

(19) **DANMARK**

(10) **DK/EP 1755706 T4**



(12) **Oversættelse af ændret
europæisk patentskrift**

Patent- og
Varemærkestyrelsen

-
- (51) Int.Cl.: **A 61 M 5/31 (2006.01)** **A 61 M 5/20 (2006.01)** **A 61 M 5/32 (2006.01)**
- (45) Oversættelsen bekendtgjort den: **2015-03-30**
- (80) Dato for Den Europæiske Patentmyndigheds bekendtgørelse om opretholdelse af patentet i ændret form: **2014-12-17**
- (86) Europæisk ansøgning nr.: **05746205.3**
- (86) Europæisk indleveringsdag: **2005-05-27**
- (87) Den europæiske ansøgnings publiceringsdag: **2007-02-28**
- (86) International ansøgning nr.: **GB2005002116**
- (87) Internationalt publikationsnr.: **WO2005115508**
- (30) Prioritet: **2004-05-28 GB 0412051**
- (84) Designerede stater: **AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HU IE IS IT LI LT LU MC NL PL PT RO SE SI SK TR**
- (73) Patenthaver: **Cilag GmbH International, Landis + Gyr-Strasse 1, 6300 Zug, Schweiz**
- (72) Opfinder: **HABESHAU, Rosie, 84a Blinco Grove, Cambridge CB1 7TS, Storbritannien**
BARROW-WILLIAMS, Tim, 200 London Road, St Albans, Hertfordshire AL1 1PL, Storbritannien
BRADY, Matthew, 9 Newlands, Ietehworth, Hertfordshire SG6 2JE, Storbritannien
HARRISON, Nigel, 15 Barley Way, Linton, Cambridge CB1 6YN, Storbritannien
- (74) Fuldmægtig i Danmark: **Budde Schou A/S, Hausergade 3, 1128 København K, Danmark**
- (54) Benævnelse: **Injektionsindretning**
- (56) Fremdragne publikationer:
WO-A-03/066141
US-A- 3 329 146
US-A- 5 540 660
US-A- 5 957 897
US-A1- 2003 121 815
US-B1- 6 447 480
EP-A2- 0 096 314
WO-A1-01/49347
GB-A- 1 514 725
US-A- 4 430 082
US-A- 4 636 201
US-A- 4 676 530
US-A- 4 874 384
US-A- 4 929 232
US-A- 5 098 400
US-A- 5 137 516

Fortsættes ...

US-A- 5 250 037

US-A- 5 368 577

US-A- 5 928 205

US-A1- 2003 181 859

US-B1- 6 692 469

Definition of cam taken from www.wikipedia.com

Cam Design and Manufacture; Preben W. Jensen; Industrial Press, New York; 1965; Chapter 1

'Mechanical engineer's Handbook', 2002, ACADEMIC PRESS, BURLINGTON, ISBN 9780080511368 deel DAN B.

MARGHITU, DAVID IRWIN: 'Machine components', pages 243 - 253

Unusual cams; V. Ryan, 2002-2009; from www.technologystudent.com

Work sheet referred in document Unusual cams; V. Ryan, 2002-2009

"Starlock Fasteners"

Description**BACKGROUND TECHNOLOGY**

5 **[0001]** The present invention relates to an injection device of the type that receives a syringe, extends it, discharges its contents and then retracts it automatically. Devices of this general description are shown in WO 95/35126 and EP-A-0 516 473 and tend to employ a drive spring and some form of release mechanism that releases the syringe from the influence of the drive spring once its contents are supposed to have
10 been discharged, to allow it to be retracted by a return spring.

[0002] Often, such injection devices are required to work with sealed hypodermic syringes which typically have a hermetically sealed cover or "boot" that covers the hypodermic needle and maintains the sterility of the syringe contents. Naturally, it is
15 necessary to maintain the sterility of the syringe contents up to the point of administration, which means that for devices that are designed to be disposable, the boot must be removed with the syringe inside the injection device.

[0003] Typically, the action required to remove the boot from the syringe entails either
20 pulling the boot away from the syringe or twisting the boot and pulling it away from the syringe. If a filled syringe has been around for quite a while before it is used, it is often difficult to remove the boot from the syringe; a substantial force of in excess of 20N is often required.

