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(54) Title: DISPENSING DEVICE

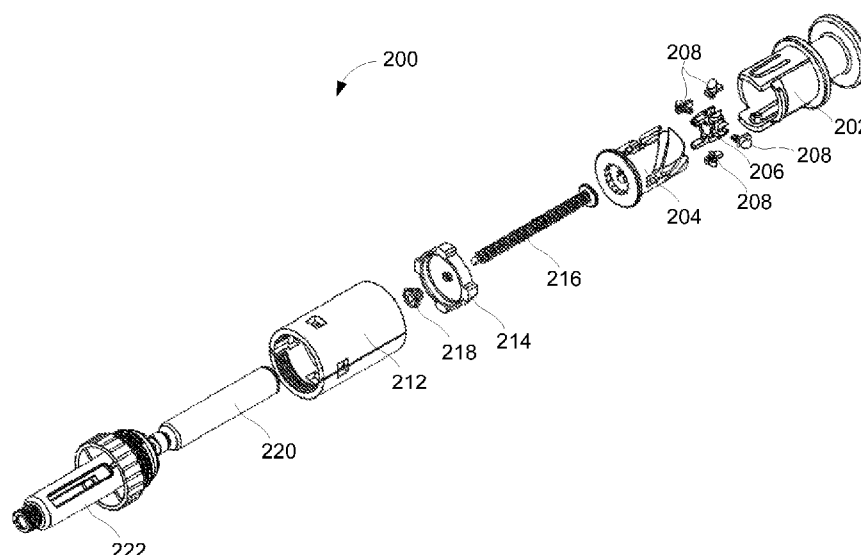


FIG. 2

(57) Abstract: A dispensing device (102) is provided to dispense a designated amount of material on every dose delivery operation. The dispensing device (102) includes a thumb pad (202) and a cam drum (204) that is coupled to the thumb pad (202). The thumb pad (202) is configured to be pulled out towards a proximal end (104) of the dispensing device (102) for setting a dose of a material to be dispensed out and to be pushed in towards a distal end (106) of the dispensing device (102) for delivering the dose. The cam drum (204) includes at least one linear cam profile (402) and at least one helical cam profile (404) that are disposed on a surface of the cam drum (204). The thumb pad (202) is configured to ride on the linear cam profile (402) when setting the dose and on the helical cam profile (404) when delivering the dose.

EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV,  
MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM,  
TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW,  
KM, ML, MR, NE, SN, TD, TG).

**Declarations under Rule 4.17:**

- *of inventorship (Rule 4.17(iv))*

**Published:**

- *with international search report (Art. 21(3))*
- *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))*
- *in black and white; the international application as filed contained color or greyscale and is available for download from PATENTSCOPE*

**(88) Date of publication of the international search report:**

25 October 2018 (25.10.2018)

# INTERNATIONAL SEARCH REPORT

International application No

PCT/IB2018/050699

A. CLASSIFICATION OF SUBJECT MATTER  
INV. A61M5/315 A61M5/50  
ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)  
A61M

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPO-Internal, WPI Data

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category* | Citation of document, with indication, where appropriate, of the relevant passages                                            | Relevant to claim No. |
|-----------|-------------------------------------------------------------------------------------------------------------------------------|-----------------------|
| A         | US 5 009 645 A (SILVER JULES [US] ET AL)<br>23 April 1991 (1991-04-23)<br>figures 1, 3<br>column 6, line 6 - line 11<br>----- | 1-24                  |
| A         | EP 2 579 925 A1 (SANOFI AVENTIS<br>DEUTSCHLAND [DE])<br>17 April 2013 (2013-04-17)<br>figures 7, 11<br>-----                  | 1-24                  |
| A         | US 2012/310168 A1 (PLUMPTRE DAVID [GB] ET<br>AL) 6 December 2012 (2012-12-06)<br>figure 5B<br>-----                           | 1-24                  |
| A         | US 2002/004648 A1 (LARSEN CARSTEN GERNER<br>[DK] ET AL) 10 January 2002 (2002-01-10)<br>figures 2, 6<br>-----<br>-/-          | 1-24                  |

☒ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

\* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search

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Name and mailing address of the ISA/

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# INTERNATIONAL SEARCH REPORT

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C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

| Category* | Citation of document, with indication, where appropriate, of the relevant passages                                                                                            | Relevant to claim No. |
|-----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|
| A         | US 2010/137792 A1 (BOYD MALCOLM [GB] ET AL) 3 June 2010 (2010-06-03)<br>figure 4<br>-----                                                                                     | 1-24                  |
| A         | US 2009/240195 A1 (SCHRUL CHRISTIAN [CH] ET AL) 24 September 2009 (2009-09-24)<br>figures 12A, 12B<br>paragraph [0075]<br>-----                                               | 25-30                 |
| A         | US 2015/094687 A1 (BOYD MALCOLM [GB] ET AL) 2 April 2015 (2015-04-02)<br>figures 8A, 8B<br>paragraphs [0121], [0122]<br>-----                                                 | 25-30                 |
| A         | WO 2016/050902 A1 (NOVO NORDISK AS [DK])<br>7 April 2016 (2016-04-07)<br>figures 4a, 4b<br>page 11, line 30 - page 12, line 4<br>page 14, line 20 - page 15, line 16<br>----- | 25-30                 |

## INTERNATIONAL SEARCH REPORT

International application No.  
PCT/IB2018/050699

### Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:  
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claims Nos.:  
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
3. ☐ Claims Nos.:  
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

### Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. ☒ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fees, this Authority did not invite payment of additional fees.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

#### Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.
- ☐ The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.
- ☒ No protest accompanied the payment of additional search fees.

**FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210**

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-24

Dispensing device designed for multiple applications of a fixed dose (searched)

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2. claims: 25-30

Dispensing device preventing further dose setting when a final dose has been delivered (searched)

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# INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/IB2018/050699

| Patent document<br>cited in search report | Publication<br>date | Patent family<br>member(s)    | Publication<br>date         |
|-------------------------------------------|---------------------|-------------------------------|-----------------------------|
| US 5009645                                | A                   | 23-04-1991                    | AT 134520 T 15-03-1996      |
|                                           |                     | DE 493639 T1 17-12-1992       |                             |
|                                           |                     | DE 69025619 D1 04-04-1996     |                             |
|                                           |                     | DE 69025619 T2 01-08-1996     |                             |
|                                           |                     | EP 0493639 A1 08-07-1992      |                             |
|                                           |                     | ES 2033594 T1 01-04-1993      |                             |
|                                           |                     | US 5009645 A 23-04-1991       |                             |
| EP 2579925                                | A1                  | 17-04-2013                    | CA 2801277 A1 15-12-2011    |
|                                           |                     | DK 2579925 T3 02-07-2018      |                             |
|                                           |                     | EP 2579925 A1 17-04-2013      |                             |
|                                           |                     | JP 2013528085 A 08-07-2013    |                             |
|                                           |                     | WO 2011154481 A1 15-12-2011   |                             |
| US 2012310168                             | A1                  | 06-12-2012                    | AR 079004 A1 21-12-2011     |
|                                           |                     | AU 2010303047 A1 19-04-2012   |                             |
|                                           |                     | BR 112012007206 A2 05-04-2016 |                             |
|                                           |                     | BR 122014012248 A2 19-04-2016 |                             |
|                                           |                     | CA 2773203 A1 07-04-2011      |                             |
|                                           |                     | CN 102639173 A 15-08-2012     |                             |
|                                           |                     | EP 2482883 A2 08-08-2012      |                             |
|                                           |                     | JP 5768050 B2 26-08-2015      |                             |
|                                           |                     | JP 2013506443 A 28-02-2013    |                             |
|                                           |                     | KR 20120092608 A 21-08-2012   |                             |
|                                           |                     | NZ 599024 A 28-03-2014        |                             |
|                                           |                     | RU 2012117205 A 10-11-2013    |                             |
|                                           |                     | TW 201127434 A 16-08-2011     |                             |
|                                           |                     | US 2012310168 A1 06-12-2012   |                             |
|                                           |                     | WO 2011039203 A2 07-04-2011   |                             |
|                                           |                     | ZA 201201565 B 28-11-2012     |                             |
| US 2002004648                             | A1                  | 10-01-2002                    | US 2002004648 A1 10-01-2002 |
|                                           |                     | US 2003139705 A1 24-07-2003   |                             |
|                                           |                     | US 2005171485 A1 04-08-2005   |                             |
|                                           |                     | US 2012277724 A1 01-11-2012   |                             |
| US 2010137792                             | A1                  | 03-06-2010                    | NONE                        |
| US 2009240195                             | A1                  | 24-09-2009                    | AT 503513 T 15-04-2011      |
|                                           |                     | AU 2007283995 A1 21-02-2008   |                             |
|                                           |                     | CN 101553265 A 07-10-2009     |                             |
|                                           |                     | DE 102006038101 A1 21-02-2008 |                             |
|                                           |                     | EP 2054112 A1 06-05-2009      |                             |
|                                           |                     | JP 5416583 B2 12-02-2014      |                             |
|                                           |                     | JP 2010500136 A 07-01-2010    |                             |
|                                           |                     | US 2009240195 A1 24-09-2009   |                             |
|                                           |                     | WO 2008019517 A1 21-02-2008   |                             |
| US 2015094687                             | A1                  | 02-04-2015                    | AR 063838 A1 25-02-2009     |
|                                           |                     | AU 2007321446 A1 22-05-2008   |                             |
|                                           |                     | BR PI0719009 A2 17-12-2013    |                             |
|                                           |                     | CA 2669363 A1 22-05-2008      |                             |
|                                           |                     | CN 101616705 A 30-12-2009     |                             |
|                                           |                     | EP 1923085 A1 21-05-2008      |                             |
|                                           |                     | EP 2083889 A1 05-08-2009      |                             |
|                                           |                     | HK 1140156 A1 17-01-2014      |                             |
|                                           |                     | IL 198755 A 29-01-2015        |                             |
|                                           |                     | JP 5286273 B2 11-09-2013      |                             |

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/IB2018/050699

| Patent document<br>cited in search report | Publication<br>date | Patent family<br>member(s) | Publication<br>date |
|-------------------------------------------|---------------------|----------------------------|---------------------|
|                                           |                     | JP 2010509956 A            | 02-04-2010          |
|                                           |                     | KR 20090083463 A           | 03-08-2009          |
|                                           |                     | MY 151515 A                | 30-05-2014          |
|                                           |                     | SG 2013060223 A            | 30-03-2015          |
|                                           |                     | TW 200840606 A             | 16-10-2008          |
|                                           |                     | US 2010094205 A1           | 15-04-2010          |
|                                           |                     | US 2015094687 A1           | 02-04-2015          |
|                                           |                     | WO 2008058665 A1           | 22-05-2008          |
| -----                                     |                     |                            |                     |
| WO 2016050902 A1                          | 07-04-2016          | CN 106714878 A             | 24-05-2017          |
|                                           |                     | EP 3200854 A1              | 09-08-2017          |
|                                           |                     | JP 2017534356 A            | 24-11-2017          |
|                                           |                     | US 2017232203 A1           | 17-08-2017          |
|                                           |                     | WO 2016050902 A1           | 07-04-2016          |
| -----                                     |                     |                            |                     |