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Claims

1. A safety device (1) for a pre-filled syringe (2), comprising
- - an outer body (1.3);
- a hollow support body (1.2) to retain the pre-filled syringe (2) therein,
- the hollow support body (1.2) is received in the outer body (1.3);
- a hollow needle shield (1.1) that slidable relative to the support body (1.2) and
- guiding means for guiding the movement of the needle shield (1.1.) relative to the support body (1.2), wherein the guiding means comprise
- a deflectable flexible arm (1.1.4) with a guide pin (1.1.3) radial extending therefrom, the flexible arm (1.1.4) extending essentially parallel to a central axis (A) of the safety device (1) and
- a guide track (1.2.2) that guides the guide pin (1.1.3) within and along the guide track (1.2.2) so that the guide pin (1.1.3) follows the guide track (1.2.2) when the needle shield (1.1) is slid relative to the support body (1.2),
- whereby the flexible arm (1.1.4) is laterally deflected as the guide pin (1.1.3) follows the guide track (1.1.2),
- whereby the flexible arm (1.1.4) is connected to or is integrally formed to the needle shield (1.1) or the support body (1.2) and the guide track (1.2.2) is formed into the other of the needle shield (1.1) or the support body (1.2).

2. A safety device (1) according to one of the claim 1, characterized in that the guiding means further comprise a longitudinal tongue (1.1.2) that is received in a longitudinal groove (1.2.1) when the needle shield (1.1) is moved with respect to the support body (1.2) in a distal direction, whereby a relative rotation of the needle shield (1.1) and the support body (1.2) is prevented.

3. A safety device (1) according to one of the previous claims, characterized in that the flexible arm (1.1.4) is deflectable and energizable by the action of a relaxing spring mean (1.4).

4. A safety device (1) according to one of the previous claims, characterized in that the guide pin (1.1.3) is located in an intermediate position (PI) in proximity of a proximal end of the guide track (1.2.2), when the needle shield (1.1) is in a retracted position (R), and in an end position (PE) in proximity of a distal end of the guide track (1.2.2), when the needle shield (1.1) is an advanced position (E), whereas the needle shield (1.1) is substantially received in the support body (1.2) in the retracted position (R) and protrudes the distal end of the support body (1.2) in the advanced position (E).

5. A safety device (1) according to one of the previous claims, characterized in that the guide pin (1.1.3) in a start position (PS), in the end position (PE) and in the intermediate position (PI) is non-biased in a lateral direction (L) perpendicular to the central axis (A).

6. A safety device (1) according to one of the previous claims, characterized in that the flexible arm (1.1.4) is deflected to bias the guide pin (1.1.3) in the lateral direction (L) when the guide pin (1.1.3) moves along the guide track (1.2.2) from the intermediate position (PI) towards the end position (PE).

7. A safety device (1) according to one of the previous claims, characterized in that the needle shield (1.1) protrudes the support body (1.2) in an initial position (I) and that the spring mean (1.4) is in a partially energized state when the needle shield (1.1) is in the initial position (I).

8. A safety device (1) according to one of the previous claims, characterized in that the needle shield (1.1) is retained in an initial position (I) by a flexing gate element (1.2.3) retaining the guide pin (1.1.3) in a start position (PS) between the distal and the proximal end of the guide track (1.2.2).

9. A safety device (1) according to claim 8, characterized in that the flexing gate element (1.2.3) guides the movement of the guide pin (1.1.3) within the guide track (1.2.2).

10. A safety device (1) according to claim 8 or 9, characterized in that the flexing gate element (1.2.3) is deflectable in a lateral direction (L) as to allow the guide pin (1.1.3) to move from the start position (PS) towards the intermediate position (PI).

11. A safety device (1) according to claims 8 to 10, characterized in that a sloped section (1.2.3.1) of the flexing gate element (1.2.3) guides the movement of the guide pin (1.1.3) along a section of the guide track (1.2.2) and prevents the guide pin (1.1.3) from re-entering the start position (PS).

12. A safety device (1) according to one of the previous claims, characterized in that the needle shield (1.1) further comprises at least one radial outwardly protruding retaining catch (1.1.6) to releasably retain the needle shield (1.1) in the retracted position (R) and the support body (1.2) further comprises at least one release flap (1.2.7) hinged to the support body (1.2), whereas an interior surface of an outer body (1.3) engages the release flap (1.2.7) that presses the retaining catch (1.1.6) inwardly to release the needle shield (1.1).

13. A safety device (1) according to one of the previous claims, characterized in that the outer body (1.3) comprises an inward projection (1.3.5) that abuts the guide pin (1.1.3) in an intermediate position (PI) to retain the needle shield (1.1) in a retracted position (R).

14. A safety device (1) according to claim 13, characterized that the guide pin (1.1.3) and the inward projection (1.3.5) comprise a substantially triangular cross-section.

