Claims

1. A drive mechanism for a drug delivery device, comprising:
   - a lead screw (5), a lead screw nut (7) and a drive member (8), aligned with an axis (4) defining an axial direction and an opposite axial direction,
   - a coupling between the lead screw (5) and the lead screw nut (7) allowing a helical movement of the lead screw (5) with respect to the lead screw nut (7) at least in the axial direction,
   - the drive member (8) being rotationally locked with the lead screw nut (7),
   - the lead screw (5) being coupled with the drive member (8), the coupling generating a helical movement of the lead screw (5) with respect to the drive member (8) when the drive member (8) is moved in the axial direction with respect to the lead screw (5), and the coupling being overridden to prevent a helical movement of the lead screw (5) with respect to the drive member (8) when the drive member (8) is moved in the opposite axial direction with respect to the lead screw (5),
   - spline features (25) of the lead screw (5), the spline features (25) being arranged in at least one row (20) parallel to the axis (4) with alternatingly small and large gaps between succeeding spline features (25), and
   - a stop feature (19) of the drive member (8), the stop feature (19) facing the lead screw (5), a dimension of the stop feature (19) in the direction of the axis (4) being larger than the small gaps and at most as large as the large gaps.

2. The drive mechanism according to claim 1, further comprising:
   a further screw thread (16) of the lead screw (5), the screw thread (6) and the further screw thread (16) having the same pitch and being intertwined.

3. The drive mechanism according to claim 2, wherein
   the spline features (25) are each arranged adjacent to the screw thread (6) or adjacent to the further screw thread (16).

4. The drive mechanism according to one of claims 1 to 3, wherein the spline features (25) are protruding elements of the lead screw (5).

5. The drive mechanism according to one of claims 1 to 4, further comprising:
a flexible guide feature (15) of the lead screw (5), and
a screw thread (18) of the drive member (8),
the flexible guide feature (15) of the lead screw (5) and the screw thread (18) of the drive member (8) providing the coupling of the lead screw (5) with the drive member (8).

6. The drive mechanism according to one of claims 1 to 5, further comprising:
stop features (17) of the lead screw (5),
the stop features (17) inhibiting the helical movement of the lead screw (5) when the drive member (8) is moved in the opposite axial direction with respect to the lead screw (5).

7. The drive mechanism according to claim 6, wherein
at least some of the spline features (25) are arranged adjacent to the stop features (17) of the lead screw (5).

8. The drive mechanism according to one of claims 1 to 7, wherein
the drive member (8) is a drive sleeve, the lead screw (5) passing through the drive member (8), and
the stop feature (19) of the drive member (8) is a protruding element or two separate protruding elements or a plurality of separate protruding elements located on an inner sidewall of the drive member (8).

9. The drive mechanism according to one of claims 1 to 8, wherein
the spline features (25) are arranged in at least two rows (20) parallel to the axis (4), the rows (20) being equi-spaced around a circumference of the lead screw (5).

10. A drug delivery device, comprising:

- a drive mechanism according to one of claims 1 to 9, and
- a body (1) having a distal end (2) and a proximal end (3), which are spaced apart in the direction of the axis (4).

11. The drug delivery device according to claim 10, further comprising:
a guide feature (10) of the drive member (8), the guide feature (10) preventing a rotation of the drive member (8) with respect to the body (1), and
the lead screw nut (7) being rotationally locked with the body (1), the drive member (8) thus being rotationally locked with the lead screw nut (7).

CLAIMS

1. A drive mechanism for a drug delivery device, comprising:
   - a lead screw (5), a lead screw nut (7) and a drive member (8), aligned with an axis (4) defining an axial direction and an opposite axial direction,
   - a coupling between the lead screw (5) and the lead screw nut (7) allowing a helical movement of the lead screw (5) with respect to the lead screw nut (7) at least in the axial direction,
   - the drive member (8) being rotationally locked with the lead screw nut (7),
   - the lead screw (5) being coupled with the drive member (8), the coupling generating a helical movement of the lead screw (5) with respect to the drive member (8) when the drive member (8) is moved in the axial direction with respect to the lead screw (5), and the coupling being overridden to prevent a helical movement of the lead screw (5) with respect to the drive member (8) when the drive member (8) is moved in the opposite axial direction with respect to the lead screw (5),
   - spline features (25) of the lead screw (5), the spline features (25) being arranged in at least one row (20) parallel to the axis (4) with alternatingly small and large gaps between succeeding spline features (25), and
   - a stop feature (19) of the drive member (8), the stop feature (19) facing the lead screw (5), a dimension of the stop feature (19) in the direction of the axis (4) being larger than the small gaps and at most as large as the large gaps.

2. The drive mechanism according to claim 1, further comprising:
   a further screw thread (16) of the lead screw (5), the screw thread (6) and the further screw thread (16) having the same pitch and being intertwined.

3. The drive mechanism according to claim 2, wherein
   the spline features (25) are each arranged adjacent to the screw thread (6) or adjacent to the further screw thread (16).

4. The drive mechanism according to one of claims 1 to 3, wherein the spline features (25) are protruding elements of the lead screw (5).

5. The drive mechanism according to one of claims 1 to 4, further comprising: a flexible guide feature (15) of the lead screw (5), and a screw thread (18) of the drive member (8), the flexible guide feature (15) of the lead screw (5) and the screw thread (18) of the drive member (8) providing the coupling of the lead screw (5) with the drive member (8).

6. The drive mechanism according to one of claims 1 to 5, further comprising: stop features (17) of the lead screw (5), the stop features (17) inhibiting the helical movement of the lead screw (5) when the drive member (8) is moved in the opposite axial direction with respect to the lead screw (5).

7. The drive mechanism according to claim 6, wherein at least some of the spline features (25) are arranged adjacent to the stop features (17) of the lead screw (5).

8. The drive mechanism according to one of claims 1 to 7, wherein the drive member (8) is a drive sleeve, the lead screw (5) passing through the drive member (8), and the stop feature (19) of the drive member (8) is a protruding element or two separate protruding elements or a plurality of separate protruding elements located on an inner sidewall of the drive member (8).

9. The drive mechanism according to one of claims 1 to 8, wherein the spline features (25) are arranged in at least two rows (20) parallel to the axis (4), the rows (20) being equi-spaced around a circumference of the lead screw (5).

10. The drive mechanism according to any one of claims 1 to 9, wherein
the stop feature (19) of the drive member (8) helps to prevent the lead screw (5) from rotating when a dose is being set,
the large gaps are provided to permit the stop feature (19) of the drive member (8) to pass through while a drug is being dispensed and the lead screw (5) is helically moved with respect to the drive member (8), and
the small gaps are sufficiently small to prevent the stop feature (19) of the drive member (8) to pass through when the drive member (8) is pulled in the proximal direction to set a dose.

11. A drug delivery device, comprising:
– a drive mechanism according to one of claims 1 to 10, and
– a body (1) having a distal end (2) and a proximal end (3), which are spaced apart in the direction of the axis (4).

12. The drug delivery device according to claim 11, further comprising:
a guide feature (10) of the drive member (8), the guide feature (10) preventing a rotation of the drive member (8) with respect to the body (1), and
the lead screw nut (7) being rotationally locked with the body (1), the drive member (8) thus being rotationally locked with the lead screw nut (7).