CLAIMS

1. A replaceable needle assembly for a retractable syringe comprising a plunger and a barrel that comprises a mounting member, said replaceable needle assembly comprising: a retractable needle that is engageable by said plunger to facilitate retraction of the retractable needle; a needle mount that is removably mountable to the mounting member of the barrel; and a needle retainer to prevent inadvertent retraction of said retractable needle.

2. The replaceable needle assembly of Claim 1, wherein the needle mount comprises a male member which is receivable by a female member of said mounting member.

3. The replaceable needle assembly of Claim 2, wherein the needle mount comprises a screw-thread which in use receives a complementary screw thread of said mounting member.

4. The replaceable needle assembly of any preceding claim, wherein the needle retainer comprises a plurality of fingers that releasably engage said retractable needle to thereby prevent inadvertent retraction of said retractable needle.

5. The replaceable needle assembly of Claim 4, wherein said plurality of fingers are releasable from said retractable needle upon retraction of said plunger when engaged with said retractable needle.

6. A barrel for a retractable syringe, said barrel comprising a mounting member to which is removably mountable a retractable, needle mount of a replaceable needle assembly.

7. The barrel of Claim 6, wherein said mounting member comprises a female member that receives a male member of the needle mount of said retractable, replaceable needle assembly.

8. The barrel of Claim 7, wherein the mounting member comprises a screw-thread which in use receives a complementary screw thread of the needle mount of said replaceable needle assembly.

9. The barrel of any one of Claims 6 to 8, wherein the barrel further comprises a needle seal coupled to the mounting member.

10. The barrel of any one of Claims 6 to 9, which further comprises a collar.

11. The barrel of Claim 10, wherein the collar comprises a releasing member.

12. The barrel of Claim 10 or Claim 11, wherein the collar comprises one or more lock elements capable of forming a lock with one or more lock elements of a plunger after retraction.

13. The barrel of any one of Claims 6-12, comprising the replaceable needle assembly according to any one of Claims 1-5 mounted thereto.

14. A plunger for a retractable syringe, said plunger comprising: a biasing means; a plunger member releasably connected to a control rod; a plunger housing; and a plunger seal mounted to the plunger member, said plunger seal comprising a releasably coupled inner member and outer member; wherein the plunger member, control rod and plunger housing co-operate to maintain said biasing means in an initially energized state prior to retraction.

15. The plunger of Claim 14, wherein the plunger seal comprises a stop to prevent or minimize forward travel of the inner member relative to the outer member.

16. The plunger of Claim 14 or Claim 15, wherein the inner member comprises a needle-engaging portion.

17. The plunger of any one of Claims 14 to 16, wherein the control rod comprises an arm that initially engages said plunger housing prior to retraction to facilitate maintaining said biasing means in an initially energized state prior to retraction.

18. The plunger of any one of Claims 14 to 17, arranged so that at the end of depression of said plunger to deliver fluid contents of said retractable syringe, said control rod is disengageable from said plunger housing to facilitate a release of energy from said biasing means to thereby retract said control rod and said plunger member with a needle coupled thereto.

19. The plunger of any one of Claims 14-18, wherein the biasing means is a spring.

20. The plunger of any one of Claims 14-19, wherein the plunger outer comprises one or more lock elements capable of forming a lock with a barrel after retraction.

21. A retractable syringe kit comprising the barrel of any one of Claims 6-13 prefilled with fluid contents and the plunger of any one of Claims 14-20 in combination; and a plurality of replaceable needle assemblies according to any one of Claims 1-5.

22. The retractable syringe kit of Claim 21, wherein the plurality of needle assemblies respectively comprise a 0.5 inch needle, a 1.0 inch needle and a 1.5 inch needle.

23. The retractable syringe kit of Claim 21 or Claim 22, which comprises a plug removably mounted to the mounting member of the barrel.

24. A retractable syringe comprising: the replaceable needle assembly of any one of Claims 1 to 5 removably mounted to the barrel of any one of Claims 6 to 13 and a plunger capable of engaging the retractable needle.

25. The retractable syringe of Claim 24, wherein the plunger is according to any one of Claim 14 to 20.

26. The retractable syringe of Claim 25, further comprising a lock formed between respective lock elements of said plunger housing and the collar of said barrel, which lock prevents or hinders removal of the plunger housing from the retractable syringe after retraction of the retractable needle.

