[0009] There is disclosed a housing having an opening, a drug storage container, a plunger, and a plunger biasing member. The drug storage container may include a delivery member having an insertion end configured to extend at least partially through the opening. The plunger may have an inner surface defining an axial chamber. The plunger biasing member may be disposed at least partially within the axial chamber of the plunger and may be initially retained in an energized state. Releasing the plunger biasing member may drive the plunger in a distal direction to expel a drug from the drug storage container through the delivery member.

[0010] There is also disclosed a housing having an opening, a drug storage container, a guard moveable positioned adjacent to the opening, a plunger, a plunger biasing member, and a releaser member. The drug storage container may include a delivery member having an insertion end configured to extend at least partially through the opening. The drug storage container may be coupled with the housing such as to resist relative movement therebetween. The plunger may be moveable in a distal direction to expel a drug from the drug storage container through the delivery member. The releaser member may be operably coupled to the guard and the plunger. Further, the releaser member may be configured to utilize inertial forces from a user to drive the housing and the drug storage container toward an injection site of the user.

[0011] There is further disclosed a drug delivery device including a housing having an opening, a drug storage container, a plunger, a plunger biasing member, and a brake member. The drug storage container may include a body portion defining a longitudinal axis and a delivery member having an insertion end configured to extend at least partially through the opening during a delivery state. The plunger may be moveable in a distal direction to expel a drug from the drug storage container through the delivery member. The plunger biasing member may be configured to urge the plunger in the distal direction. The brake member may be operably coupled to the plunger. Movement of the plunger in the distal direction may cause the plunger and/or the brake member to rotate about the longitudinal axis.

BRIEF DESCRIPTION OF THE DRAWINGS

[0012] It is believed that the disclosure will be more fully understood from the following description taken in conjunction with the accompanying drawings. Some of the drawings may have been simplified by the omission of selected elements for the purpose of more clearly showing other elements. Such omissions of elements in some drawings are not necessarily indicative of the presence or absence of particular elements in any of the exemplary embodiments, except as may be explicitly delineated in the corresponding written description. Also, none of the drawings is necessarily to scale.

[0013] Fig. 1 is a perspective view of a drug delivery device according to an embodiment of the present disclosure.

[0014] Fig. 2 is cross-sectional view of the drug delivery device in Fig. 1.

[0015] Fig. 3 is an exploded assembly view of the drug delivery device in Fig. 2.

[0016] Figs. 4 and 5 are different perspective views of a plunger guide illustrated in Fig. 2.

[0017] Figs. 6 and 7 are different perspective views of a releaser member depicted in Fig. 2.

[0018] Fig. 8 is a partial perspective view of a plunger, a plunger biasing member, and a plunger guide shown in Fig. 2.

[0019] Fig. 9A is a cross-sectional view taken along line Z-Z in Fig. 9B.

[0020] Fig. 9B is perspective view of a plunger retaining arrangement prior retraction of a guard member. In Fig. 9B, the releaser member is illustrated as being semi-transparent. Also, in Fig. 9B, the guard extension and the guard biasing member are omitted for clarity.

[0021] Fig. 9C is a perspective view of a distal end of the plunger retaining arrangement in Fig. 9B. In Fig. 9C, each of the guard and the guard extension is illustrated as being semi-transparent. Also, in Fig. 9C, the guard biasing member, the plunger, and the plunger guide are omitted for clarity.

[0022] Fig. 9D is a cross-sectional view taken along line Y-Y in Fig. 9C.

[0023] Fig. 9E is perspective view of a proximal end of the retaining arrangement in Fig. 9B. In Fig. 9E, the releaser member is illustrated as being semi-transparent. Also, in Fig. 9E, the guard biasing member is omitted for clarity.

What is claimed is:

1. A drug delivery device comprising:

a housing;

a drug storage container fixed relative to the housing and including an interior surface and a stopper slidable along the interior surface;

a biasing member; and

a plunger operably coupled to the biasing member and configured to:

selectively rotate from an initial rotational position to a second rotational position under a biasing force exerted by the biasing member, and

translate linearly in a distal direction to drive the stopper through the drug storage container after rotating from the initial rotational position to the second rotational position.

2. The drug delivery device of claim 1, comprising a biasing member disposed at least partially within the plunger.

3. The drug delivery device of claim 2, the biasing member comprising a compression spring.

4. The drug delivery device of any one of claims 2 or 3, wherein the plunger is configured to translate linearly in the distal direction while rotating from the initial rotational position to the second rotational position.

