CLAIMS

What is claimed is:

1. An attachment for a syringe, the syringe comprising a syringe body and a plunger, the attachment comprising:

a main body having a plunger engaging end adapted to engage the plunger; and

an assist feature cooperatively associated with the main body and having a rolling element adapted to rotate relative to the attachment main body and to cooperate with the syringe body, whereby rotation of the rolling element causes movement of the attachment and the plunger relative to the syringe body.

2. The attachment of claim 1, wherein the assist feature rolling element includes at least one attachment toothed component adapted to engage at least one syringe body toothed component on the syringe body.

3. The attachment of claim 2, wherein the at least one attachment toothed component is a pinion gear on the rolling element.

4. The attachment of claim 2, wherein the at least one syringe body toothed component comprises at least one toothed rack extending axially along the syringe body.

5. The attachment of claim 1, wherein the rolling element provides a mechanical advantage for moving the attachment main body relative to the syringe body.

6. The attachment of claim 3, wherein the rolling element has an outer contact surface and wherein the outer contact surface is a radial distance from the axis of rotation of the rolling element that is greater than the pitch radius of the pinion gear.

7. The attachment of claim 4, wherein the at least one toothed rack is formed integrally with the syringe body.

8. The attachment of claim 1, wherein the attachment main body further comprises a guide end for receiving the syringe body movably supporting the attachment relative to the syringe body.

9. The attachment of claim 8, wherein the guide end includes a pair of laterally extending guide extensions for engaging the syringe body.

10. The attachment of claim 1, wherein the attachment main body includes a viewing window formed therein for permitting a user to view the syringe body when the attachment is installed thereon.

11. A system for operating a syringe comprising:

a syringe comprising a syringe body and a plunger;

an attachment comprising a main body having a plunger engaging end adapted to engage the plunger and an assist feature cooperatively associated with the main body and having a rolling element adapted to rotate relative to the attachment main body and to cooperate with the syringe body, whereby rotation of the rolling element causes movement of the attachment and the plunger relative to the syringe body.

12. The system of claim 11, wherein the assist feature rolling element includes at least one attachment toothed component adapted to engage at least one syringe body toothed component on the syringe body.

13. The system of claim 12, wherein the at least one attachment toothed component is a pinion gear on the rolling element.

14. The system of claim 2, wherein the at least one syringe body toothed component comprises at least one toothed rack extending axially along the syringe body.

15. The system of claim 1, wherein the syringe body has a flat surface and wherein the attachment includes at least one guide rail for guiding the attachment along the flat surface.

16. The system of claim 1, wherein the attachment main body includes a viewing window formed therein for permitting a user to view the flat surface of the syringe body.

17. A system for operating a syringe comprising:

a syringe comprising a syringe body and a plunger, the syringe body having an axially extending flat surface;

an attachment comprising:

a main body having a plunger engaging end adapted to engage the plunger and a guide end adapted to receive and support the attachment for sliding movement on the syringe body;

a thumb-engaging projection for permitting a user to apply force to the attachment to cause relative axial movement relative to the syringe body;

a viewing window formed in the main body for allowing a user to view the syringe flat surface; and

a pair of guide rails on the main body for supporting the attachment for sliding movement on the syringe flat surface.

18. The attachment of claim 17, wherein the attachment further comprises at least one guiding projection disposed near the thumb-engaging projection for supporting the attachment for sliding movement on the syringe body flat surface.

19. The system of claim 17, further comprising a tactile indicator for generating a tactile event to the user as the main body moves relative to the syringe body.

20. The attachment of claim 17, wherein the attachment main body guide end includes a U-shaped extension for receiving the syringe body.

CLAIMS

What is claimed is:

1. An attachment for controlling the operation of a syringe, the syringe comprising a barrel having an outer surface and a plunger, the attachment comprising:

a main body;

a syringe plunger engaging end extending from the main body and adapted to engage the syringe plunger;

a guide extending from the main body for supporting the main body for movement relative to the syringe barrel; and

a rolling element, mounted for rotation relative to the main body and adapted to engage the syringe barrel outer surface such that rotation of the rolling element causes the attachment to move relative to the syringe barrel;

whereby a user may actuate the plunger by rotation of the rolling element.

2. The attachment of claim 1, wherein the rolling element provides a mechanical advantage in moving the attachment relative to the syringe barrel.

3. The attachment of claim 1, wherein the rolling element comprises a friction surface for engaging the syringe barrel outer surface.

