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Claims

1. A safety device (1) for a pre-filled syringe (2), comprising
- a hollow support body (1.2) to retain the pre-filled syringe (2) therein,
- a retaining collar (1.5) releasably mounted to the support body (1.2) and mounted to the prefilled syringe (2) and
- a rotating collar (1.4) comprising a central opening for the reception of the prefilled syringe (2) and at least one outwardly protruding guide pin (1.4.1) that protrudes through a guide track (1.2.2) formed into the support body (1.2.2), whereas the rotating collar (1.4) is arranged within the support body (1.2) and slidable along an axial length of the support body (1.2) and rotatable around a central axis (A) of the safety device (1) and whereas the retaining collar (1.5) is movable with respect to the support body (1.2) in a proximal direction when the retaining collar (1.5) is released from being mounted to the support body (1.2) by the rotating collar (1.4).

2. A safety device (1) according to claim 1, characterized in that an outer body (1.3) slidably arranged relative to the support body (1.2) abuts the outwardly protruding guide pin (1.4.1), so that the rotating collar (1.4) jointly moves together with the outer body (1.3) along a substantial axial length of the support body (1.2).

3. A safety device (1) according to one of the previous claims, characterized in that an inclined section (1.2.2.1) of the guide track (1.2.2) is oriented at an acute angle relative to an axial section (1.2.2.2) of the guide track (1.2.2), whereas the inclined section (1.2.2.1) is connected to the axial section (1.2.2.2) by a narrowed section limited by a flexing gate element (1.2.4) that is resiliently deflectable.

4. A safety device (1) according to claim 3, characterized in that the safety device (1) produces an audible feedback

when the guide pin (1.4.1) passes the narrowed section limited by the flexing gate element (1.2.4).

5. A safety device (1) according to one of the previous claims, characterized in that the rotating collar (1.4) is biased in the proximal direction by a spring (1.6) arranged within the support body.

6. A safety device (1) according to claim 5, characterized in that a needle shield (1.1) is slidably arranged relative to the support body (1.2), whereas the needle shield (1.1) is biased in a distal direction by the spring (1.6)

7. A safety device (1) according to claim 6, characterized in that the needle shield (1.1) has a central aperture (1.1.3) of variable diameter (D1, D2).

8. A safety device (1) according to claim 6 or 7, characterized in that the needle shield (1.1) is made by the process of a two-shot injection moulding.

9. A safety device (1) according to one of the previous claims, characterized in that the retaining collar (1.5) comprises at least one ratchet arm (1.5.3) that latches to a locking cut-out (1.3.5) formed into the outer body (1.3) to lock the retaining collar (1.5) relative to the outer body (1.3).

10. A safety device (1) according to claim 9, characterized in that the outer body (1.3) comprises a plurality of locking cut-outs (1.3.5) that are axially displaced from each other and aligned in parallel to the central axis (A).

11. A safety device (1) according to one of the previous claims, characterized in that a guide rail (1.3.3) is formed into an inner surface of the outer body (1.3).

12. A safety device (1) according to claim 11, characterized in that the guide rail (1.3.3) comprises a first section (1.3.3.1) that is oriented at an angle less than 90 degrees with respect to the central axis (A) and a second section (1.3.3.2) that substantially extends parallel to the central axis (A).

13. An injection device (D) comprising a safety device (1) according to one of the previous claims and a pre-filled syringe (2), wherein the safety device (1) comprises
- a hollow support body (1.2) to retain the pre-filled syringe (2) therein,
- a retaining collar (1.5) releasably mounted to the support body (1.2) and mounted to the prefilled syringe (2) and
- a rotating collar (1.4) arranged within the support body (1.2) comprising a central opening for the reception of the prefilled syringe (2) and at least one outwardly protruding guide pin (1.4.1) that protrudes through a guide track (1.2.2) formed into the support body (1.2.2),

wherein the rotating collar (1.4) is slidable along an axial length of the support body (1.2) and rotatable around a central axis (A) of the safety device (1) and wherein the retaining collar (1.5) is movable with respect to the support body (1.2) in a proximal direction when the retaining collar (1.5) is released from being mounted to the support body (1.2) by the rotating collar (1.4), and wherein the pre-filled syringe (2) is retractable into the support body (1.2) from an advanced position (PA) to a retracted position (PR), in which the hypodermic needle (2.1) is surrounded by the support body (1.2).

