CLAIMS

1. A system for storing and delivering a predetermined amount of fluid, the system comprising:

(a) a syringe defining a longitudinal axis, comprising:

(i) a barrel comprising:

(A) a first end,

(B) a second end, and

(C) a lumen extending between the first and second ends,

(ii) a first flange disposed at the second end and extending away from the longitudinal axis, and

(iii) a plunger assembly configured to be received in the lumen of the barrel and move relative to the lumen to draw fluid into and dispense fluid from the syringe, wherein the plunger assembly comprises:

(A) a piston, and

(B) a plunger rod comprising a first end and a second end, wherein the first end of the plunger rod is coupled with the piston, wherein the plunger rod comprises a second flange at the second end of the plunger rod;

(b) a first stop feature, wherein the first stop feature includes:

(i) at least one snap fit feature, wherein the first stop feature is removably coupleable in a snap fit manner to at least one of the barrel, the first flange, or the plunger assembly using the at least one snap fit feature,

(ii) a proximal flange disposed at a proximal most end of the first stop feature and extending perpendicular to the longitudinal axis, wherein the proximal flange is configured to contact the first flange of the syringe, and

(iii) a distal flange disposed at a distal most end of the stop feature and

extending perpendicular to the longitudinal axis, wherein the proximal and distal flanges are configured to restrict advancement of the plunger assembly relative to the barrel to prevent the plunger assembly from advancing beyond a first predetermined distance from either a portion of the first flange or a portion of the barrel;

(c) an adaptor that includes a third flange; and

(d) a collar that includes a ramp feature, wherein the ramp feature extends transversely to the longitudinal axis, wherein the ramp feature is configured to urge the first and third flanges toward each other.

2. The system of claim 1, wherein the plunger rod is threadably coupled with the piston.

3. The system of claim 2, wherein the first end of the plunger rod comprises a threaded portion, wherein the piston comprises a threaded aperture configured to receive the threaded portion of the plunger rod.

4. The system of claim 1, wherein the first stop feature comprises an engagement portion, wherein a portion of the engagement portion has a shape that is complementary to a cross-sectional profile of the plunger rod.

5. The system of claim 1, wherein the plunger rod is configured to decouple from the piston, wherein the adapter is configured to be received in the second end of the barrel in the absence of plunger rod, wherein the adapter is configured to fluidly couple the syringe with a source of pressurized fluid to move the piston within the lumen.

6. The system of claim 5, wherein the adapter comprises a first tubular portion and a second tubular portion, wherein the third flange is disposed between the first and second tubular portions, wherein the first tubular portion is configured to be received in the second end of the barrel in the absence of plunger rod, wherein the third flange is configured to abut the first flange

when the first tubular portion is received in the second end of the barrel.

7. The system of claim 6, wherein the collar is configured to secure the adapter to the syringe.

8. The system of claim 7, wherein the collar is configured to envelop at least a portion of the first flange and at least a portion of the third flange.

9. The system of claim 7, wherein the collar further comprises a cavity configured to receive at least a portion of the first flange and at least a portion of the third flange.

10. The system of claim 9, wherein the ramp feature is configured to urge the first and third flanges toward each other when the first and third flanges are directed into the cavity.

11. The system of claim 10, wherein the ramp feature includes a tapered leading portion.

12. The system of claim 7, further comprising:

(a) a pump operable to provide a pressurized fluid medium; and

(b) a pressure regulator, wherein the pressure regulator is in fluid communication with the pump and is thereby operable to regulate the pressure of the pressurized fluid medium provided by the pump, wherein the pressure regulator is further in communication with the syringe such that the syringe is operable to receive the pressurized fluid medium.

13. A method of operating a syringe, wherein the syringe defines a longitudinal axis, wherein the syringe comprises a barrel and a plunger assembly including a plunger rod removably coupled to a piston, the method comprising:

(a) fluidly coupling the barrel with a source of fluid;

(b) moving the plunger assembly relative to the barrel in a first direction along

the longitudinal axis to draw fluid into the barrel;

(c) removably coupling a stop member to a portion of the syringe or the plunger rod;

(d) moving the plunger assembly relative to the barrel in a second direction that is opposite to the first direction until the stop member prevents further movement of the plunger assembly in the second direction;

(e) decoupling the plunger rod from the piston and removing the plunger rod from the barrel;

(f) securing an adapter to the syringe using a collar, wherein the collar comprises at least one ramp feature extending transversely to the longitudinal axis, wherein the at least one ramp feature includes a tapered leading portion that urges a flange of the adaptor towards a flange of the syringe; and

(g) subsequently advancing the piston further in the second direction.

14. The method of claim 13, further comprising decoupling the stop member from the syringe or the plunger rod.

15. The method of claim 13, wherein decoupling the plunger rod from the piston further comprises rotating the plunger rod relative to the piston to release a threaded engagement between the plunger rod and the piston.

16. The method of claim 13, further comprising:

(a) fluidly coupling the syringe to a source of pressurized fluid; and

(b) directing the pressurized fluid into the syringe to advance the piston further in the second direction.

17. The method of claim 13, wherein the first stop member includes a grip portion extending between the proximal and distal flanges.

18. The method of claim 13, wherein the adaptor includes proximal and distal portions, wherein the distal portion of the adaptor includes at least one O-ring, wherein the method further includes coupling the proximal end of the adaptor to proximal using a barbed connection feature.

19. A method of operating a syringe, wherein the syringe defines a longitudinal axis, wherein the syringe comprises a barrel including a proximal end and a distal end, wherein the syringe further comprises a plunger assembly configured to be received in the proximal end of the barrel, wherein the plunger assembly comprises a threaded plunger rod removably coupled to a threaded piston, the method comprising:

(a) fluidly coupling the distal end of the barrel with a source of fluid;

(b) moving the plunger assembly proximally relative to the barrel along the longitudinal axis to draw fluid into the barrel, wherein the fluid is received distal to the threaded piston;

(c) priming the syringe to purge air from the syringe;

(d) decoupling the threaded plunger rod from the threaded piston and removing the threaded plunger rod from the barrel while leaving the threaded piston in contact with the fluid;

(e) fluidly coupling the barrel to a source of pressurized fluid at the proximal end of the barrel using a collar, wherein the collar comprises at least one ramp feature extending transversely to the longitudinal axis that urges a flange of an adaptor towards a flange of the syringe; and

(f) subsequently directing pressurized fluid into the barrel to advance the threaded piston distally, wherein the act of directing pressurized fluid into the barrel comprises directing the pressurized fluid proximal to the threaded piston.

20. The method of claim 19, wherein the threaded plunger rod is externally threaded and the piston is internally threaded.