas chamber 3200, discharge away from pistons 4400, and/or exhaust from system 1000 and/or housing 1100, such as via status indicator 1400 and/or a gas escape port located on housing 1100).

[89] Referring to **FIG. 8** and **FIG. 9**, as sufficient gas is vented from gas chamber 3200, the pressure applied by the gas in gas chamber 3200 can decrease until the force applied by the gas on medicament actuator 4000 is less than the force of compressed spring 1600. Thus, spring(s) 1600 can begin to expand, thereby moving medicament carrier 9000, vial assembly 5000, and medicament actuator 4000 away from actuator bar 1300 and helping to exhaust gas from gas chamber 3200. As medicament carrier 9000 moves, use indicator 7000 can travel with it, due to the engaged relationship of medicament carrier hooks 9600 and engagement receivers 7100 and/or

engagement catches 7200 in use indicator 7000. As use indicator 7000 moves away from actuation bar 1300, sheath 6300 can travel with it, thereby creating a gap between sheath tip 6400 and needle port 1340, and thereby exposing a previously non-visible colored portion 1350 of actuation bar 1300 and/or providing an indication that system 1000 has been used (and likely substantially exhausted of its medicament), thereby discouraging any further attempts to use system 1000.

[90] As medicament carrier 9000 moves away from actuator bar 1300, needle 6100 can retract into sheath 6300 which un-buckles and/or un-deforms towards its original shape. Eventually, needle 6100 can retract completely within the boundaries of housing 1100, thereby tending to prevent accidental needle sticks after the initial injection and/or potentially reducing and/or eliminating a sharps hazard.

[91] In certain exemplary embodiments, system actuator 2000 can comprise a finger triggered, twistable, pivotable, and/or lever-operated mechanism. For example, system actuator 2000 can comprise a twistable handle that can screw into gas port 2600. In certain exemplary embodiments, system actuator 2000 can be a finger trigger located on a side of the housing.

[92] **FIG. 10** is a flowchart of an exemplary embodiment of a method 10000 for operating a medicament delivery apparatus. At activity 10100, an actuation lock for the apparatus is released. At activity 10200, an actuating portion of the contents of a compressed gas container are released. At activity 10300, via pressure provided by the released gas, a needle is extended from the apparatus. At activity 10400, via pressure provided by the released gas, a piston applies pressure to a medicament stored in one of a plurality of vials. At activity 10500, a frangible containing the medicament in the vial is burst. At activity 10600, the medicament flows from the vial, through the needle, and into a patient. At activity 10700, once a predetermined dose is expelled and/or injected, the needle is withdrawn from the patient and/or retracted into the pre-use bounds of the apparatus. At activity 10800, the apparatus is rendered unusable for additional injections and/or indicated as previously utilized.

[93] **FIG. 11** is a perspective view of an exemplary embodiment of system 1000, showing actuation guard 1200 removed from housing 1100, so that actuation guard 1200 no longer separates actuator bar 1300 from handheld portion 1800. Actuation guard 1200 can comprise a grippable portion 1220 that can be gripped by a user to pull actuation guard 1200 away from housing 1100, thereby allowing system 1000 to be activated, such as via slapping actuator bar 1300 against a thigh of the user. Actuation guard 1200 can comprise an actuation stick separator portion 1240, that can keep separate actuation stick prongs 2240 when actuation guard 1200 is installed on housing 1100. Actuation guard 1200 can comprise a guard portion 1260 that can separate actuator bar 1300 from handheld portion 1800 when system 1000 is not in use and/or when system 1000 has not been used.

[94] **FIG. 12** is a perspective cross-sectional view taken along lines B-B of **FIG. 11**, and **FIG. 13** is a perspective view of an exemplary embodiment of actuation stick 2200. Referring to **FIGs. 12** and **13**, system 1000 can comprise housing 1100, actuation bar 1300, and system actuator 2000, which can comprise prong squeezer 1390, actuation stick 2200, prong retainer 2100, spring 2300, upper spring retainer 2260, gas container 2400, gas port 2600, and/or puncturer 2700. When actuation bar 1300 is pressed firmly against a user's body, such as via slapping housing actuation bar against the user's thigh, buttocks, and/or arm, prong squeezer 1390 can urge prong tips 2220 of prongs 2240 of actuation stick 2200 toward one another. Note that prong tips 2200 can have a triangular, wedge, angular, and/or frustro-conical shape. As prongs tips 2220 slide along the angled V-groove of prong squeezer 1390, prong catches 2230 can substantially loose contact with prong retainer 2100. This can allow compressed spring 2300 to rapidly urge actuation stick 2200 and gas container 2400 toward puncturer 2700, which can penetrate gas port 2600, thereby allowing gas to escape from gas container 2400. Although any of many different types of gas containers can be utilized, an exemplary gas container can be obtained from Leland Limited, Inc. of South Plainfield, NJ.