25 **[0004]** If the injection devices are used by patients having rheumatoid arthritis or elderly or weak patients, it is difficult for the patient to remove the boot from the syringe prior to its use. In addition, the boots are small and fiddly to grip for all users but particularly for users who have poor flexibility in their joints or limited manual dexterity. Since the boot of the syringe may be positioned inside the housing, there
30 may also be limited access to the boot.

[0005] US patent no. 5,957,897 discloses a hollow needle applicator for cartridged drugs with a provision for automatic needle retraction after cartridge contents expression. The preamble of claim 1 is based on this document. US patent no.
35 6,447,480 discloses an injection device where the protective cap has a complementary profile with an intermediate section in the form of a cam.

SUMMARY OF THE INVENTION

[0006] The injection devices of the present invention are designed to deal with these problems.

5

[0007] An injection device according to the present invention comprises:

10 a housing adapted to receive a syringe having a discharge nozzle and a boot that covers its discharge nozzle, the housing defining a first axis and having first and second ends, wherein the discharge nozzle is capable of extending from the first end of the housing through an exit aperture, the housing further having a camming surface at its first end; and

15 a housing closure member having a camming surface for communicating with the camming surface on the housing so that rotation of the housing closure member about the axis causes the housing closure member to move axially away from the housing;

20 the housing closure member further comprising means for connecting to the boot of the syringe so that removal of the housing closure member from the housing causes removal of the boot from the syringe:

25 wherein the camming surfaces on the housing and housing closure means comprise corresponding curved surfaces; and

wherein the means for connecting comprises a pressed grip washer with a profiled internal diameter.

30 **[0008]** The housing closure member may further comprise an external grip feature with which a user can grip the housing closure member.

35 **[0009]** One of the housing closure member and the housing may further comprise a ridge with which a corresponding indentation on the other of the housing closure member and the housing can communicate in order to retain the housing closure member on the housing.

[0010] In use, the boot would be inserted into the centre of the grip washer, and the profiled internal diameter would deform slightly to surround the boot. In particular, the grip washer may be bent into a frustroconical shape. However, as the cap is removed, the grip washer would dig into the boot and prevent it from being removed from the cap.

[0011] The internal diameter of the grip washer may be castellated. Alternatively, the grip washer may comprise an internally toothed star washer or shakeproof washer.

[0012] The means for connecting may be formed from metal.

[0013] The means for connecting may be held in an indentation moulded into the housing closure means.

[0014] The means for connecting may be housed in a central boss moulded into the inside of the housing closure means. The means for connecting may be held in place in the housing closure means by an indentation moulded in to the central boss.

[0015] The housing closure means may further comprise a support surface for supporting an end of a boot of a syringe.

BRIEF DESCRIPTION OF THE DRAWINGS

[0016] The invention will now be described by way of example with reference to the accompanying drawings, in which:

Figure 1 shows a perspective view of an injection device according to the present invention with the housing closure member removed and the needle in an extended position;

Figure 2 shows a plan view of the injection device of figure 1;

Figure 3 shows a side view of the injection device of figure 1;

Figure 4 shows a perspective view of the injection device of figures 1 to 3, with the housing closure member in place;

Figure 5 shows a plan view of the injection device of figure 4;

Figure 6 shows a perspective view of a castellated grip washer for use in an injection device according to an embodiment of the present invention;

Figure 7 shows a housing closure member for use in an injection device according to an embodiment of the present invention;

Figure 8 shows the cap of figure 7 when engaged with a syringe boot of a syringe used with an injection device according to an embodiment of the present invention; and

5 Figure 9 shows a cross-sectional view of part of an injection device according to an embodiment of the present invention.

DETAILED DESCRIPTION

10 **[0017]** Figures 1 to 5 and 9 show an injection device 110 according to a first embodiment of the present invention. The injection device has an injection device housing 112.

