Claims

1. An injection device (D) comprising
   - a pre-filled syringe (2) comprising
   - a barrel (2.3) with an inner cavity (2.3.1) in fluid communication with
   - a hypodermic needle (2.1) attached to a distal end of the pre-filled syringe(2),
   - a piston (2.4) fluid-tightly sealing a proximal end of the inner cavity (2.3.1) and a safety device (1) comprising
   - a support body (1.2) for retaining the pre-filled syringe (2) therein,
   - an outer body (1.3) operably connected to the piston (2.4),
   - a needle shield (1.1),
   - a releasable retaining means (R)

wherein the needle shield (1.1), the support body (1.2) and the outer body (1.3) are telescopable relative to each other, wherein the piston (2.4) is movable in a distal direction to expel a medicament contained in the inner cavity (2.3.1) through the hypodermic needle (2.1) by a manual actuation of the outer body (1.3), wherein a telescoping movement of the outer body (1.3) with respect to the support body (1.2) is restricted by the retaining means (R) when the needle shield (1.1) is moved with respect to the support body (1.2) in a proximal direction from an initial position (I) towards a retracted position (II), and wherein the retaining means (R) is released when the needle shield (1.1) reaches the retracted position (II) allowing for a telescoping movement of the outer body (1.3) with respect to the support body (1.2) to expel the medicament contained in the pre-filled syringe (2) through the hypodermic needle (2.1), characterized in that the retaining means (R) comprises a radial projection (1.2.3) connected to or being an integral part of one of the support body (1.2) or the outer body (1.3) and a longitudinal recess (1.3.2) formed into the other of the support body (1.2) or the outer body (1.3) and adapted to receive the radial projection (1.2.3), wherein the longitudinal recess (1.3.2) comprises a first section (1.3.2.1) and a second section (1.3.2.2) separated by a web (1.3.3) from each other, wherein the radial projection (1.2.3) engages the first section (1.3.2.1) of the longitudinal recess (1.3.2) to prevent the telescoping movement of the outer body (1.3) with respect to the support body (1.2) until the needle shield (1.1) has reached a retracted position (II), wherein the radial projection (1.2.3) has to overcome the web (1.3.3) before the outer body (1.3) is allowed to telescope with respect to the support body (1.2), wherein a retention force required to deflect the radial projection (1.2.3) exceeds a force required to move the needle shield (1.1) with respect to the support body (1.2) from the initial position (I) to the retracted position (II).

2. An injection device (D) according to claim 1, characterized in that a piston rod (2.5) connected to the piston (2.4) abuts the outer body (1.3) or is arranged with the outer body (1.3) as one piece.

3. An injection device (D) according to one of the claims 1 or 2, characterized in that the second section (1.3.2.2) of the longitudinal recess (1.3.2) extends over a substantial axial length of one of the outer body (1.3) or the support body (1.2).

4. An injection device (D) according to one of the claims 1 to 3, characterized in that the radial projection (1.2.3) engages the second section (1.3.2.2) of the longitudinal recess (1.3.2) when the retaining means (R) are released and the radial projection (1.2.3) moves along the second section (1.3.2.2) of the longitudinal recess (1.3.2) when the outer body (1.3) is moved with respect to the support body (1.2).

5. An injection device (D) according to one of the previous claims, characterized in that guiding means (G) is disposed between the needle shield (1.1) and the support body (1.2) that guide the telescoping movement of the needle shield (1.1) relative to the support body (1.2).

6. An injection device (D) according to claim 5, characterized in that the guiding means (G) comprise

- a guide pin (1.1.3) connected to one of the needle shield (1.1) or the support body (1.2) and
- a guide track (1.2.5) formed into the other of the needle shield (1.1) or the support body (1.2),

wherein the guide pin (1.1.3) protrudes into the guide track (1.2.5) and moves along the guide track (1.2.5) when the needle shield (1.1) is moved relative to the support body (1.2).

