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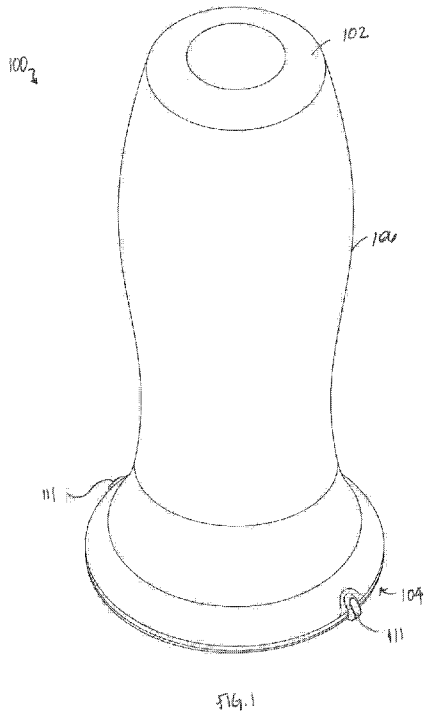

FIG. 1

(57) Abstract: In an embodiment, an injection actuation assist device is provided, including a top side, a bottom side, an opening in the bottom side for receiving an autoinjector, and an elongated shaft extending between the top side and the bottom side. The device further includes an elongated chamber having a first end and a second end and extending the length of the shaft and terminating at the opening, the chamber being configured to receive a portion of the autoinjector device and comprising a plurality of ribs extending into the chamber for gripping the autoinjector device. The device may further include a notch at the opening for receiving a protrusion of the autoinjector device, when the autoinjector device is received within the chamber, wherein receipt of the autoinjector device within the chamber and movement of the actuation assist device toward the distal end of the autoinjector device, actuates the autoinjector device to deliver an injection.

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INJECTION ASSIST DEVICE

BACKGROUND

[001] Rheumatoid arthritis (RA) is an autoimmune disease that attacks tissues near joints and other body parts, causing chronic swelling and pain. RA focuses on the synovial tissues within the joints. Autoimmune diseases occur when the body's immune system mistakes its own tissues as foreign, and attacks the tissue by way of antibodies which seek out and destroy the "invaders" in the synovium. Patients suffering from RA have stiffness in the joints, which often begins in the fingers and toes, causing joint pain as well as restricted movement. These patients have difficulty articulating the joint, and consequently, manipulating devices with their hands becomes difficult. Most self-administered medications require a medication delivery device, for example, an autoinjector, and oftentimes, these devices require manipulation of the device by the patient to self-deliver a dose. Autoinjectors can be shroud actuated or button actuated. Button actuated autoinjector devices include an actuation button, typically located at the top end of the device, that must be manipulated by the user to deliver a medicament injection. Patients with RA struggle to actuate these devices, due to the restricted movement of their joints.

SUMMARY

[002] In one embodiment, an injection actuation assist device is provided, including a top side, a bottom side, an opening in the bottom side for receiving an injection device, and a shaft extending between the top side and the bottom side. The device further includes a chamber having a first end and a second end and terminating at the opening, the chamber being configured to receive a portion of the injection device and comprising a plurality of ribs extending into the chamber for gripping the injection device. The device may further include a notch at the opening for receiving a protrusion of the injection device when the injection device is received within the chamber, wherein receipt of the injection device within the chamber and movement of the actuation assist device toward the distal end of the injection device, actuates the injection device to deliver an injection.

[003] In another embodiment, a method for actuating an injection device is provided. The method includes placing an injection actuation assist device over the an injection device such that the injection device is partially disposed within the chamber of the assist device, and at least one protrusion on an outer surface of the injection device is longitudinally aligned with a notch on the assist device. The method further includes inserting the injection device into the chamber of the assist device until the button contacts a chamber ceiling of the assist device, and rotating the assist device until the at least one protrusion of the injection device is removably received within the notch of the assist device. The method further includes applying a downward force on the assist device to actuate the injection device to deliver an injection.

BRIEF DESRIPTION OF THE DRAWINGS

[004] A more particular description briefly stated above will be rendered by reference to specific embodiments thereof that are illustrated in the appended drawings. Understanding that these drawings depict only typical embodiments and are not therefore to be considered to be limiting of its scope, the embodiments will be described and explained with additional specificity and detail through the use of the accompanying drawings in which:

[005] FIG. 1 is a perspective view of an injection actuation assist device embodiment.