15 **[0018]** The housing 112 contains a hypodermic syringe 114 of conventional type, including a syringe body 116 defining a reservoir and terminating at one end in a hypodermic needle 118. The syringe 114 has a hermetically sealed cover or "boot" that covers the hypodermic needle 118 and maintains the sterility of the syringe contents. The boot is generally formed of a soft rubber or plastics material. Whilst the syringe illustrated is of hypodermic type, this need not necessarily be so. Transcutaneous or ballistic dermal and subcutaneous syringes may also be used with
20 the injection device of the present invention.

[0019] The injection device is further provided with a cap 130. As is best seen from figures 1 to 3 and 7, the cap is retained on the housing 112 by a ridge 113 on the housing 112, and a corresponding indentation 131 on the inside of the cap 130.
25

[0020] Close to the end of the housing 112 from which the hypodermic needle can extend, there is provided a curved camming surface 150 which corresponds with another curved camming surface 152 on the cap 130.

30 **[0021]** As can be seen from figures 7 and 8, the interior of the cap 130 is provided with a castellated grip washer 160. This grip washer 160 is shown in figure 6. The grip washer 160 is held in place in the cap 130 by a corresponding indentation 162 which is moulded into the interior of the cap 130.

35 **[0022]** The exterior of the cap 130 is provided with a pair of grip surfaces 170. These grip surfaces 170 provide a surface through which the user can grip the cap 130.

[0023] As can be seen from figure 9, the interior of the cap 130 may be provided with a support surface 180 which supports the end of the boot 120.

5 **[0024]** During manufacture of the injection device 110, the syringe 114 and boot 120 are inserted into the housing as a single piece. The cap is placed onto the housing such that the boot 120 is forced into the centre of the castellated washer 160 and the ridge 113 on the housing engages with the indentation 131 in the cap 130. In addition the two camming surfaces 150 are aligned. By forcing the boot 120 into the castellated
10 washer 160, the castellations deform so that the washer takes up a slightly frustoconical shape. The metal from which the washer 160 is formed cuts into the softer plastics or rubber material from which the boot 120 is formed. Consequently a very firm grip is produced on the boot 120.

15 **[0025]** When the injection device 110 is to be used, the user holds the housing with one hand, and grips the cap 130 with the other hand using the grip surfaces 170. The user then rotates the cap 130. In rotating the cap 130, the two camming surfaces 150, 152 move over each other, and the cap 130 is moved axially away from the housing 112. This rotational and axial movement also twists and pulls the boot 120 off the
20 syringe 114. The boot 120 is held stationary within the cap 130 by the castellated washer 160 because the force required to twist the boot 120 and remove it from the syringe 114 is significantly less than that required to pull the boot 120 out of the centre of the castellated washer 160. The support surface 180 helps to prevent the boot 120 from being pulled away from the syringe 114 at an angle, by maintaining the axial
25 alignment of the boot 120 within the cap 130.

[0026] The present invention provides a simple and effective way of solving the problems of the prior art devices. Since no modifications need to be made to the syringe or boot, a standard syringe can be used, and manufacturing costs can be
30 reduced. Furthermore, the tolerances with which the syringe and boot are positioned within the housing are not critical since once the boot has been inserted into the castellated washer, it cannot be removed. It does not matter how much of the boot extends through the washer, provided that the washer grips the boot sufficiently. Since the insertion depth and exact size of the syringe and boot can be subject to variation,
35 this is a significant advantage.

[0027] In addition, the number of operational steps required to use the device is

minimised since it is not necessary to perform two separate steps to remove the cap and the boot.

PATENTKRAV

1. Injektionsindretning (110) omfattende:

5 et hus (112), der er indrettet til at modtage en sprøjte (114), som har en udtømningsdyse (118) og en kappe (120), der dækker udtømningsdysen, idet huset definerer en første akse og har første og anden ender, hvor udtømningsdysen er i stand til at strække sig fra husets første ende gennem en udløbsåbning, og huset ydermere har en knastflade (150) ved sin første ende, og **kendetegnet ved:**

10 en huslukkedel (130), der har en knastflade (152) til at stå i forbindelse med knastfladen på huset, således at drejning af huslukkedelen omkring aksen vil få huslukkedelen til at bevæge sig aksialt bort fra huset, og huslukkedelen ydermere omfatter midler (160) til forbindelse med sprøjtens kappe, så fjernelse af huslukkedelen fra huset vil medføre fjernelse af kappen fra sprøjten,

15 hvor knastfladerne på huset og huslukkedelen omfatter sammenhørende krumme overflader, og

hvor forbindelsesmidlet omfatter en presset gribeskive (160) med en takket inderdiameter.

