Sanofi-Aventis Deutschland GmbH DE2009/223 MSC

Amended Claims

1. A piston for a cartridge (24) for a drug delivery device comprising:

- at least one annular sealing surface (35) to radially abut against an inner side wall (24) of a cartridge (33),

- a distal surface (42) to confine a drug receiving volume of the cartridge (33),

- a thrust receiving surface (40) adapted to receive a thrust exerting plunger (10, 32) of a drug delivery device for displacing the piston in a proximal direction relative to the side wall (24),

- wherein the thrust receiving surface (40) comprises numerous centering elements (34) protruding from the thrust receiving surface (40) towards the plunger (10, 32) and wherein the centering elements (34) comprise an outer shape and geometry that matches with a corresponding receptacle (38) of the plunger (10, 32), and wherein the centering elements (34) comprising an arcuate shape in a plane parallel to the thrust receiving surface (40) are arranged and aligned on the circumference of an imaginary annular or circular structure, characterized in that at least one centering element comprises a knob-like shape..

2. The piston according to claim 1, wherein the centering elements (34) and/or the circular structure corresponds with a circular shape of the receptacle (38) of the plunger (32).

3. The piston according to claim 1, wherein at least one centering element (34) is integrally formed with a body (36) of the piston.

4. The piston according to any one of the preceding claims, wherein at least one centering element (34) is tapered in direction towards the plunger (10, 32).

5. The piston according to any one of the preceding claims, wherein at least one centering element (34) comprises a bevelled lateral surface (46) oriented at an angle of 20° to 80° with respect to the plane of the thrust receiving surface (40).

6. The piston according to any one of the preceding claims, wherein at least one centering element (34) is of triangular or convex shape in a plane perpendicular to the thrust receiving surface (40).

7. The piston according to any one of the preceding claims, wherein the ratio of at least one centering element's (34) axial extension versus its radial expansion is larger or equal than 0.6.

8. A plunger of a drive mechanism of a drug delivery device, comprising an end face (44) adapted to but against a thrust receiving surface (40) of a piston (36) according to any of the preceding claims being slidably disposed in a drug containing cartridge (33), wherein the end face (44) comprises at least one receptacle (38) adapted to receive numerous centering elements (34) protruding from the thrust receiving surface (40) of the piston (36), characterized in that the receptacle (38) comprises a circular or annular shape corresponding with the alignement of the centering elements (34) being arranged on the circumference of an imaginary annular or circular structure on the thrust receiving surface (40) of the piston the shape and geometry of the receptacle (38) matches with the shape and geometry of the piston's centering element (34), such that the end face (44) almost entirely buts against the thrust receiving surface of the piston (36).

9. The plunger according to claim 8, wherein the receptacle (38) comprises a substantially U- or V-shaped groove of circular geometry in the plane of

the end face (44).

10. The plunger according to any one of the preceding claims 8 or 9, further comprising an axially displaceable piston rod (10) and a radially extending bearing disc (32), wherein the bearing disc (32) is rotatably supported at a distal end portion of the piston rod (10) and comprises the receptacle (38).

11. A cartridge for a drug delivery device comprising a substantially cylindrical cartridge body (24) providing a drug receiving volume and at least partially filled with a medicament and being sealed by means of a piston (36) according to any one of the preceding claims 1 to 7.

12. A drug delivery device for dispensing of a pre-defined amount of a liquid drug and being adapted to receive a cartridge (33) according to claim 12, further comprising a drive mechanism having a plunger (10, 32) according to any one of the preceding claims 8 to 10.

Claims

1. A drug delivery device for dispensing of a pre-defined amount of a liquid drug comprising a drive mechanism having a plunger (10, 32) and being adapted to receive a cartridge (33), wherein the cartridge (24) comprises a cylindrical cartridge body (24) providing a drug receiving volume being at least partially filled with a medicament and being sealed by means of a piston (36), the piston comprising:

- a body (36) comprising natural or synthetic rubber,

- at least one annular sealing surface (35) to radially abut against an inner side wall (24) of a cartridge (33),

- a distal surface (42) to confine a drug receiving volume of the cartridge (33),

- a thrust receiving surface (40) adapted to receive a thrust exerting plunger (10, 32) of a drug delivery device for displacing the piston in a distal direction relative to the side wall (24),

- wherein the thrust receiving surface (40) comprises numerous knob-like centering elements (34) protruding from the thrust receiving surface (40) towards the plunger (10, 32) and wherein the centering elements (34) comprise an outer shape and geometry that matches with a corresponding receptacle (38) of the plunger (10, 32), and wherein the centering elements (34) are arranged and aligned on the circumference of an imaginary annular or circular structure, and

- wherein the plunger comprises a bearing disc (32) with a circumferential groove (38) to entirely receive the centering elements (34) such that the distal end face (44) of the bearing disc (32) directly abuts against the thrust receiving surface (40) of the piston and wherein the shape and geometry of the groove (38) matches with the shape and

geometry of the piston's centering elements (34), such that the end face (44) almost entirely buts against the thrust receiving surface (40) of the piston (36).

2. The drug delivery device according to claim 1, wherein at least one centering element (34) is integrally formed with a body (36) of the piston.

3. The drug delivery device according to any one of the preceding claims, wherein at least one centering element (34) is tapered in direction towards the plunger (10, 32).

4. The drug delivery device according to any one of the preceding claims, wherein at least one centering element (34) comprises a bevelled lateral surface (46) oriented at an angle of 20° to 80° with respect to the plane of the thrust receiving surface (40).

5. The drug delivery device according to any one of the preceding claims, wherein at least one centering element (34) is of triangular or convex shape in a plane perpendicular to the thrust receiving surface (40).

6. The drug delivery device according to any one of the preceding claims, wherein the ratio of at least one centering element's (34) axial extension versus its radial expansion is larger or equal than 0.6.

7. The drug delivery device according to any one of the preceding claims, wherein the receptacle (38) comprises a substantially U- or V-shaped groove of circular geometry in the plane of the end face (44).

8. The drug delivery device according to any one of the preceding claims , wherein the plunger further comprising an axially displaceable piston rod (10) with a distal end portion on which the radially extending bearing disc (32)is rotatably supported.