Disposable Syringe

The present invention seeks to provide a disposable syringe which overcomes some of the prior art.

The present invention also seeks to provide a disposable syringe in which the needle becomes safely housed in the barrel of the syringe, after use.

In one broad form, the present invention provides a disposable syringe, including:

- a plunger movable within a barrel;
- a needle carrier to retain a needle; and,
- a connection means attached to the plunger,

wherein, the connection means includes an engaging recess formed with a neck and an enlarged chamber, and, the needle carrier includes a plurality of hooks, each hook having a deformable arm and an enlarged head, such that, when said hooks become fully inserted within the engaging recess, the arms of the hooks spring back to their uncompressed state and the head of each hook is permanently retained within the chamber.

Preferably, said disposable syringe, whereby upon depression of the plunger said connection means is adapted to engage the needle carrier in an angularly displaced manner, such that, upon subsequent withdrawal of the plunger, the needle carrier and needle become housed within the barrel in a canted manner.

Preferably, said neck of said engaging recess of said connection means is angularly offset from a longitudinal axis of said syringe.

Preferably, each hook is formed of rigid by somewhat flexible plastics or like material, the permit some deformation during engagement with said connection means.

Preferably, said connection means can either be permanently or removably attached to said plunger.

Preferably, said connection means is attached to said plunger via a shaped protrusion being provided on said plunger which is adapted to be received in a corresponding recess provided in said connection means, or vice versa.

Preferably, the needle carrier includes a sealing device as a separate component.

Preferably, the sealing device includes a flange that is wider than the opening of the barrel, and is adapted to form a sealing between the outer wall of the sealing device and the inner wall of a barrel.

Preferably, the sealing device has a seat below the flange.

Preferably, the sealing device is formed as an O-ring.

Preferably, the sealing device has at least one chamfered edge.

Preferably, sealing device is chamfered at the lower side of the sealing device.

Preferably, the barrel has, shoulders at the distal end, which allows for the resting of the sealing device.

Preferably, the seat of the sealing device rests on the barrel shoulders.

Preferably, the shoulders are substantially flat with sloped edges.

Preferably, the shoulders are substantially near a thicker barrel wall.

Preferably, the barrel has at least one ratchet protrusion at its proximal end.

Preferably, the chamfered edge of the sealing device allows for the sealing device to pass through the ratchet protrusions of the barrel, upon entering the barrel at the proximal end, however, does not allow for the sealing device to exit the barrel.

Preferably, two or more protrusions are attached to anywhere along the interior barrel wall for engagement with the needle carrier.

Preferably, the protrusions have a pyramid-shaped head.

Preferably, the needle carrier is formed such that it includes depressions, which are able to receive the protrusions along the barrel wall and/or barrel sleeve, in order for the barrel to engage the needle carrier.

Preferably, the needle carrier is engaged by the barrel by a locking mechanism.

Preferably, the locking mechanism is a snap-lock mechanism.

Preferably, the needle carrier is adapted to hold the needle by the use of a carrier stem.

Preferably, the carrier stem is attached to a needle hub.

Preferably, the carrier stem and the needle hub are attached using the Luer-lock principle.

Preferably, the stem is formed by a truncated cone.

Preferably, the needle hub is formed by a truncated cone.

Preferably, the stem is inserted into the hub.

Preferably, a screw thread engages the stem and hub.

Preferably, a female thread engages the stem and hub.

Preferably, the needle hub is turned, thereby creating a seal between the hub and the stem such that the diameter of the stem is substantially larger than the diameter of the hub, and the stem and the hub are at the same angle.

Preferably, the hooks are of spring formation.

Preferably, the connection means is formed of rubber or plastic material.

Preferably, the needle carrier is formed of plastic material.

Preferably, once the needle has been retracted, it is adapted to rest any where along the barrel wall, whereby by further depression of the plunger the needle is bent.

Preferably, once the needle has been retracted, it is adapted to rest any at the shoulders of the barrel wall, whereby by further depression of the plunger the needle pushes the shoulder and is thereby bent.

Preferably, after bending of the needle, further depression of the plunger results in coiling of the needle.

In a further broad form, the present invention provides a connection means, for use in a syringe, adapted to be attached to a plunger, and to receive a needle carrier, the needle carrier being connected to a needle, such that, the connection means enables a substantial angular displacement of the needle, thereby canting the needle, after the retraction of the needle into the syringe.

Preferably, said connection means is formed of rubber or like material to permit some deformation during engagement of the needle carrier therewith.

Preferably, said connection means including an engaging recess formed with a neck and an enlarged chamber, for engagement with a plurality of hooks of said needle carrier, each hook having a deformable arm and an enlarged head, such that, when each hook is inserted within the engaging recess, the arm of the hooks spring

back to their uncompressed state and the head of each hook is permanently retained within the chamber.

Preferably, the neck of said engaging recess of said connection means is angularly offset from a longitudinal axis of the syringe.

In a further broad form, the present invention provides a needle carrier, for use in a syringe, the needle carrier including:

- at least one holding means;
- a sealing device

whereby the needle carrier is adapted to be attached to a needle, and can also be attached to the plunger of a syringe, through the holding means, and whereby the sealing means is a separate component to the holding means.