20 2. Injektionsindretning ifølge krav 1, yderligere omfattende en ekstern gribeindretning (170), hvormed brugeren kan gribe huslukkedelen.

25 3. Injektionsindretning ifølge et af de foregående krav, hvor enten huslukkedelen eller huset yderligere omfatter en ryg (113), som en tilhørende indskæring (131) på den anden af huslukkedelen og huset kan stå i forbindelse med for at fastholde huslukkedelen på huset.

4. Injektionsindretning ifølge krav 1, hvor inderdiameteren af gribeskiven er kreneleret.

30 5. Injektionsindretning ifølge krav 1, hvor gribeskiven omfatter en indvendigt fortandet stjerneskiye eller rystelsessikker skive.

6. Injektionsindretning ifølge et af kravene 1, 4 eller 5, hvor gribeskiven efter at bunden af sprøjten er forbundet til huslukkemidlet, bøjes til en keglestubformet form.

35 7. Injektionsindretning ifølge et af de foregående krav, hvor forbindelsesmidlet er formet af metal.

8. Injektionsindretning ifølge et af de foregående krav, hvor forbindelsesmidlet holdes i en indskæring, der er støbt i huslukkemidlet.

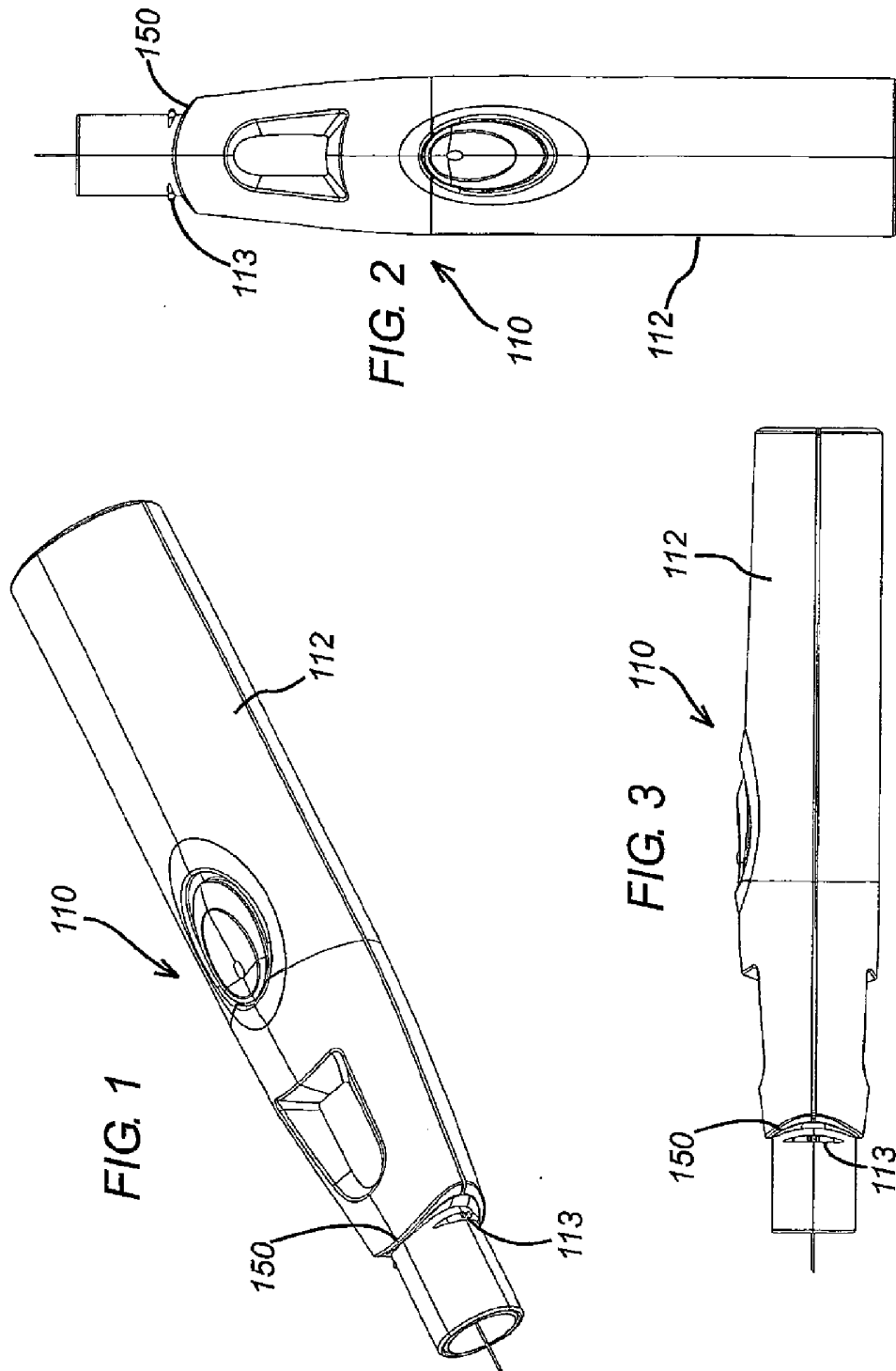
- 5 9. Injektionsindretning ifølge et af de foregående krav, hvor forbindelsesmidlet rummes i et centralt fremspring, der er støbt ind i indersiden af huslukkemidlet.