[006] FIG. 2 is a side view of an injection actuation assist device embodiment.

[007] FIG. 3 is a perspective bottom view of an injection actuation assist device embodiment.

[008] FIG. 4 is a bottom view of an injection actuation assist device embodiment.

[009] FIG. 5 is a cross sectional view of an of an injection actuation assist device embodiment.

[010] FIG. 6 is a top view of an injection actuation assist device embodiment, with an autoinjector device received there within.

[011] FIG. 7 is a top perspective view of an alternative embodiment of an injection actuation assist device.

[012] FIG. 8 is a perspective cross sectional view of an injection actuation assist device and an injection device for placement into the injection actuation assist device.

[013] FIG. 9 is a cross sectional view of the injection device received within the actuation assist device.

[014] FIG. 10 is a cross sectional view of the injection device secured into the injection actuation assist device for use.

DETAILED DESCRIPTION

[015] For the purposes of promoting an understanding of the principles and operation of the invention, reference will now be made to the embodiments illustrated in the drawings and specific language will be used to describe the same. It will nevertheless be understood that no limitation of the scope of the invention is thereby intended, such alterations and further modifications in the illustrated device, and such further applications of the principles of the invention as illustrated therein being contemplated as would normally occur to those skilled in the art to which the invention pertains.

[016] It is to be noted that the terms "first," "second," and the like as used herein do not denote any order, quantity, or importance, but rather are used to distinguish one element from another. The terms "a" and "an" do not denote a limitation of quantity, but rather denote the presence of at least one of the referenced item. Furthermore, to the extent that the terms "including," "includes," "having," "has," "with," or variants thereof are used in either the detailed description and/or the claims, such terms are intended to be inclusive in a manner similar to the term "comprising." The modifier "about" used in connection with a quantity is inclusive of the stated value and has the meaning dictated by the context (e.g., includes the degree of error associated with measurement of the particular quantity). It is to be noted that all ranges disclosed within this specification are inclusive and are independently combinable.

[017] The terminology used herein is for the purpose of describing particular embodiments only and is not intended to be limiting. As used herein, the singular forms "a," "an," and "the" are intended to include the plural forms as well, unless the context clearly indicates otherwise these terms do not denote a limitation of quantity, but rather denote the presence of at least one of the referenced item. Furthermore, to the extent that the terms "including," "includes," "having," "has," "with," or variants thereof are used in either the detailed description and/or the claims, such terms are intended to be inclusive in a manner similar to the term "comprising." Moreover, unless specifically stated, any use of the terms first,

second, etc., does not denote any order, quantity or importance, but rather the terms first, second, etc., are used to distinguish one element from another.

[018] Notwithstanding that the numerical ranges and parameters setting forth the broad scope are approximations, the numerical values set forth in specific non-limiting examples are reported as precisely as possible. Any numerical value, however, inherently contains certain errors necessarily resulting from the standard deviation found in their respective testing measurements. Moreover, all ranges disclosed herein are to be understood to encompass any and all sub-ranges subsumed therein. As a non-limiting example, a range of "less than 10" can include any and all sub-ranges between (and including) the minimum value of zero and the maximum value of 10, that is, any and all sub-ranges having a minimum value of equal to or greater than zero and a maximum value of equal to or less than 10, e.g., 1 to 7.

[019] Turning to the drawings, FIG. 1 is a perspective view of an injection actuation assist device 100 including a top side 102, a bottom side 104, an opening 103 in the bottom side for receiving an autoinjector (opening shown in FIG. 3), and an elongated shaft 106 extending between the top side 102 and the bottom side 104. The device 100 further includes an elongated chamber 108 (chamber shown in FIG. 4-5) having a first end 108a and a second end 108b and extending the length of the shaft 106 and terminating at the opening 103, the chamber 108 being configured to receive a portion of the autoinjector device 20 (shown in FIG. 6) and comprising a plurality of channels 109 extending between the first 108a and second ends 108b of the chamber for gripping the autoinjector device 20. One or more anti-roll features, or stabilizers, 111 are shown at the base portion of the device 100 in FIG. 1. These anti-roll features 111 prevent rolling of the device 100 when placed on a surface on its side.