7. An injection device (D) according to claim 5 or 6,

characterized in that the needle shield (1.1) is releasably retained in the initial position (I) by the guide pin (1.1.3) being retained in a start position (PI) within the guide track (1.2.5), wherein the hypodermic needle (2.1) is surrounded by the needle shield (1.1) in the initial position (I).

8. An injection device (D) according to one of the previous claims, characterized in that the needle shield (1.1) is movable in the distal direction from the retracted position (II) to an advanced position (III), wherein the needle shield (1.1) in the advanced position (III) surrounds the hypodermic needle (2.1) after an injection.

9. An injection device (D) according to claim 8, characterized in that the needle shield (1.1) is permanently retained in the advanced position (III) by the guide pin (1.1.3) being retained in an end position (PIII) defined by a U-shaped indent of the guide track (1.2.5).

CLAIMS

The invention claimed is:

1. An injection device comprising
a pre-filled syringe comprising
a barrel with an inner cavity in fluid communication with
a hypodermic needle attached to a distal end of the pre-filled syringe,
a piston fluid-tightly sealing a proximal end of the inner cavity and a safety device comprising
a support body for retaining the pre-filled syringe therein,
an outer body operably connected to the piston,
a needle shield,
a releasable retaining means
wherein the needle shield, the support body and the outer body are telescopable relative to each other, wherein the piston is movable in a distal direction to expel a medicament contained in the inner cavity through the hypodermic needle by a manual actuation of the outer body, wherein a telescoping movement of the outer body with respect to the support body is restricted by the retaining means when the needle shield is moved with respect to the support body in a proximal direction from an initial position towards a retracted position, and wherein the retaining means is released when the needle shield reaches the retracted position allowing for a telescoping movement of the outer body with respect to the support body to expel the medicament contained in the pre-filled syringe through the hypodermic needle, wherein the retaining means comprises a radial projection connected to or being an integral part of one of the support body or the outer body and a longitudinal recess formed into the other of the support body or the outer body and adapted to receive the radial projection, wherein the longitudinal recess comprises a first section and a second section separated by a web from each other, wherein the radial projection engages the first section of the longitudinal recess to prevent the telescoping movement of the outer body with respect to the support body until the needle shield has reached a retracted position, wherein the radial projection has to overcome the web before the outer body is allowed to telescope with respect to the support body, wherein a retention force required to deflect the radial projection exceeds a force required to move the needle shield with respect to the support body from the initial position to the retracted position.

2. An injection device according to claim 1, wherein a piston rod connected to the piston abuts the outer body or is arranged with the outer body as one piece.

3. An injection device according to claim 1, wherein the longitudinal recess comprises a first section and a second section separated by a web from each other.

4. An injection device according to claim 3, wherein the radial projection engages the first section of the longitudinal recess to restrict the telescoping movement of the outer body with respect to the support body.

5. An injection device according to claim 3, wherein the second section of the longitudinal recess extends over a substantial axial length of one of the outer body or the support body.

6. An injection device according to claim 1, wherein the radial projection engages the second section of the longitudinal recess when the retaining means are released and the radial projection moves along the second section of the longitudinal recess when the outer body is moved with respect to the support body.

7. An injection device according to claim 1, wherein guiding means is disposed between the needle shield and the support body that guide the telescoping movement of the needle shield relative to the support body.

8. An injection device according to claim 7, wherein the guiding means comprise
a guide pin connected to one of the needle shield or the support body and
a guide track formed into the other of the needle shield or the support body,
wherein the guide pin protrudes into the guide track and moves along the guide track when the needle shield is moved relative to the support body.

9. An injection device according to claim 7, wherein the needle shield is releasably retained in the initial position by the guide pin being retained in a start position within the guide track, wherein the hypodermic needle is surrounded by the needle shield in the initial position.

10. An injection device according to claim 1, wherein the needle shield is movable in the distal direction from the retracted position to an advanced position, wherein the needle shield in the advanced position surrounds the hypodermic needle after an injection.

11. An injection device according to claim 10, wherein the needle shield is permanently retained in the advanced position by the guide pin being retained in an end position defined by a U-shaped indent of the guide track.