10. Injektionsindretning ifølge krav 9, hvor forbindelsesmidlet holdes på plads i huslukkemidlet i kraft af en indskæring (162) indstøbt i det centrale fremspring.

10

11. Injektionsindretning ifølge et af de foregående krav, yderligere omfattende en støtteflade (180) til at understøtte en ende af en kappe for en sprøjte.

15



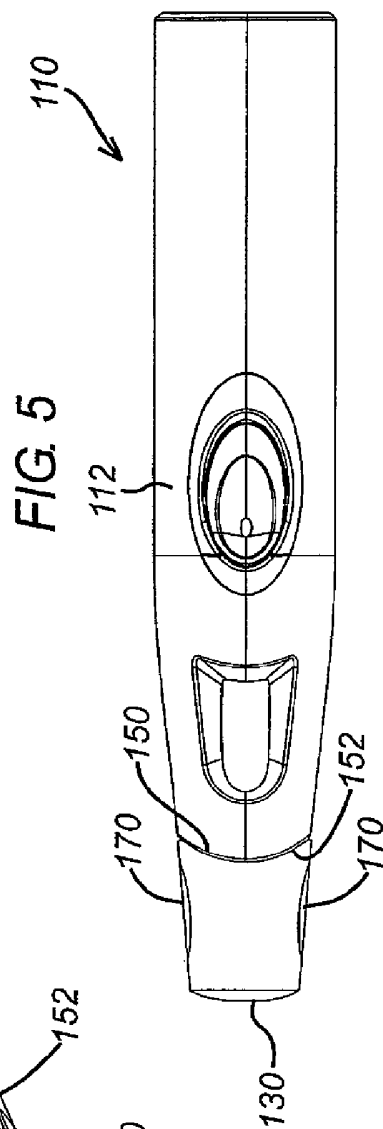
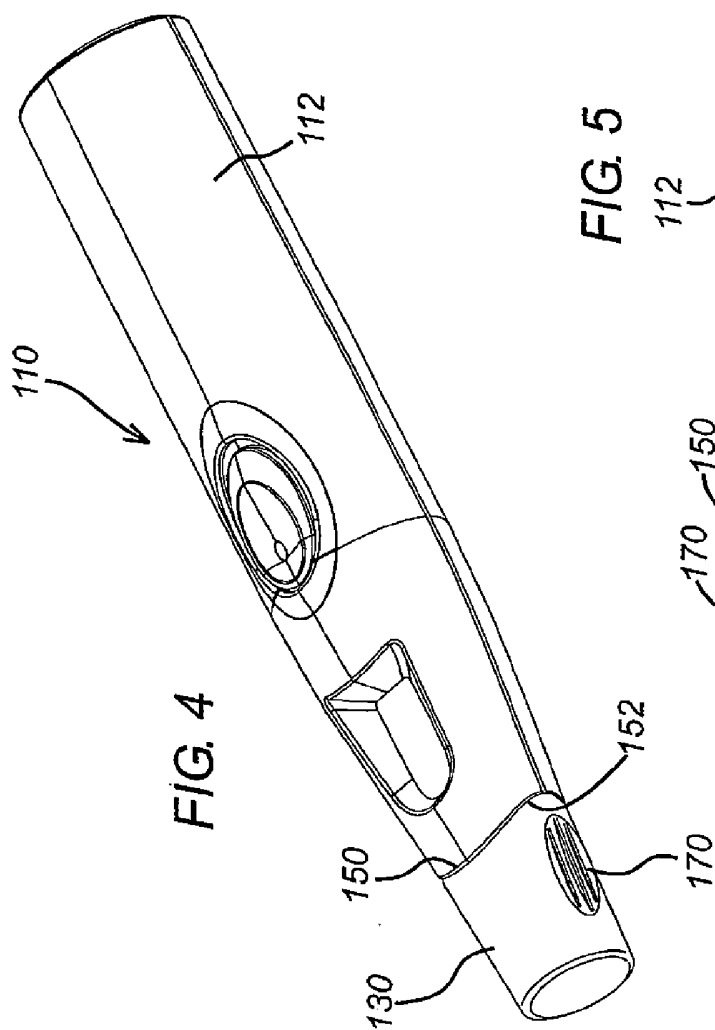