[95] **FIG. 14** is a cross-sectional view of an exemplary embodiment of gas venting mechanism 8000 of system 1000 taken along lines **A-A** of **FIG. 3**. System 1000 can comprise handheld portion 1800, actuator bar 1300, sleeve 1500. As pistons 4440 near the limit of their travels, medicament 5200 can be expelled along medicament path 5900, which can extend past frangible 5300, through medicament channels 9200, medicament conduit 9300, and needle 6100, and into the body of a user, such as subcutaneously, intramuscularly, and/or at a depth of from approximately 0.25 millimeters to approximately 20 millimeters, including all values and subranges therebetween, such as up to 2 millimeters, greater than 5 millimeters, etc.

[96] As pistons 4440 near the limit of their travels, engagement of gas release actuator 9700 with gas release valve 8200 can cause compressed spring 8300 to move valve arm such that o-ring 8400 is urged away from its seat 8500. This movement can reveal a passage 8600, via which gas can exit gas chamber 3200 along gas exhaust path 8900, which can extend between sleeve inner walls 1520 and outer walls 9100 of medicament carrier 9000. Eventually, gas exhaust path 8900 can extend between handheld portion 1800 and actuator bar 1300. Likewise, an alternative embodiment of valve 8200, made of rubber or any other resilient material, can be placed across seat 8500 to provide a seal that, once gas release actuator 9700 interacts with valve 8200, allows valve 8200 to bend or flap upwards away from seat 8500, causing the gas to escape via passage 8600.

[97] Still other embodiments will become readily apparent to those skilled in this art from reading the above-recited detailed description and drawings of certain exemplary embodiments. It should be understood that numerous variations, modifications, and additional embodiments are possible, and accordingly, all such variations, modifications, and embodiments are to be regarded as being within the spirit and scope of this application. For example, regardless of the content of any portion (e.g., title, field, background, summary, abstract, drawing figure, etc.) of this application, unless clearly specified to the contrary, there is no requirement for the inclusion in any claim herein or of any application claiming priority hereto of any particular described or

illustrated activity or element, any particular sequence of such activities, or any particular interrelationship of such elements. Moreover, any activity can be repeated, any activity can be performed by multiple entities, and/or any element can be duplicated. Further, any activity or element can be excluded, the sequence of activities can vary, and/or the interrelationship of elements can vary. Accordingly, the descriptions and drawings are to be regarded as illustrative in nature, and not as restrictive. Moreover, when any number or range is described herein, unless clearly stated otherwise, that number or range is approximate. When any range is described herein, unless clearly stated otherwise, that range includes all values therein and all subranges therein. Any information in any material (e.g., a United States patent, United States patent application, book, article, etc.) that has been incorporated by reference herein, is only incorporated by reference to the extent that no conflict exists between such information and the other statements and drawings set forth herein. In the event of such conflict, including a conflict that would render invalid any claim herein or seeking priority hereto, then any such conflicting information in such incorporated by reference material is specifically not incorporated by reference herein.

Claims:

1. An apparatus, comprising:

a compressed gas container;

an actuator adapted to discharge an actuating portion of a contents of the compressed gas container;

a plurality of vials adapted to store a liquid medicament, each vial defining a longitudinal axis, the longitudinal axes of the plurality of vials parallel and non-co-axial, the plurality of vials fluidly coupleable to the actuating portion of the contents of the gas container;

a plurality of pistons, each piston adapted to move within a corresponding vial from the plurality of vials, the plurality of pistons adapted to, in response to discharge of the actuating portion of the contents of the compressed gas container, transfer the liquid medicament from the plurality of vials and through a single needle; and

a housing adapted to contain the compressed gas container, the plurality of vials, and the plurality of pistons.

2. An apparatus, comprising:

a compressed gas container;

a plurality of vials adapted to store a liquid medicament, each vial defining a longitudinal axis, the longitudinal axes of the plurality of vials parallel and non-co-axial, the plurality of vials fluidly coupleable to an actuating portion of a contents of the compressed gas container; and

a plurality of pistons, each piston adapted to move within a corresponding vial from the plurality of vials, the plurality of pistons adapted to, in response to discharge of the actuating portion of the contents of the compressed gas container, transfer at least a portion of the liquid medicament from the plurality of vials and through a needle that is extendable into a body.

3. The apparatus of claim 2, further comprising a plurality of channels adapted to convey the at least a portion of the medicament from the plurality of vials to the needle.

4. The apparatus of claim 2, further comprising a housing adapted to contain the compressed gas container, the plurality of vials, and the plurality of pistons.

5. The apparatus of claim 2, further comprising a housing adapted to contain the compressed gas container, the plurality of vials, and the plurality of pistons, the housing defining a length and width approximating a credit card and a thickness of less than one inch.

6. The apparatus of claim 2, further comprising a housing adapted to contain the compressed gas container, the plurality of vials, and the plurality of pistons, the housing comprising a translucent portion adapted to allow viewing of at least one of a location of the needle, an activation status of the apparatus, and a status of the liquid medicament.

7. The apparatus of claim 2, further comprising a housing adapted to contain the compressed gas container, the plurality of vials, and the plurality of pistons, the housing comprising a status indicator.