4. The attachment of claim 1, wherein the rolling element includes at least one toothed element.

5. The attachment of claim 1, wherein the rolling element is mounted to provide selective engagement with the syringe barrel.

6. The attachment of claim 1, wherein the main body includes at least two mounting stations for the rolling element to permit the user to adjustably mount the rolling element.

7. The attachment of claim 1, further comprising a tactile indicator for generating a tactile event to the user as the main body moves incrementally relative to the syringe barrel.

8. The attachment of claim 7, wherein the tactile indicator comprises at least one raised element on the syringe barrel adapted to be engaged by the rolling element.

9. The attachment of claim 1, further comprising an optical element mounted on the main body for enhancing visualization of gradations on the syringe barrel.

10. The attachment of claim 9, wherein the optical element is a magnifying element.

11. The attachment of claim 9, wherein the optical element includes a bottom flat surface and wherein the main body includes a pair of shoulders for retaining the bottom flat surface a predetermined distance from the syringe barrel.

12. The attachment of claim 1, wherein the guide includes a U-shaped member for engaging the outer surface of the syringe barrel.

13. A system for precision controlled delivery of a therapeutic composition comprising:

a syringe having a plunger and a barrel;

an attachment for enabling control of movement of the syringe plunger relative to the barrel, the attachment comprising:

a main body;

a syringe plunger engaging end extending from the main body and adapted to engage the syringe plunger;

a guide extending from the main body for supporting the main body for movement relative to the syringe barrel; and

a rolling element, mounted for rotation relative to the main body and adapted to engage an outer surface of the syringe barrel such that rotation of the rolling element causes the attachment to move relative to the syringe barrel;

whereby a user may actuate the plunger by rotation of the rolling element.

14. The system of claim 13, wherein the syringe barrel includes an axially extending flat surface and gradation indicators on the flat surface and wherein the rolling

element is adapted to rotate about an axis that extends parallel to the axially extending flat surface of the syringe barrel.

15. The system of claim 13, wherein the rolling element comprises a friction surface for engaging the syringe barrel outer surface.

16. The system of claim 13, wherein the rolling element is mounted to provide selective engagement with the syringe barrel.

17. The system of claim 13, wherein the main body includes at least two mounting stations for the rolling element to permit the user to adjustably mount the rolling element.

18. The system of claim 13, further comprising a tactile indicator for generating a tactile event to the user as the main body moves incrementally relative to the syringe barrel.

19. The system of claim 18, wherein the tactile indicator comprises at least one raised element on the syringe barrel adapted to be engaged by the rolling element.

20. The system of claim 18, wherein the tactile indicator includes a series of projections on the syringe barrel and a projection on the main body of the attachment for generating the tactile event as the main body projection passes over one of the series of the syringe barrel projections.

21. The system of claim 13, further comprising an optical element mounted on the main body for enhancing visualization of gradations on the syringe barrel.

22. The system of claim 21, wherein the optical element is a magnifying element.

23. The system of claim 21, wherein the optical element includes a bottom flat surface and wherein the main body includes a pair of shoulders for retaining the bottom flat surface a predetermined distance from the syringe barrel surface.

24. The system of claim 13, wherein the guide includes a U-shaped member for engaging the syringe barrel.

25. The system of claim 13, wherein the syringe is provided with 25 gradations each corresponding to 0.01 milliliters of volume and wherein the gradations extend over a length that is about 2 inches.

26. The system of claim 13, wherein the syringe is provided with 50 gradations each corresponding to 0.01 milliliters of volume and wherein the gradations extend over a length that is about 2 inches.

27. An attachment for controlling operation of a syringe, the syringe comprising a barrel having an outer surface and a plunger, the attachment comprising:

a main body; a syringe plunger engaging end extending from the main body and adapted to engage the syringe plunger;

a guide extending from the main body for supporting the main body for movement relative to the syringe barrel; and

an assist feature to enhance control of the movement of the attachment relative to the syringe barrel, the assist feature including a wheel configured to engage and move incrementally along the outer surface of the syringe barrel with a rolling motion, whereby a user may actuate the plunger by rotation of the wheel.

28. The attachment of claim 27, wherein the wheel is adapted to frictionally engage the syringe barrel outer surface.

29. The attachment of claim 27, wherein the wheel includes at least one pinion gear adapted to engage a toothed rack formed in the outer surface of the syringe barrel.

30. The attachment of claim 27, wherein the wheel is adapted to selectively engage the syringe barrel outer surface.