14. An injection device (D) according to claim 13, characterized in that the ratchet arm (1.5.3) and the plurality of locking cut-outs visually indicate an amount of a medication contained in the inner cavity (2.3.1).

CLAIMS

The invention claimed is:

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

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

a retaining collar releasably mounted to the support body and

a rotating collar comprising a central opening for the reception of the prefilled syringe and at least one outwardly protruding guide pin that protrudes through a guide track formed into the support body,

a guide rail formed into an inner surface of an outer body,

whereas the guide track comprises an inclined section and an axial section connected therewith,

whereas the rotating collar is arranged within the support body and slidable along an axial length of the support body and rotatable around a central axis of the safety device and whereas the retaining collar is movable with respect to the support body in a proximal direction when the retaining collar is released from being mounted to the support body by the rotating collar.

2. A safety device according to claim 1, characterized in that an outer body slidably arranged relative to the support body abuts the outwardly protruding guide pin, so that the rotating collar jointly moves together with the outer body along a substantial axial length of the support body.

3. A safety device according to claim 1, characterized in that the inclined section of the guide track is oriented at an acute angle relative to the axial section of the guide track, whereas the inclined section is connected to the axial section by a narrowed section limited by a flexing gate element that is resiliently deflectable.

4. A safety device according to claim 3, characterized in that the safety device produces an audible feedback when the guide pin passes the narrowed section limited by the flexing gate element.

5. A safety device according to claim 1, characterized in that the rotating collar is biased in the proximal direction by a spring arranged within the support body.

6. A safety device according to claim 5, characterized in that a needle shield is slidably arranged relative to the support body, whereas the needle shield is biased in a distal direction by the spring.

7. A safety device according to claim 6, characterized in that the needle shield has a central aperture of variable diameter.

8. A safety device according to claim 6, characterized in that the needle shield is made by

the process of a two-shot injection moulding.

9. A safety device according to claim 1, characterized in that the retaining collar comprises at least one ratchet arm that latches to a locking cut-out formed into an outer body to lock the retaining collar relative to the outer body.

10. A safety device according to claim 9, characterized in that the outer body comprises a plurality of locking cut-outs that are axially displaced relative to each other.

11. A safety device according to claim 1, characterized in that the guide rail comprises a first section that is oriented at an angle less than 90 degrees with respect to the central axis and a second section that substantially extends parallel to the central axis.

12. An injection device comprising a safety device and a pre-filled syringe, wherein the safety device comprises

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

a retaining collar releasably mounted to the support body and

a rotating collar arranged within the support body comprising a central opening for the reception of the prefilled syringe and at least one outwardly protruding guide pin that protrudes through a guide track formed into the support body,

a guide rail formed into an inner surface of an outer body,

whereas the guide track comprises an inclined section and an axial section connected therewith,

wherein the rotating collar is slidable along an axial length of the support body and rotatable around a central axis of the safety device and wherein the retaining collar is movable with respect to the support body in a proximal direction when the retaining collar is released from being mounted to the support body by the rotating collar,

and wherein the pre-filled syringe is retractable into the support body from an advanced position to a retracted position, in which the hypodermic needle is surrounded by the support body.

13. The injection device according to claim 12, characterized in that the retaining collar comprises at least one ratchet arm that latches to a locking cut-out formed into an outer body to lock the retaining collar relative to the outer body.

14. A safety device according to claim 13, characterized in that the outer body comprises a plurality of locking cut-outs that are axially displaced relative to each other.

15. An injection device according to claim 14, characterized in that the ratchet arm and the plurality of locking cut-outs visually indicate an amount of a medication contained in an inner cavity.