15. A safety device (1) according to claim 13 or 14, characterized in that the inward projection (1.3.5) moves along a section of the guide track (1.2.2) thereby releasing the needle shield (1.1) from being retained in the retracted position (R).

16. An injection device (D) comprising a safety device (1) according to one of the previous claims and a pre-filled syringe (2), wherein the pre-filled syringe (2) is retained within the support body (1.2) of the safety device (1), so that the hypodermic needle (2.1) protrudes the distal end of the support body (1.2), whereas the hypodermic needle (2.1) is surrounded by the needle shield (1.1) in the initial position (I) and/or in the advanced position (E) and the hypodermic needle (2.1) is exposed when the needle shield (1.1) is in the retracted position (R).

THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:

1. A safety device for a pre-filled syringe, comprising:

- a hollow support body to retain the pre-filled syringe therein,

- a piston rod for moving a piston within an inner cavity of the pre-filled syringe,

- a longitudinal notch formed into an outer surface of the support body,

- an outer body slidably arranged relative to the support body, wherein an inwardly protruding dent is formed into an inner surface of the substantially hollow outer body that is received in the longitudinal notch, wherein a proximal end of the piston rod abuts with or is an integral part of the outer body,

- a hollow needle shield that slidable relative to the support body and

- guiding means for guiding the movement of the needle shield relative to the support body, wherein the guiding means comprise

- a deflectable flexible arm with a guide pin radial extending therefrom, the flexible arm extending essentially parallel to a central axis of the safety device and

- a guide track that guides the guide pin within and along the guide track so that the guide pin follows the guide track when the needle shield is slid relative to the support body,

- whereby the flexible arm is laterally deflected as the guide pin moves along a section of the guide track oriented at an acute angle relative to the central axis,

- whereby the flexible arm is connected to or is integrally formed to the needle shield or the support body and the guide track is formed into the other of the needle shield or the support body,

wherein the guiding means further comprise a longitudinal tongue that is received in a longitudinal groove when the needle shield is moved with respect to the support body in a distal direction, whereby a relative rotation of the needle shield and the support body is prevented.

2. A safety device according to one of the previous claims, characterized in that the flexible arm is deflectable and energizable by the action of a relaxing spring mean.

3. A safety device according to one of the previous claims, characterized in that the guide pin is located in an intermediate position in proximity of a proximal end of the guide track, when the needle shield is in a retracted position, and in an end position in proximity of a distal end of the guide track, when the needle shield is an advanced position, whereas the needle shield is substantially received in the support body in the retracted position and protrudes the distal end of the support body in the advanced position.

4. A safety device according to one of the previous claims, characterized in that the guide pin in a start position, in the end position and in the intermediate position is non-biased in a lateral direction perpendicular to the central axis.

5. A safety device according to one of the previous claims, characterized in that the flexible arm is deflected to bias the guide pin in the lateral direction when the guide pin moves along the guide track from the intermediate position towards the end position.

6. A safety device according to one of the previous claims, characterized in that the needle shield protrudes the support body in an initial position and that the spring mean is in a partially energized state when the needle shield is in the initial position.

7. A safety device according to one of the previous claims, characterized in that the needle shield is retained in an initial position by a flexing gate element retaining the guide pin in a start position between the distal and the proximal end of the guide track.

8. A safety device according to claim 7,
characterized in that the flexing gate element guides the movement of the guide pin within the guide track.

9. A safety device according to claim 7 or 8,
characterized in that the flexing gate element is deflectable in a lateral direction as to allow the guide pin to move from the start position towards the intermediate position.

10. A safety device according to claims 7 to 9,
characterized in that a sloped section of the flexing gate element guides the movement of the guide pin along a section of the guide track and prevents the guide pin from re-entering the start position.

11. A safety device according to one of the previous claims,
characterized in that the needle shield further comprises at least one radial outwardly protruding retaining catch to releasably retain the needle shield in the retracted position and the support body further comprises at least one release flap hinged to the support body, whereas an interior surface of an outer body engages the release flap that presses the retaining catch inwardly to release the needle shield.

12. A safety device according to one of the previous claims,
characterized in that the outer body comprises an inward projection that abuts the guide pin in an intermediate position to retain the needle shield in a retracted position.

13. A safety device according to claim 12,
characterized that the guide pin and the inward projection comprise a substantially triangular cross-section.

14. A safety device according to claim 12 or 13,
characterized in that the inward projection moves along a section of the guide track thereby releasing the needle shield from being retained in the retracted position.

15. An injection device comprising a safety device according to one of the previous claims and a pre-filled syringe, wherein the pre-filled syringe is retained within the support body of the safety device, so that the hypodermic needle protrudes the distal end of the support body, whereas the hypodermic needle is surrounded by the needle shield in the initial position and/or in the advanced position and the hypodermic needle is exposed when the needle shield is in the retracted position.