Claims

1. A needle shield (1.1) comprising at least two different plastic materials of different flexibility and a central aperture (1.1.3) of variable diameter (D1, D2), wherein the central aperture (1.1.3) comprises a first diameter (D1) for retaining a needle cap (2.2) therein, wherein the diameter of the central aperture (1.1.3) changes upon removal of the needle cap (2.2) from the first diameter (D1) to a second diameter (D2) by virtue of a memory effect of the material of the needle shield (1.1), characterized in that the needle shield (1.1) is made by an injection moulding process.

2. A needle shield (1.1) according to claim 1,
characterized in that the needle shield (1.1) is made from an arbitrary combination of plastics materials of the following classes: polymer, elastomer, silicone and silicone elastomer.

3. A needle shield (1.1) according to one of the previous claims,
characterized in that a distal end wall (1.1.1) of the needle shield (1.1) is made from a relatively flexible plastics material.

4. A needle shield (1.1) according to one of the previous claims,
characterized in that a peripheral part (1.1.4) of a distal end wall (1.1.1) is made from a relatively stiff plastics material, whereas an opening part (1.1.5) of the distal end wall (1.1.1) is made from a relatively flexible plastics material.

5. 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 and
- a needle shield (1.1) according to one of the previous claims, wherein the needle shield (1.1) is slidably arranged relative to the support body (1.2).

6. A safety device (1) according to claim 5,

characterized in that the needle shield (1.1) is slidable relative to the support body (1.2) from at least an advanced position (I) to a retracted position (II), wherein the needle shield (1.1) protrudes the support body (1.2) in the advanced position (I).

7. A safety device (1) according to claim 5 or 6,
characterized in that the safety device (1) comprises a spring (1.5) that biases the needle shield (1.1) with respect to the support body (1.2) in a distal direction.

8. An injection device (D) comprising a safety device (1) according to one of the previous claims 5 to 7 and a pre-filled syringe (2) with a hypodermic needle (2.1) attached to a distal end of the pre-filled syringe (2), wherein the hypodermic needle (2.1) is covered by a needle cap (2.2) frictionally affixed to the distal end of the pre-filled syringe (2),
characterized in that the needle cap (2.2) protrudes through the central aperture (1.1.3) of the needle shield (1.1), whereby the needle shield (1.1) frictionally engages the needle cap (2.2).

9. An injection device (D) according to claim 8,
characterized in that the first diameter (D1) of the central aperture (1.1.3) corresponds to an outer diameter of the needle cap (2.2).

10. An injection device (D) according to claim 8 or 9,
characterized in that the second diameter (D2) of the central aperture (1.1.3) is sized to allow the hypodermic needle (2.1) to protrude through the central aperture (1.1.3) of the needle shield (1.1).

11. An injection device (D) according to one of the previous claims 8 to 10,
characterized in that the needle shield (1.1) is retained against a biasing force exerted upon the needle shield (1.1) by the spring (1.5) in the retracted position (II) by the frictional engagement of the needle shield (1.1) with the needle cap (2.2).

THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:

1. A needle shield comprising at least two different plastic materials of different flexibility and a central aperture of variable diameter, wherein the central aperture comprises a first diameter for retaining a needle cap therein, wherein the diameter of the central aperture changes upon removal of the needle cap from the first diameter to a second diameter by virtue of a memory effect of the material of the needle shield, characterized in that the needle shield is made by a two-shot injection moulding process.

2. A needle shield according to claim 1, characterized in that the needle shield is made from an arbitrary combination of plastics materials of the following classes: polymer, elastomer, silicone and silicone elastomer.

3. A needle shield according to one of the previous claims, characterized in that a distal end wall of the needle shield is made from a relatively flexible plastics material.

4. A needle shield according to one of the previous claims, characterized in that a peripheral part of a distal end wall is made from a relatively stiff plastics material, whereas an opening part of the distal end wall is made from a relatively flexible plastics material.

5. A safety device for a pre-filled syringe comprising

- a hollow support body to retain the pre-filled syringe therein and
- a needle shield according to one of the previous claims, wherein the needle shield is slidably arranged relative to the support body.

6. A safety device according to claim 5, characterized in that the needle shield is slidable relative to the support body from at least an advanced position to a retracted position, wherein the needle shield protrudes the support body in the advanced position.

7. A safety device according to claim 5 or 6, characterized in that the safety device comprises a spring that biases the needle shield with respect to the support body in a distal direction.

8. An injection device comprising a safety device according to one of the previous claims 5 to 7 and a pre-filled syringe with a hypodermic needle attached to a distal end of the pre-filled syringe, wherein the hypodermic needle is covered by a needle cap frictionally affixed to the distal end of the pre-filled syringe, characterized in that the needle cap protrudes through the central aperture of the needle shield, whereby the needle shield frictionally engages the needle cap.

9. An injection device according to claim 8, characterized in that the first diameter of the central aperture corresponds to an outer diameter of the needle cap.

10. An injection device according to claim 8 or 9, characterized in that the second diameter of the central aperture is sized to allow the hypodermic needle to protrude through the central aperture of the needle shield.

11. An injection device according to one of the previous claims 8 to 10 when dependent from claim 7, characterized in that the needle shield is retained against a biasing force exerted upon the needle shield by the spring in the retracted position by the frictional engagement of the needle shield with the needle cap.