Description

FIXED DOSE INJECTION DEVICE WITH RESETTABLE DRIVE MECHANISM

This disclosure relates to an injection device for administering a fixed dose of a medication. In particular, it relates to a drive mechanism for such an injection device.

The patent application EP 1923084 A1 discloses an injection device for setting and dispensing a fixed dose of a medicament. Here, in order to set a dose, a user pulls a dose button in a proximal direction and, in order to dispense the dose, pushes the dose button towards a distal direction of the injection device.

The publication WO 2004/078239 A1 discloses an injection device, wherein a user can select the size of a dose. In order to set a dose, the user rotates a dose dial sleeve with respect to a housing and, in order to dispense dose, a user depresses a dose button.

Embodiments~~It is the aim~~ of the ~~present~~ invention ~~to~~ provide an injection device for administering a fixed dose of a medication which is easy to use and highly reliable.

According to a first aspect of the present invention, an injection device for administering a fixed dose of a medication is provided. The injection device comprises a housing wherein a drive mechanism comprising a drive member is at least partially enclosed.

The housing has an inner thread which has a dose setting section and a dose dispense section. The drive member engages the dose setting section during dose setting and engages the dose dispense section during dose dispensing.

Furthermore, the injection device comprises a dosing element which is permanently fixed relative to the drive member. A dose can be set by rotating the dosing element relative to the housing in a dose setting direction and the dose can be dispensed by pushing the dosing element towards the housing and a piston rod threadedly engaged with the housing and with the drive member.

The drive member may be engaged with a piston rod acting on a piston in a cartridge wherein a medicament is disposed. Preferably, the movement of the dosing element and therewith the movement of the drive member towards the housing results in a movement of the piston rod towards the distal end of the injection device. Thereby, also the piston is moved forward and the medicament is pressed out of the cartridge.

The ratio of the amounts of movement along the longitudinal axis of the injection device of the drive member and the piston rod depends on the mechanical advantage of the device.

Preferably, the piston rod is threadedly engaged with the housing. In particular, the piston rod may be a double-threaded lead screw.

In a preferred embodiment, the inner thread of the drive sleeve comprises a stop face which prevents full setting of a dose after the last available dose has been dispensed.

Thereby, when a user tries to set a dose after the last available dose has been dispensed, the engaging feature of the piston rod may abut against the stop face of the inner thread of the drive sleeve. As the piston rod is engaged with the housing, a counterforce is exerted on the drive sleeve such that a further movement of the drive sleeve in the dose setting direction and the full setting of a further dose is prevented.

In a preferred embodiment, the injection device is a pen-type device. As an example, the cartridge may contain medicaments like heparin, GLP1 or insulin.

According to a second aspect of the invention, a method of operating an injection device is provided for the administration of a fixed dose of a medication comprising the steps:
A) Setting a dose by rotating a dosing element relative to a housing of the injection device in a dose setting direction to move a drive member that is threadedly engaged with a piston rod according to a dose setting section of an inner thread of the housing, whereby during or at the end of step A) the dose can be cancelled by
B) rotating the dosing element in a direction opposite to the dose setting direction to reverse the movement of the drive member.

Other features will become apparent from the following detailed description when considered in conjunction with the accompanying drawings.

Figure 1 is a cross-sectional view of an injection device comprising a drive mechanism,

Figure 2 is an unwound depiction of the inner thread of the housing engaged with an engaging feature of the drive member,

Figure 3 is an unwound depiction of the inner thread of the drive member engaged with an engaging feature of the piston rod.

Figure 1 shows a pen-type injection device 1 having a longitudinal axis l. The injection device 1 comprises a housing 2 with a main part 21 and a cartridge holder 22 wherein a cartridge 6 containing a liquid medicament is disposed. A needle unit (not shown here)