27. The retractable syringe of Claim 25 or Claim 26, which is a prefilled retractable syringe.

28. A method of operating a retractable syringe comprising a barrel and a plunger, including the step of removably mounting a replaceable needle assembly comprising a retractable needle that is engageable by said plunger to facilitate retraction of the retractable needle; a needle mount that is removably mountable to the barrel; and a needle retainer to prevent inadvertent retraction of said retractable needle to a barrel of a retractable syringe prefilled with fluid contents.

29. The method of Claim 28, which includes the step of removing a plug from a mounting member of the barrel prior to removably mounting the replaceable needle assembly to the mounting member.

30. The method of Claim 28 or Claim 29, which includes the step of screw-threadedly mounting a needle mount of the replaceable needle assembly to a mounting member of the barrel.

31. The method of any one of Claims 28-30, wherein the replaceable needle assembly is according to any one of Claims 1 to 5; the barrel is according to any one of Claims 6 to 13; and/or the plunger is as according to any one of Claims 14 to 20.

32. A method of making a pre-filled syringe including the steps of coupling a plunger and a plunger seal in a syringe barrel, wherein the syringe barrel is prefilled with fluid contents, and comprises a plug member removably mounted thereto or a replaceable needle assembly removably mounted thereto.

33. The method of any one of Claims 28 to 32, wherein the replaceable needle assembly is according to any one of Claims 1 to 5; the barrel is according to any one of Claims 6 to 13; and/or the plunger is as according to any one of Claims 14 to 20.

CLAIMS

1. A replaceable needle assembly for a retractable syringe comprising a plunger and a barrel that comprises a mounting member, said replaceable needle assembly comprising: a retractable needle that is engageable by said plunger to facilitate retraction of the retractable needle; a needle mount that is removably mountable to the mounting member of the barrel; and a needle retainer that releasably engages said retractable needle to prevent inadvertent retraction of said retractable needle.

2. The replaceable needle assembly of Claim 1, wherein the needle mount comprises a male member which is receivable by a female member of said mounting member.

3. The replaceable needle assembly of Claim 2, wherein the needle mount comprises a screw-thread which in use receives a complementary screw thread of said mounting member.

4. The replaceable needle assembly of any preceding claim, wherein the needle retainer comprises a plurality of fingers that releasably engage said retractable needle to thereby prevent inadvertent retraction of said retractable needle.

5. The replaceable needle assembly of Claim 4, wherein said plurality of fingers are releasable from said retractable needle upon retraction of said plunger when engaged with said retractable needle.

6. A barrel for a retractable syringe, said barrel comprising a replaceable needle assembly according to any one of Claims 1-5 removably mounted thereto.

7. The barrel of Claim 6, wherein said mounting member comprises a female member that receives a male member of the needle mount of said retractable, replaceable needle assembly.

8. The barrel of Claim 7, wherein the mounting member comprises a screw-thread which in use receives a complementary screw thread of the needle mount of said replaceable needle assembly.

9. The barrel of any one of Claims 6 to 8, wherein the barrel further comprises a needle seal coupled to the mounting member.

10. The barrel of any one of Claims 6 to 9, which further comprises a collar.

11. The barrel of Claim 10, wherein the collar comprises a releasing member.

12. The barrel of Claim 10 or Claim 11, wherein the collar comprises one or more lock elements capable of forming a lock with one or more lock elements of a plunger after retraction.

13. A plunger for a retractable syringe, said plunger comprising: a biasing means; a plunger member releasably connected to a control rod; a plunger housing; and a plunger seal mounted to the plunger member, said plunger seal comprising a releasably coupled inner member and outer member; wherein the plunger member, control rod and plunger housing co-operate to maintain said biasing means in an initially energized state prior to retraction.

14. The plunger of Claim 13, wherein the plunger seal comprises a stop to prevent or minimize forward travel of the inner member relative to the outer member.

15. The plunger of Claim 13 or Claim 14, wherein the inner member comprises a needle-engaging portion.

16. The plunger of Claim 15, wherein the needle-engaging portion is for engaging a foot of a needle body of a retractable needle.

17. The plunger of any one of Claims 13 to 16, wherein the control rod comprises an arm that initially engages said plunger housing prior to retraction to facilitate maintaining said biasing means in an initially energized state prior to retraction.

18. The plunger of any one of Claims 13 to 17, arranged so that at the end of depression of said plunger to deliver fluid contents of said retractable syringe, said control rod is disengageable from said plunger housing to facilitate a release of energy from said biasing means to thereby retract said control rod and said plunger member with a needle coupled thereto.

