tend to simplify the steps required for a user to reset a dose setting mechanism while also making the device less complex and more compact in size.

SUMMARY

Embodiments~~It is an object~~ of the present invention seek to provide an improved dose setting mechanism for a drug delivery device.

Embodiments of the present invention provide~~This object is solved by~~ a dose setting mechanism comprising an inner housing with means for guiding a dial sleeve and/or a driver of said mechanism.

According to an exemplary arrangement (first embodiment), a dose setting mechanism for a drug delivery device comprises an outer housing, ~~and~~ an inner housing having an external groove and a driver. The inner housing guides the driver to dispense a dose set by the dose setting mechanism. A dial sleeve is disposed between the outer and inner housing and is rotatably engaged with the external groove of the inner housing. When a dose is set, the dial sleeve is rotated with respect to both the outer housing and the inner housing. The inner housing is operatively coupled to the driver and guides the driver to dispense a dose set by the dose setting mechanism. The dial sleeve is translated away from both the outer housing and the inner housing. Preferably, said external groove of said inner housing comprises a helical groove having a constant pitch. The dose dial grip is non-rotatably coupled to a dose button such that when a dose is rotated with respect to both the outer housing and the inner housing and the dial sleeve is translated away from both the outer housing and the inner housing.

The inner housing may comprise an internal surface having a mechanical configuration that guides said driver to dispense said dose set by said dose setting mechanism. According to a first aspect of this embodiment, said mechanical configuration of said inner housing comprises a spline that guides said driver to dispense said dose set by said dose setting mechanism. Alternatively, said mechanical configuration of said inner housing may comprise a groove that guides said driver to dispense said dose set by said dose setting mechanism.

To improve the mechanical properties of the dose setting mechanism, said dial sleeve may have a generally smooth outer surface. Preferably, a scale arrangement is provided along a portion of said generally smooth outer surface. According to a further

Claims

1. A dose setting mechanism for a drug delivery device, said mechanism comprising an outer housing ~~(40; 204)~~, an inner housing ~~(208)~~, a driver ~~(30; 209)~~ and a dial sleeve ~~(10; 206)~~ disposed between said outer housing and said inner housing, wherein the inner housing has an external groove ~~(232)~~, said inner housing being operatively coupled to the driver ~~(30; 209)~~ and guiding said driver to dispense a dose set by said dose setting mechanism and wherein said dial sleeve is rotatably engaged with said external groove of said inner housing; a dose dial grip ~~(12; 202)~~ is provided rotatably coupled to said dial sleeve ~~(10; 206)~~, said dose dial grip non-rotatably coupled to a dose button ~~(5; 216)~~, such that when a dose is set by rotating said dose dial grip of said dose setting mechanism, said dial sleeve is rotated with respect to both said outer housing and said inner housing and said dial sleeve is translated away from both said outer housing and said inner housing.

2. The dose setting mechanism of claim 1 wherein a spindle ~~(42; 214)~~ for acting on a cartridge bung ~~(18)~~ is provided, with the driver ~~(30; 209)~~ cooperating with said spindle, and the inner housing having an inner surface dictating movement of said driver during a dose dispensing step so that said spindle acts on said cartridge bung.

3. The dose setting mechanism of claim 1 or 2 wherein a clutch ~~(26; 205)~~ operatively coupled to said dial sleeve ~~(10; 206)~~ and said driver ~~(30; 209)~~ is provided, said clutch allows said dial sleeve and said driver to rotate together during a setting of a dose of said drug delivery device, and said clutch allows relative rotation of said driver and said dial sleeve during an injection of said dose.

4. The dose setting mechanism of any of claims 1 to 3 wherein the dose setting mechanism is configured such that when a dose is set by said dose setting mechanism, said dial sleeve ~~(10; 206)~~ and driver ~~(30; 209)~~ are both rotated with

respect to both said outer housing ~~(40; 204)~~ and said inner housing ~~(208)~~ and are translated away from both said outer housing and said inner housing.

5. The dose setting mechanism of any of claims 1 to 4 wherein said dose dial grip is non-rotatably coupled to the dose button ~~(5; 216)~~, such that when a dose is set by rotating said dose dial grip of said dose setting mechanism, said dial sleeve is rotated with respect to both said outer housing and said inner housing and said dial sleeve is translated away from both said outer housing and said inner housing while said button does not rotate.

6. The dose setting mechanism of any of claims 1 to 5, wherein said inner housing ~~(208)~~ comprises an internal surface ~~(238)~~, said internal surface comprising a mechanical configuration that guides said driver ~~(30; 209)~~ to dispense said dose set by said dose setting mechanism.

7. The dose setting mechanism of claim 6 wherein said mechanical configuration of said inner housing ~~(208)~~ comprises a spline that guides said driver ~~(30; 209)~~ to dispense said dose set by said dose setting mechanism.

8. The dose setting mechanism of claim 6 wherein said mechanical configuration of said inner housing ~~(208)~~ comprises a groove that guides said driver ~~(30; 209)~~ to dispense said dose set by said dose setting mechanism.

9. The dose setting mechanism of any of claims 1 to 8 wherein said external groove ~~(232)~~ of said inner housing ~~(208)~~ comprises a helical groove having a constant pitch.

10. The dose setting mechanism of any of claims 1 to 9 wherein said dial sleeve ~~(10; 206)~~ has a generally smooth outer surface ~~(240)~~.

11. The dose setting mechanism of claim 10 comprising a scale arrangement ~~(16; 242)~~ provided along a portion of said generally smooth outer surface.

12. The dose setting mechanism of claim 11 wherein said scale arrangement ~~(16; 242)~~ provided along said portion of said generally smoother outer surface is viewable only through a window ~~(14; 244)~~ provided in an outer housing ~~(40; 204)~~ of said dose setting mechanism.

13. The dose setting mechanism of any of claims 1 to 12 wherein said dose setting mechanism is coupled, preferably permanently coupled, to a cartridge holder ~~(6)~~.

14. The dose setting mechanism of any of claims 1 to 13 comprising a spindle ~~(42; 214)~~ operatively coupled to said driver ~~(30; 209)~~ such that when said inner housing guides said driver to dispense said dose set by said dose setting mechanism, said driver pushes said spindle to act on a cartridge bung ~~(18)~~ while said spindle translates in a distal direction to expel said dose from said cartridge.

15. The dose setting mechanism of any of claims 1 to 14 wherein the inner surface of said inner housing ~~(208)~~ comprises at least one longitudinal groove.

16. The dose setting mechanism of any of claims 1 to 14 wherein the inner surface of said inner housing ~~(208)~~ comprises at least a portion of a helical groove.

17. The dose setting mechanism of any of claims 1 to 14 wherein the inner surface of said inner housing ~~(208)~~ comprises a male groove guide.

18. The dose setting mechanism of any of claims 1 to 17 wherein said spindle ~~(42; 214)~~ comprises at least one groove ~~(19)~~, said at least one groove allowing said spindle to translate in a distal direction to expel said dose from a cartridge ~~(20)~~.

19. The dose setting mechanism of any of claims 1 to 18 wherein the inner housing ~~(208)~~ has a length ~~(L, 230)~~ in its axial direction which is essentially the same as the length of the dose setting mechanism ~~(4; 200)~~, or the outer housing ~~(40; 204)~~ or the dose dial sleeve ~~(10; 206)~~.