CLAIMS

1. A plunger for a retractable syringe comprising a barrel and a retractable needle, said plunger comprising a plunger member, a plunger outer and one or more locking members, a first of said one or more locking members mounted to the plunger outer and capable of preventing or impeding further movement of said plunger member relative to said plunger outer and/or said barrel after needle retraction.

2. The plunger of Claim 1, wherein the first locking member comprises a lock spring.

3. The plunger of Claim 2, wherein the first locking member is capable of engaging the plunger member after needle retraction to thereby prevent or impede further movement of said plunger member relative to said plunger outer and/or said barrel.

4. The plunger of any preceding claim, which comprises a second locking member which is capable of engaging the barrel at the end of injection of fluid contents to thereby prevent or impede further movement of the plunger outer relative to the barrel.

5. The plunger of any preceding claim, wherein the plunger further comprises a biasing member whereby the plunger member and the plunger outer co-operate to releasably maintain said biasing member in an initially energized state.

6. The plunger of Claim 5, wherein the biasing member is an initially compressed spring.

7. The plunger of any preceding claim, wherein the plunger further comprises a needle-engaging member.

8. The plunger of any one of Claims 1-7, further comprising a plunger seal.

9. The plunger of Claim 8, wherein the plunger seal is mounted to the plunger member.

10. The plunger of Claim 8 or Claim 9, wherein the plunger seal comprises the needle-engaging member.

11. The plunger of any one of Claims 8-10, wherein the plunger seal comprises one or more fluid conduits that are capable of directing fluid to said retractable needle.

12. The plunger of any preceding claim, further comprising a control rod.

13. The plunger of Claim 12, wherein the control rod and plunger member are releasably connected.

14. A needle assembly comprising a retractable needle that comprises a cannula and a needle body comprising one or more fluid channels that in use direct fluid to said cannula.

15. The needle assembly of Claim 14, whereby in use the one or more fluid channels co-operate with one or more fluid conduits of a plunger seal to direct fluid to said cannula.

16. The needle assembly of Claim 14 or Claim 15, wherein the needle body is engageable by a needle-engaging member of a plunger to facilitate retraction of said retractable needle.

17. The needle assembly of Claim 16, wherein the plunger is according to any one of Claims 1-13.

18. The needle assembly of any one of Claims 14 to 17, further comprising a needle retainer releasably coupled to said needle body.

19. The needle assembly of Claim 18, wherein the needle retainer comprises a plurality of barbed arms that in use are releasably coupled to said needle body.

20. The needle assembly of Claim 18 or Claim 19, wherein the needle retainer comprises a plurality of centering bosses that facilitate self-centering of the needle retainer during syringe assembly.

21. The needle assembly of any one of Claims 18 to 20, wherein the needle retainer comprises a plurality of guide channels which facilitate or guide the flow of glue or adhesive for adhering the needle retainer to the barrel during syringe assembly.

22. The needle assembly of any one of Claims 14-21, further comprising an ejector.

23. The needle assembly of Claim 22, wherein the ejector facilitates release of the retractable needle from the retainer to allow retraction of said retractable needle when engaged by said plunger.

24. The needle assembly of Claim 22 or Claim 23, wherein the ejector comprises a plurality of tabs that releasably engage said retractable needle.

25. The needle assembly of Claim 24, wherein said tabs provide an acceptable or desired level of retraction activation force for disengaging the retractable needle.

26. The needle assembly of any one of Claims 14-25, which further comprises a needle seal.

27. A retractable syringe comprising a barrel, a plunger and the needle assembly of any one of Claims 14-26.

28. The retractable syringe of Claim 27, wherein the plunger is according to any one of Claims 1-13.

29. A retractable syringe comprising a barrel, a plunger according to any one of Claims 1-13 and a needle assembly.

30. The retractable syringe of Claim 29, wherein the needle assembly is according to any one of Claims 13-25.

31. The retractable syringe of any one of Claims 27 to 30 wherein the barrel comprises a collar.

32. The retractable syringe of Claim 31, wherein the collar comprises one or more releasing members.

33. The retractable syringe of Claim 32, wherein the one or more releasing members are in the form of, or comprise, a release ring operable to disengage said plunger member from said plunger outer to allow decompression of said biasing means.

34. The retractable syringe of any one of Claims 27-33, further comprising a lock formed between the barrel and the plunger after injection of fluid contents of said syringe.