19. The plunger of any one of Claims 13-18, wherein the biasing means is a spring.

20. The plunger of any one of Claims 13-19, wherein the plunger outer comprises one or more lock elements capable of forming a lock with a barrel after retraction.

21. A retractable syringe kit comprising the barrel of any one of Claims 6-12 prefilled with fluid contents and the plunger of any one of Claims 13-20 in combination; and a plurality of replaceable needle assemblies according to any one of Claims 1-5.

22. The retractable syringe kit of Claim 21, wherein the plurality of needle assemblies respectively comprise a 0.5 inch needle, a 1.0 inch needle and a 1.5 inch needle.

23. The retractable syringe kit of Claim 21 or Claim 22, which comprises a plug removably mounted to the mounting member of the barrel.

24. A retractable syringe comprising the barrel of any one of Claims 6 to 13 and a plunger capable of engaging the retractable needle.

25. The retractable syringe of Claim 24, wherein the plunger is according to any one of Claims 14 to 20.

26. The retractable syringe of Claim 25, further comprising a lock formed between respective lock elements of said plunger housing and the collar of said barrel, which lock prevents or hinders removal of the plunger housing from the retractable syringe after retraction of the retractable needle.

27. The retractable syringe of Claim 25 or Claim 26, which is a prefilled retractable syringe.

28. A method of operating a retractable syringe comprising a barrel and a plunger, including the step of removably mounting: a replaceable needle assembly comprising a retractable needle that is engageable by said plunger to facilitate retraction of the retractable needle; a needle mount that is removably mountable to the barrel; and a needle retainer that releasably engages said retractable needle to prevent inadvertent retraction of said retractable needle; to a barrel of a retractable syringe prefilled with fluid contents.

29. The method of Claim 28, which includes the step of removing a plug from a mounting member of the barrel prior to removably mounting the replaceable needle assembly to the mounting member.

30. The method of Claim 28 or Claim 29, which includes the step of screw-threadedly mounting a needle mount of the replaceable needle assembly to a mounting member of the barrel.

31. The method of any one of Claims 28-30, wherein the replaceable needle assembly is according to any one of Claims 1 to 5; the barrel is according to any one of Claims 6 to 12; and/or the plunger is as according to any one of Claims 14 to 20.

32. A method of making a pre-filled syringe including the steps of coupling a plunger and a plunger seal in a syringe barrel, wherein the syringe barrel is

prefilled with fluid contents, and comprises a plug member removably mounted thereto or a replaceable needle assembly removably mounted thereto.

33. The method of any one of Claims 28 to 32, wherein the replaceable needle assembly is according to any one of Claims 1 to 5; the barrel is according to any one of Claims 6 to 13; and/or the plunger is as according to any one of Claims 14 to 20.

CLAIMS

1. A replaceable needle assembly for a retractable syringe comprising a plunger and a barrel that comprises a mounting member, said replaceable needle assembly comprising: a retractable needle that is engageable by said plunger to facilitate retraction of the retractable needle; a needle mount that is removably mountable to the mounting member of the barrel; and a needle retainer that comprises a plurality of fingers that can releasably engage said retractable needle to prevent inadvertent retraction of said retractable needle until spring-driven retraction of the plunger and retractable needle engaged therewith disengages the retractable needle from the fingers of the needle retainer

2. The replaceable needle assembly of Claim 1, wherein the needle mount comprises a male member which is receivable by a female member of said mounting member.

3. The replaceable needle assembly of Claim 2, wherein the needle mount comprises a screw-thread which in use receives a complementary screw thread of said mounting member.

4. The replaceable needle assembly of Claim 1, wherein said plurality of fingers are releasable from said retractable needle upon retraction of said plunger when engaged with said retractable needle.

5. A barrel for a retractable syringe, said barrel comprising a replaceable needle assembly according to any one of Claims 1-4 removably mounted thereto.

6. The barrel of Claim 5, wherein said mounting member comprises a female member that receives a male member of the needle mount of said retractable, replaceable needle assembly.

7. The barrel of Claim 6, wherein the mounting member comprises a screw-thread which in use receives a complementary screw thread of the needle mount of said replaceable needle assembly.

8. The barrel of any one of Claims 5 to 7, wherein the barrel further comprises a needle seal coupled to the mounting member.

9. The barrel of any one of Claims 5 to 8, which further comprises a collar.

10. The barrel of Claim 9, wherein the collar comprises a releasing member.

11. The barrel of Claim 9 or Claim 10, wherein the collar comprises one or more lock elements capable of forming a lock with one or more lock elements of a plunger after retraction.

