US011446443B2

(12) **United States Patent**
Moeller et al.

(10) **Patent No.: US 11,446,443 B2**
(45) **Date of Patent: *Sep. 20, 2022**

(54) **INJECTION DEVICE WITH TORSION SPRING AND ROTATABLE DISPLAY**

(71) Applicant: **Novo Nordisk A/S**, Bagsvaerd (DK)

(72) Inventors: **Claus Schmidt Moeller**, Fredensborg (DK); **Tom Hede Markussen**, Bagsvaerd (DK); **Christian Peter Enggaard**, Vejby (DK)

(73) Assignee: **Novo Nordisk A/S**, Bagsvaerd (DK)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

This patent is subject to a terminal disclaimer.

(21) Appl. No.: **16/589,566**

(22) Filed: **Oct. 1, 2019**

(65) **Prior Publication Data**

US 2020/0030541 A1 Jan. 30, 2020

Related U.S. Application Data

(63) Continuation of application No. 15/606,147, filed on May 26, 2017, now Pat. No. 10,471,214, which is a (Continued)

(30) **Foreign Application Priority Data**

Oct. 21, 2004 (EP) 04077899

(51) **Int. Cl.**
A61M 5/20 (2006.01)
A61M 5/315 (2006.01)
(Continued)

(52) **U.S. Cl.**
CPC ***A61M 5/31535*** (2013.01); ***A61M 5/14566*** (2013.01); ***A61M 5/20*** (2013.01);
(Continued)

(58) **Field of Classification Search**
CPC A61M 5/31535; A61M 5/3155; A61M 5/31553; A61M 5/31556; A61M 5/20;
(Continued)

(56) **References Cited**

U.S. PATENT DOCUMENTS

4,393,723 A 7/1983 Brand
4,865,591 A 9/1989 Sams
(Continued)

FOREIGN PATENT DOCUMENTS

AU 2003232576 A1 1/2004
CA 2359375 A1 7/2000
(Continued)

OTHER PUBLICATIONS

Owen Mumford Pre-2001 Product Catalog.
(Continued)

Primary Examiner — Laura A Bouchelle
(74) *Attorney, Agent, or Firm* — Wesley Nicolas

(57) **ABSTRACT**

The present invention relates to an injection device comprising a torsion spring operatively connected to a dose setting member being adapted to set a dose to be ejected from the injection device. A rotatably mounted display member adapted to display the dose to be ejected in accordance with a setting of the dose setting member is also provided. The rotatably mounted display member is adapted to be rotated over an angle corresponding to at least one revolution of the display member. The display member may be implemented as a dose indicator barrel having numerals arranged along a helical path on an outer surface thereof, or alternatively, as a counting device having two or more display wheels having numerals arranged on an outer surface thereof.

19 Claims, 5 Drawing Sheets