[020] In one embodiment, the injection actuation assist device 100 may include a first mating element, and the injection device may include a second mating element, wherein the first and second mating elements engage one another to maintain the injection actuation assist device 100 and the injection device 20 together during use. In some non-limiting examples, the first and second mating elements may include a notch and protrusion relationship, wherein one of the first or second mating elements includes a notch, and the other of the first or second mating elements includes a protrusion. In another non-limiting embodiment, the first mating element and/or

second mating element may include a portion or surface of one device that is held by friction to another portion or a surface of another device.

[021] In one non-limiting example, the first mating element may include a notch 110, in one example the notch 110 may be disposed at the opening 103 of the device 100 as shown in FIG. 1. In a non-limiting embodiment, the second mating element may include a protrusion 22. The notch 110 may be configured for receiving a protrusion of the injection device 20, in one non-limiting embodiment as shown in FIG. 7, when the autoinjector device 20 is received within the chamber 108 to maintain the injection device 20 within the chamber 108 during use. Receipt of the injection device 20 within the chamber 108 and application of a downward force on the injection actuation assist device onto the injection device 20, toward the distal end of the injection device 20 actuates the injection device 20 to deliver an injection. Actuation of the injection device 20 in this manner, with the injection actuation assist device 100 provides assistance to patients with poor joint movement, and difficulty moving the digits of the hand as it removes the need for pressing down on the autoinjector device to inject a medicament while pressing the distal or bottom end of the device against the target injection area, in order to actuate the device to deliver an injection.

[022] Additionally, some patients lack dexterity or simply lack strength in their hands, and consequently, actuation of autoinjector devices (or any injection devices) can be cumbersome. The injection actuation assist device 100 embodiments described herein facilitate an easier injection for these patients by transferring the actuation of the button on a button-actuated autoinjector, for example, to the injection actuation assist device. The user simply provides the downward force on the assist device, while gripping an easy to hold and easy to grip shaft of the device, instead of manipulating the actuation button of the device while pressing the device down onto the target injection area. When used with a shroud-actuated injection device, the injection actuation assist device allows for easier actuation of the autoinjector device, by providing a more ergonomic shaped object (i.e., the shaft) to grip, while applying downward pressure toward a target site for injection.

[023] In some examples, the outer profile of the injection actuation assist device may include an ergonomic shape, in one embodiment as shown in FIG. 1, configured to be easily held within a hand of a user to further facilitate the injection process. In some non-limiting

embodiments, the outer profile of the injection assist device may include a longitudinal shaft extending from the base of the device, for example. In yet further embodiments, various shapes, sizes and profiles may be used for the shaft portion of the injection assist device to enhance gripping of the device during use. In still further embodiments, surface treatments or variations to the material of the injection actuation assist device 100 may be provided to enhance a user's ability to hold and grip the device during use. FIG. 7 provides a non-limiting example, wherein the shaft includes a ribbed feature on its outer surface.

[024] With the injection actuation assist device 100 embodiments described herein, a user may simply apply pressure to the device 100 once the autoinjector is placed there within and apply the pressure against the target injection site in order to actuate the autoinjector device and deliver the injection.

[025] Furthermore, for button actuated devices, wherein the button for actuating the device is located on a top surface of the device downward force on the injection assist device 100 causes actuation of the injection device by compressing the button via contact between the button and the chamber ceiling 112. This action may cause movement between the button-actuated injection device and the injection actuation assist device.

[026] FIG. 2 is a side view of an injection actuation assist device 100 embodiment. In FIG. 2, length *a* denotes the diameter of the bottom side 104 of the device, and the top side 102 diameter *b* is also shown. As demonstrated in FIG. 2, in an embodiment, the largest diameter of the bottom side *b* is greater than the largest diameter of the top side *a*. In one non-limiting embodiment, the bottom side 104 may include a rigid material. The bottom side 104 may include a flange 105, which extends from the shaft. The flange 105 may be used to stabilize the device on the target surface of the user. The flange 105 may be formed of a rigid material in one non-limiting embodiment. Materials may include plastics, rubbers, and other materials known to those skilled in the art to which the invention pertains. The shaft 106 of the assist device may be formed of a soft substrate material to aid in providing comfort to the user during use of the assist device 100. On the bottom surface of the device, a device receipt indicator 107 is shown. The device receipt indicator 107 allows alignment of the device within the device 100 for receipt therein. Upon receiving an injection device (shown in FIGS. 7-10) within the injection actuation assist device 100, a protrusion 22 on the outer surface of the injection device 20 should align

with the device receipt indicator 107 to position the injection device for receipt and locking within the device 100. In some embodiments, the device receipt indicator may include an alignment guide. In other non-limiting embodiments, the device receipt indicator may indicate alignment and/or receipt of the injection device by visual, audible, or tactile feedback.