12. A retractable syringe kit comprising the barrel of any one of Claims 5-11 prefilled with fluid contents and a plunger a plunger capable of engaging the retractable needle, in combination; and a plurality of replaceable needle assemblies according to any one of Claims 1-4.

13. The retractable syringe kit of Claim 12, wherein the plurality of needle assemblies respectively comprise a 0.5 inch needle, a 1.0 inch needle and a 1.5 inch needle.

14. The retractable syringe kit of Claim 12 or Claim 13, which comprises a plug removably mounted to the mounting member of the barrel.

15. A retractable syringe comprising the replaceable needle assembly of any one of Claims 1-4 mounted to a barrel of the retractable syringe and a plunger capable of engaging the retractable needle.

16. The retractable syringe of Claim 15, wherein the barrel is according to any one of Claims 5-11.

17. The retractable syringe of Claim 15 or Claim 16, which is a prefilled retractable syringe.

18. The retractable syringe kit of any one of Claims 12 to 14 or the retractable syringe of any one of Claims 15-17, wherein the plunger comprises: a biasing means; a plunger member releasably connected to a control rod; a plunger housing; and a plunger seal mounted to the plunger member, said plunger seal comprising a releasably coupled inner member and outer member; wherein the plunger member, control rod and plunger housing co-operate to maintain said biasing means in an initially energized state prior to retraction.

19. The retractable syringe kit or the retractable syringe of Claim 18, wherein the plunger seal comprises a stop to prevent or minimize forward travel of the inner member relative to the outer member.

20. The retractable syringe kit or the retractable syringe of Claim 18 or Claim 19, wherein the inner member comprises a needle-engaging portion.

21. The retractable syringe kit or the retractable syringe of Claim 20, wherein the needle-engaging portion is for engaging a foot of a needle body of a retractable needle.

22. The retractable syringe kit or the retractable syringe of any one of Claims 18 to 21, wherein the control rod comprises an arm that initially engages said

plunger housing prior to retraction to facilitate maintaining said biasing means in an initially energized state prior to retraction.

23. The retractable syringe kit or the retractable syringe of any one of Claims 18 to 22, arranged so that at the end of depression of said plunger to deliver fluid contents of said retractable syringe, said control rod is disengageable from said plunger housing to facilitate a release of energy from said biasing means to thereby retract said control rod and said plunger member with a needle coupled thereto.

24. The retractable syringe kit or the retractable syringe of any one of Claims 18-23, wherein the biasing means is a spring.

25. The retractable syringe kit or the retractable syringe of any one of Claims 18-24, wherein the plunger outer comprises one or more lock elements capable of forming a lock with the barrel after retraction.

26. The retractable syringe kit or the retractable syringe of Claim 25, wherein the lock is formed between respective lock elements of said plunger housing and the collar of said barrel, which lock prevents or hinders removal of the plunger housing from the retractable syringe after retraction of the retractable needle.

27. A method of operating a retractable syringe comprising a barrel prefilled with fluid contents and a plunger, including the step of removably mounting: a replaceable needle assembly comprising a retractable needle that is engageable by said plunger to facilitate retraction of the retractable needle; a needle mount that is removably mountable to the barrel; and a needle retainer that comprises a plurality of fingers that releasably engage said retractable needle to prevent inadvertent retraction of said retractable needle until spring-driven retraction of the plunger and retractable needle engaged therewith disengages the retractable needle from the fingers of the needle retainer.

28. The method of Claim 27, which includes the step of removing a plug from a mounting member of the barrel prior to removably mounting the replaceable needle assembly to the mounting member.

29. The method of Claim 27 or Claim 28, which includes the step of screw-threadedly mounting a needle mount of the replaceable needle assembly to a mounting member of the barrel.

30. A method of making a pre-filled syringe including the steps of coupling a plunger and a plunger seal in a syringe barrel, wherein the syringe barrel is

prefilled with fluid contents, and comprises the replaceable needle assembly of any one of Claims 1-4 removably mounted thereto.

31. The method of any one of Claims 27 to 30, wherein the barrel is according to any one of Claims 5 to 11.

32. The method of any one of Claims 27-31, wherein the plunger comprises: a biasing means; a plunger member releasably connected to a control rod; a plunger housing; and a plunger seal mounted to the plunger member, said plunger seal comprising a releasably coupled inner member and outer member; wherein the plunger member, control rod and plunger housing co-operate to maintain said biasing means in an initially energized state prior to retraction.