5. The drug delivery device of any one of claims 1 to 4, comprising a plunger guide fixed relative to the housing, the plunger being disposed at least partially within the plunger guide.

6. The drug delivery device of claim 5, wherein one of the plunger and the plunger guide comprises a cam and the other one of the plunger and the plunger guide comprises a cam follower.

7. The drug delivery device of claim 6, wherein the biasing force of the biasing member urges the cam follower against the cam to urge the plunger to rotate from the initial rotational position toward the second rotational position.

8. The drug delivery device of claim 7, wherein the plunger includes the cam follower and the plunger guide includes the cam, and wherein the cam follower is formed by at least one projection extending outwardly from the plunger.

9. The drug delivery device of claim 8, wherein the plunger guide comprises an annular wall, wherein the cam is formed by a proximally facing surface of the annular wall.

10. The drug delivery device of any one of claims 5 to 9, comprising:

a releaser member operably coupled to the plunger and configured to selectively rotate relative to the housing, wherein each of the plunger and the plunger guide is disposed at least partially within the releaser member; and

a guard moveably positioned adjacent to an opening in the housing and operably coupled to the releaser member.

11. The drug delivery device of claim 10, wherein the guard has an extended position wherein the guard extends at least partially through the opening in the housing and a retracted position wherein the guard is positioned away from the extended position toward the housing.

12. The drug delivery device of claim 11, wherein the releaser member is prevented from rotating in at least one rotational direction when the guard is in the extended position, and wherein the releaser member is allowed to rotate in the at least one rotational direction when the guard is in the retracted position.

13. The drug delivery device of any one of claims 11 or 12, wherein moving the guard from the extended position to the retracted position allows the releaser member and the plunger to rotate jointly from the initial rotation position toward the second rotation position under the biasing force exerted by the biasing member.

14. A drug delivery device comprising:

a housing having an opening;

a drug storage container including a delivery member having an insertion end configured to extend at least partially through the opening;

a guard moveably positioned adjacent to the opening;

a plunger moveable in a distal direction to expel a drug from the drug storage container through the delivery member;

a plunger biasing member; and

a releaser member operably coupled to the guard and the plunger, wherein the releaser member is configured to rotate from an initial rotational position to a second rotational position under a biasing force exerted by the plunger biasing member.

15. The drug delivery device of claim 14, wherein the guard has an extended position wherein the guard extends at least partially through the opening in the housing and a retracted position wherein the guard is positioned away from the extended position toward the housing.

16. The drug delivery device of claim 15, wherein the releaser member is prevented from rotating from the initial rotational position toward the second rotation position when the guard is in the extended position, and wherein the releaser member is allowed to rotate from the initial rotational position toward the second rotational position when the guard is in the retracted position.

17. The drug delivery device of any one of claims 15 or 16, wherein moving the guard from the extended position to the retracted position allows the releaser member and the plunger to rotate jointly from the initial rotation position to the second rotation position under the biasing force exerted by the plunger biasing member.

18. The drug delivery device of any one of claims 15 to 17, comprising a guard extension, wherein the releaser member is disposed at least partially within the guard extension.

19. The drug delivery device of claim 18, comprising a first projection extending outwardly from the releaser member and a second projection extending inwardly from the guard extension, wherein the first and second projections engage one another to retain the releaser member in the initial rotational position.

20. The drug delivery device of claim 19, wherein the second projection slides out of engagement with the first projection to allow the releaser member to rotate away from the initial rotational position toward the second rotational position when the guard is in the retracted position.

21. A drug delivery device comprising:

a housing having an opening;

a drug storage container including a delivery member having an insertion end configured to extend at least partially through the opening;

a plunger;

a plunger biasing member initially retained in an energized state, wherein releasing the plunger biasing member drives the plunger in a distal direction to expel a drug from the drug storage container through the delivery member; and

an indicator having an initial position wherein the indicator retains the plunger biasing member in the energized state, and a second position wherein the indicator generates an audible signal indicating an end of drug delivery.

22. The drug delivery device of claim 21, comprising an indicator biasing member configured to bias the indicator in the proximal direction.

23. The drug delivery device of claim 22, comprising a cam and a cam follower, wherein the indicator includes the cam follower.

24. The drug delivery device of claim 23, wherein a biasing force of the indicator biasing member urges the cam follower against the cam to urge the indicator to rotate relative to the housing.

25. The drug delivery device of claim 24, wherein the indicator, when moving from the initial position to the second position, rotates relative to the housing and translates linearly in the proximal direction.