[027] FIG. 3 is a perspective bottom view of an injection actuation assist device 100 embodiment showing the opening 103 disposed at the bottom side 104 of the device 100, and a notch 110 positioned at the opening 103 receiving a protrusion of an autoinjector device Autoinjector devices routinely include protrusions on their outer surface, these protrusions are often called "pips". When received within the injection actuation assist device 100, the autoinjector proximal end is placed into the chamber 108, and the assist device 100 is slid partway over the autoinjector device until the autoinjector device contacts a chamber ceiling 112 (shown in FIG. 4) of the device 100.

[028] FIG. 4 is a bottom view of an injection actuation assist device 100 embodiment showing a view into the chamber 108. The notch 110, is as in FIG. 3 shown as positioned at the opening 103 of the chamber 108 in the bottom side 104 of the device 100. A view into the chamber 108 shows the chamber ceiling 112 provide for abutting the autoinjector device during use of the device 100. On the chamber ceiling 112 is provided a number of ridges 114 for interfacing with the autoinjector device once placed therein. A device receipt indicator 113 is shown on the bottom surface of the device 100 in one non-limiting embodiment, to indicate when an autoinjector device has been received within the chamber 108.

[029] FIG. 5 is a cross sectional view of an of an injection actuation assist device 100 embodiment from the bottom side 104, with notch 110 disposed at the opening 103 to the chamber 108. FIG. 5 shows the channels 109 for gripping the autoinjector once placed therein. The channels 109 extend from the chamber first end 108a to the chamber second end 108b and provide additional friction for receiving and maintaining the autoinjector within the chamber 108 during use of the device 100.

[030] FIG. 6 is a top view of an injection actuation assist device 100 embodiment, showing a view of the top side 102, with an autoinjector device 20 and the flange. The anti-roll features 111 are viewable associated with the bottom side 104 of the device 100 in the top view of the device 100.

[031] FIG. 7 is a top perspective view of an alternative embodiment of an injection actuation assist device 200, shown receiving an injection device 20 within a chamber 208 of the assist device 200. The injection actuation assist device 200 includes a top side 202 and bottom side 204, and a shaft 206 extending between the top and bottom sides 202, 204. The injection actuation assist device 200 includes, in one non limiting embodiment, anti-roll features 211. Moreover, the shaft 206 of the injection actuation assist device 200 embodiment is shown as an elongated vertical shaft. The shaft 206 may be provided of any shape sufficient to grip in the hand of a user to assist actuation of an injection by receiving an injection device within the chamber of the assist device 200. In some embodiments, a surface treatment may be provided on an outer surface of the device. In one example, the shaft 206 may include a ribbed surface as shown in FIG. 7. Certain materials, surface treatments, or shapes of the device may enhance the ability of a user to grip and use the device 200.

[032] FIG. 8 is a cross-sectional view of the embodiment of the injection actuation assist device 200 shown in FIG. 7, with a cross sectional view of an injection device 20 shown beneath the assist device 200. A first mating element 210, shown as a notch in FIG. 8 is disposed at an opening to the chamber 208 of the device 200. A second mating element 22, shown as a protrusion in the embodiment shown in FIG. 8 is provided on an outer surface of the injection device 20. Upon alignment of the protrusion 22 with the notch 210 and insertion of the injection device 20 into the chamber 208 of the injection actuation assist device 200 as shown in FIG. 9, the protrusion is received within the notch 210 to lock the injection device 20 into the injection actuation assist device 200 for use. The injection device 20 may be removably locked into the injection assist device 200, or may be permanently locked into the injection assist device 200 in alternative embodiments.

[033] As shown in FIG. 10, upon receipt of the protrusion 22 within the notch 210, and rotation of the injection device 20 relative to the injection actuation assist device 200, or rotation of the injection actuation assist device 200 relative to the injection device 20, or rotation of both components relative to one another, the protrusion 22 is locked into the notch 210 for use of the device to deliver an injection.