35. The retractable syringe of any one of Claims 27-34, which is a prefilled syringe.

36. A method of making a retractable syringe including the step of inserting a needle retainer into a barrel of the retractable syringe, the needle retainer comprising a plurality of centering bosses that facilitate self-centering of the needle retainer in the barrel.

37. The method of Claim 36, including the step of adhering the needle retainer to the barrel by providing a flow of adhesive through guide channels of said needle retainer.

38. The method of Claim 36 or Claim 37, wherein the retractable syringe is according to any one of Claims 27 to 35.

CLAIMS

1. A plunger for a retractable syringe comprising a barrel and a retractable needle, said plunger comprising a plunger member that comprises a plunger seal having one or more fluid conduits that are capable of directing fluid to said retractable needle, a plunger outer and one or more locking members, a first of said one or more locking members mounted to the plunger outer and capable of engaging the plunger member after needle retraction, thereby preventing or impeding further movement of said plunger member relative to said plunger outer and/or said barrel after needle retraction.

2. The plunger of Claim 1, wherein the one or more fluid conduits are in a recess of the plunger seal that engages the retractable needle.

3. The plunger of Claim 1 or Claim 2, wherein the first locking member comprises a lock spring.

4. The plunger of Claim 3, wherein the lock spring is a stainless steel R-shaped clip.

5. The plunger of any preceding claim, which comprises a second locking member which is capable of engaging the barrel at the end of injection of fluid contents to thereby prevent or impede further movement of the plunger outer relative to the barrel.

6. The plunger of any preceding claim, wherein the plunger further comprises a biasing member whereby the plunger member and the plunger outer co-operate to releasably maintain said biasing member in an initially energized state.

7. The plunger of Claim 6, wherein the biasing member is an initially compressed spring.

8. The plunger of any one of Claims 1-7, further comprising a control rod.

9. The plunger of Claim 8, wherein the control rod and plunger member are releasably connected.

10. A retractable syringe comprising a barrel, the plunger of any one of Claims 1-9 and a needle assembly that comprises the retractable needle.

11. The retractable syringe of Claim 10, wherein the retractable needle comprises a cannula and a needle body comprising fluid channels that in use co-operate with one or more fluid conduits of a plunger seal to direct fluid to said cannula.

12. The retractable syringe of Claim 11, wherein the needle body is engageable by a needle-engaging member of a plunger to facilitate retraction of said retractable needle.

13. The retractable syringe of Claim 11 or Claim 12, the needle assembly further comprising a needle retainer releasably coupled to said needle body.

14. The retractable syringe of Claim 13, wherein the needle retainer comprises a plurality of barbed arms that in use are releasably coupled to said needle body.

15. The retractable syringe of Claim 13 or Claim 14, wherein the needle retainer comprises a plurality of centering bosses that facilitate self-centering of the needle retainer during syringe assembly.

16. The retractable syringe of any one of Claims 13 to 15, wherein the needle retainer comprises a plurality of guide channels which facilitate or guide the flow of glue or adhesive for adhering the needle retainer to the barrel during syringe assembly.

17. The retractable syringe of any one of Claims 10-16, the needle assembly further comprising an ejector.

18. The retractable syringe of Claim 17, wherein the ejector facilitates release of the retractable needle from the retainer to allow retraction of said retractable needle when engaged by said plunger.

19. The retractable syringe of Claim 17 or Claim 18, wherein the ejector comprises a plurality of tabs that releasably engage said retractable needle.

20. The retractable syringe of Claim 19, wherein said tabs provide an acceptable or desired level of retraction activation force for disengaging the retractable needle.

21. The retractable syringe of any one of Claims 10 to 20, which further comprises a needle seal.

22. The retractable syringe of any one of Claims 10 to 21 wherein the barrel comprises a collar.

23. The retractable syringe of Claim 22, wherein the collar comprises one or more releasing members.

24. The retractable syringe of Claim 23, wherein the one or more releasing members are in the form of, or comprise, a release ring operable to disengage said plunger member from said plunger outer to allow decompression of said biasing means.

25. The retractable syringe of any one of Claims 10-24, further comprising a lock formed between the barrel and the plunger after injection of fluid contents of said syringe.

26. The retractable syringe of any one of Claims 10-25, which is a prefilled syringe.

27. A method of making a retractable syringe according to any one of Claims 15-26 including the step of inserting the needle retainer into a glass barrel of the retractable syringe, the plurality of centering bosses facilitating self-centering of the needle retainer in the barrel.

28. The method of Claim 27, including the step of adhering the needle retainer to the barrel by providing a flow of adhesive through guide channels of said needle retainer.