8. The apparatus of claim 2, further comprising a housing adapted to contain the compressed gas container, the plurality of vials, and the plurality of pistons, the housing comprising a gas escape port.

9. The apparatus of claim 2, further comprising an actuator adapted to discharge an actuating portion of the contents of the compressed gas container.

10. The apparatus of claim 2, further comprising a spring-assisted actuator adapted to force the compressed gas container into a puncturer.

11. The apparatus of claim 2, further comprising a valve adapted to discharge an actuating portion of the contents of the compressed gas container.

12. The apparatus of claim 2, further comprising a puncturer adapted to penetrate the compressed gas container.

13. The apparatus of claim 2, further comprising a channel adapted to direct discharged contents of the compressed gas container.

14. The apparatus of claim 2, further comprising a pusher adapted to simultaneously move each of the plurality of pistons.

15. The apparatus of claim 2, further comprising a pusher adapted to simultaneously move each of the plurality of pistons in response to a pressure provided by discharged contents of the compressed gas container.

16. The apparatus of claim 2, further comprising a spring adapted to retract the needle.

17. The apparatus of claim 2, further comprising a frangible seal adapted to burst when an expulsion pressure is applied to the liquid medicament in at least one vial from the plurality of vials.

18. The apparatus of claim 2, further comprising a releasable actuation lock adapted to prevent accidental discharge of the actuating portion of the contents of the compressed gas container.

19. The apparatus of claim 2, further comprising a gas exhaust mechanism adapted to exhaust discharged contents of the compressed gas container away from the plurality of pistons.

20. An apparatus, comprising:

a compressed gas container;

an actuator adapted to discharge an actuating portion of a contents of the compressed gas container;

a biasing member configured to bias the actuator;

a vial adapted to store a liquid medicament, said vial defining a longitudinal axis that is non-coaxial with a longitudinal axis of the actuator, said vial fluidically coupleable to the actuating portion of the contents of the gas container;

a piston adapted to move within the vial, the piston adapted to, in response to discharge of the actuating portion of the contents of the compressed gas container, transfer the liquid medicament from the vial and through a single needle; and

a housing adapted to contain the compressed gas container, the vial, and the piston.

21. The apparatus of claim 20, wherein the actuator is adapted to discharge the actuating portion of the contents of the compressed gas container when the actuator is moved from a first configuration to a second configuration,

the actuator including a puncturer, a portion of the puncturer disposed apart from the compressed gas container when the actuator is in the first configuration, the portion of the puncturer being disposed within the compressed gas container when the actuator is in the second configuration.

22. The apparatus of claim 20, wherein the actuator is adapted to discharge the actuating portion of the contents of the compressed gas container when the actuator is moved from a first configuration to a second configuration,

the biasing member configured to bias the actuator toward the second configuration.

23. The apparatus of claim 20, wherein the actuator is adapted to discharge the actuating portion of the contents of the compressed gas container when the actuator is moved from a first configuration to a second configuration, the apparatus further comprising:

a retainer configured to selectively retain the actuator in the first configuration.

24. The apparatus of claim 20, wherein

the housing defines a gas chamber adjacent a portion of the piston; and

the actuator is configured to discharge the actuating portion of the contents of the compressed gas container into the gas chamber.

25. The apparatus of claim 20, wherein the compressed gas container is movably disposed within the housing.

26. The apparatus of claim 20, wherein:

the actuator is adapted to discharge the actuating portion of the contents of the compressed gas container when the actuator is moved from a first configuration to a second configuration; and

the compressed gas container is movably disposed within the housing such that when the actuator moves from the first configuration to the second configuration the compressed gas container is moved within the housing from a first position to a second position.

27. The apparatus of claim 20, wherein:

the actuator is adapted to discharge the actuating portion of the contents of the compressed gas container when the actuator is moved from a first configuration to a second configuration;

the compressed gas container is movably disposed within the housing such that when the actuator moves from the first configuration to the second configuration the compressed gas container is moved within the housing in a first direction; and

the vial is configured to move within the housing in a second direction substantially opposite the first direction in response to the actuator moving from the first configuration to the second configuration.

28. The apparatus of claim 20, wherein:

the compressed gas container is configured to move within the housing in a first direction substantially parallel to the longitudinal axis of the actuator; and

the vial is configured to move within the housing in a second direction substantially opposite the first direction when the actuating portion of the contents of the compressed gas container is discharged.

29. The apparatus of claim 20, wherein the vial is configured to be moved within the housing between a first position and a second position when the actuating portion of the contents of the compressed gas container is discharged, the apparatus further comprising:

a needle defining a lumen therethrough, the lumen being fluidically isolated from the vial when the vial is in the first position, the lumen being in fluid communication with the vial when the vial is in the second position.

30. The apparatus of claim 20, wherein a portion of the piston is disposed within a first end portion of the vial; and

a second end portion of the vial includes a frangible seal.

31. The apparatus of claim 20, wherein the piston is configured to move within the vial with a force sufficient to break a frangible seal disposed at an end portion of the vial.

32. The apparatus of claim 20, wherein the vial is a substantially cylindrical vessel configured to contain the liquid medicament.