FIG. 6

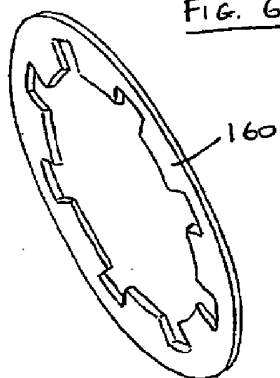


FIG. 7

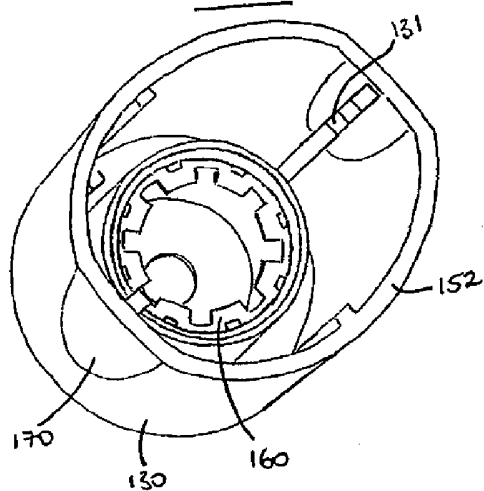


FIG. 8

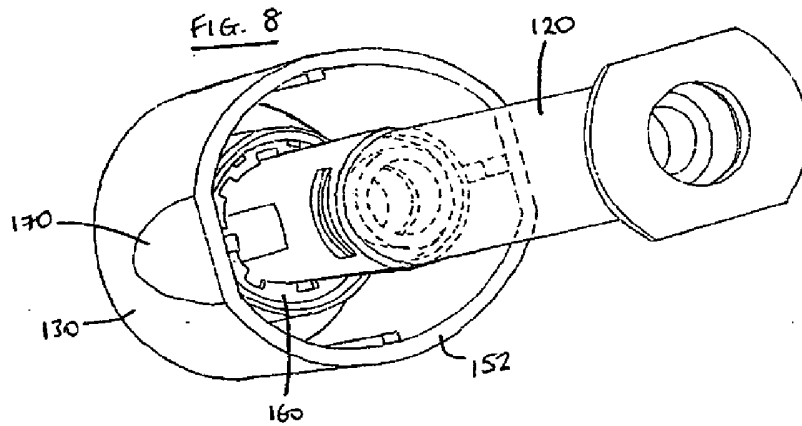


FIG. 9