Preferably, the needle carrier is adapted to be attached to a needle, through a stem.

Preferably, the needle holding means includes a plurality of hooks.

In a further broad form, the present invention provides a sealing device for use in a syringe, the sealing device including a flange, whereby the flange is adapted to be wider than the opening of the syringe, and when inserted into the syringe, the flange is compressed such that to allow sealing between the flange and the syringe.

Preferably, the barrel of the disposable syringe with protrusions having a pyramid-shaped head attached to anywhere along the interior barrel wall and/or barrel sleeve for engagement with the needle carrier.

THE CLAIMS:

1. A disposable syringe, including:
   - a plunger movable within a barrel;
   - a needle carrier to retain a needle; and,
   - a connection means attached to the plunger,

   wherein, the connection means includes an engaging recess formed with a neck and an enlarged chamber, and the needle carrier includes a plurality of hooks, each hook having a deformable arm and an enlarged head, such that, when said hooks become fully inserted within the engaging recess, the arms of the hooks spring back to their uncompressed state and the head of each hook is permanently retained within the chamber.

2. A disposable syringe as claimed in Claim 1, whereby upon depression of the plunger, said connection means is adapted to engage the needle carrier in an angularly displaced manner, such that, upon subsequent withdrawal of the plunger, the needle carrier and needle become housed within the barrel in a canted manner.

3. A disposable syringe as claimed in any one of Claims 1 to 2, wherein said neck of said engaging recess of said connection means is angularly offset from a longitudinal axis of said syringe.

4. A disposable syringe as claimed in any one of Claims 1 to 3, whereby the sealing device has a seat below the flange.

5. A disposable syringe as claimed in any one of Claims 1 to 4, whereby the seat of the sealing device rests on the barrel shoulders.

6. The disposable syringe as claimed in any one of Claims 1 to 5, whereby the shoulders are substantially flat with sloped edges.

7. The disposable syringe as claimed in any one of Claims 4 to 5, whereby the said sealing device has at least one chamfered edge allowing for the said sealing device to pass through the ratchet protrusions of the barrel, and upon entering the barrel

at the proximal end, however, does not allow for the sealing device to exit the barrel.

8. The disposable syringe as claimed in any one of Claims 1 to 6, whereby the protrusions at the distal end, used for attachment to anywhere along the interior barrel wall and/or barrel sleeve for engagement with the needle carrier, have a pyramid-shaped head.

9. The disposable syringe as claimed in Claim 8, whereby the needle carrier is formed such that it includes depressions, which are able to receive the protrusions along the barrel wall, in order for the barrel to engage the needle carrier.

10. The disposable syringe as claimed in Claim 9, whereby the needle carrier is engaged by the barrel by a locking mechanism.

11. The disposable syringe as claimed in Claim 10, whereby the locking mechanism is a snap-lock mechanism.

12. The disposable syringe as claimed in any one of Claims 1 to 11, whereby the carrier stem and the needle hub are attached using the Luer-lock principle.

13. The disposable syringe as claimed in Claim 12, whereby a screw thread engages the stem and hub.

14. The disposable syringe as claimed in Claim 13, whereby a female thread engages the stem and hub.

15. The disposable syringe as claimed in any one of Claims 13 to 14, whereby the needle hub is turned, thereby creating a seal between the hub and the stem such that the diameter of the stem is substantially larger than the diameter of the hub, and the stem and the hub are at the same angle.

PCT/SG2005/000177
04 APRIL 2006

16. The disposable syringe as claimed in any one of Claims 1, 2 or 9, whereby the needle carrier is formed of plastic material.

17. A connection means which is formed of rubber or like material to permit some deformation during engagement of the needle carrier therewith, for use in a syringe, adapted to be attached to a plunger, and to receive a needle carrier;
said needle carrier being connected to a needle, such that, the connection means enables a substantial angular displacement of the needle, thereby canting the needle, after the retraction of the needle into the syringe.

18. A connection means as claimed in Claim 17, wherein said connection means includes an engaging recess formed with a neck and an enlarged chamber, for engagement with a plurality of hooks of said needle carrier, each hook having a deformable arm and an enlarged head, such that, when each hook is inserted within the engaging recess, the arm of the hooks spring back to their uncompressed state and the head of each hook is permanently retained within the chamber.

19. A connection means as claimed in Claim 18, wherein the neck of said engaging recess of said connection means is angularly offset from a longitudinal axis of the syringe.

20. The needle carrier as claimed in any one of Claims 1, 2, 9, 16 to 18, whereby the needle holding means includes a plurality of hooks.

21. A sealing device for use in a syringe, the sealing device including a flange, whereby the flange is adapted to be wider than the opening of the syringe, and when inserted into the syringe, the flange is compressed such that to allow sealing between the flange and the syringe.

AMENDED SHEET

PCT/SG2005/000172
04 APRIL 2006

22. A barrel of a syringe with protrusions having a pyramid-shaped head attached to anywhere along the interior barrel wall and/or barrel sleeve for engagement with the needle carrier.

AMENDED SHEET