[034] In another embodiment, a method for actuating an injection device 20 is provided. In one embodiment, the injection device may include an autoinjector. In further non-limiting embodiments, the autoinjector may include a button activated autoinjector or a shield activated

autoinjector. The method includes placing the injection device 20 into the injection actuation assist device chamber 108, such that the autoinjector device 20 is at least partially disposed within the chamber 108 of the assist device 100. In one embodiment, at least one protrusion 22 on an outer surface of the injection device 20 is longitudinally aligned with a notch 110 on the assist device 100. The method further includes inserting the injection device 20 into the chamber 108 of the assist device 100 until top surface of the injection device 20 contacts a chamber ceiling 112 of the assist device 100 until the injection device is secured within the injection actuation assist device 100, 200. In some embodiments, securing the injection device 20 within the injection actuation assist device 100, 200 requires rotation of the injection device 20 once placed within the chamber 108, 208, to secure the injection device 20 within the injection actuation assist device 100, 200. Rotation of the injection device 20 in the embodiment shown in FIG. 7-10 for example, allows the protrusion 22 of the injection device 20 to be received within the notch 210 of the injection actuation assist device 200.. The method further includes applying a downward force on the assist device 100 to actuate the autoinjector device 20 and deliver an injection through the autoinjector device 20.

[035] It is important to an understanding of the present invention to note that all technical and scientific terms used herein, unless defined herein, are intended to have the same meaning as commonly understood by one of ordinary skill in the art. The techniques employed herein are also those that are known to one of ordinary skill in the art, unless stated otherwise. For purposes of more clearly facilitating an understanding the invention as disclosed and claimed herein, the following definitions are provided.

[036] While a number of embodiments of the present invention have been shown and described herein in the present context, such embodiments are provided by way of example only, and not of limitation. Numerous variations, changes and substitutions will occur to those of skill in the art without materially departing from the invention herein. For example, the present invention need not be limited to best mode disclosed herein, since other applications can equally benefit from the teachings of the present invention. Also, in the claims, means-plus-function and step-plus-function clauses are intended to cover the structures and acts, respectively, described herein as performing the recited function and not only structural equivalents or act equivalents, but also equivalent structures or equivalent acts, respectively. Accordingly, all such

modifications are intended to be included within the scope of this invention as defined in the following claims, in accordance with relevant law as to their interpretation.

CLAIMS

What is claimed is:

1. An injection actuation assist device, comprising:

a top side, a bottom side, an opening in the bottom side for receiving an injection device, and a shaft extending between the top side and the bottom side;

a chamber comprising a first end and a second end, the chamber and terminating at the opening, said chamber configured to receive a portion of the injection device; and

a first mating element configured to interface with a second mating element on the injection device;

wherein receipt of the injection device within the chamber and a distal movement of the actuation assist device toward the injection device actuates the injection device to deliver an injection.

2. The injection actuation assist device of claim 1, wherein the injection device comprises an autoinjector device.

3. The injection actuation assist device of claim 2, wherein the autoinjector device comprises a button-actuated autoinjector device or a shroud actuated autoinjector device.

4. The injection actuation assist device of claim 1, wherein the first mating element comprises a notch.

5. The injection actuation assist device of claim 4, wherein the notch is disposed at the opening.

6. The injection actuation assist device of claim 4, wherein the first mating element is configured to interface with a second mating element on the injection device to secure the injection device within the injection actuation assist device.

7. The injection actuation assist device of claim 1, wherein the diameter of the bottom side is greater than the diameter of the top side.

8. The injection actuation assist device of claim 1, further comprising a flange extending from the bottom side of the device for stabilizing the device on the target site.

9. The injection actuation assist device of claim 1, wherein the bottom side comprises a rigid material.

10. The injection actuation assist device of claim 4, wherein receipt of the protrusion of the autoinjector device within the notch of the assist device, and rotation of the assist device relative to the injection device locks the injection device into place for use.

11. The injection actuation assist device of claim 1, further comprising a chamber ceiling positioned at the top end of the chamber, configured to abut a first end of the injection device when received within the chamber.

12. The injection actuation assist device of claim 11, further comprising a plurality of ridges on the chamber ceiling for gripping the injection device or positioned within the chamber.

13. A method for actuating an autoinjector device, comprising:

placing the injection actuation assist device of claim 1 over a portion of an autoinjector device such that the autoinjector device is partially disposed within the chamber of the actuation assist device;

inserting the autoinjector device into the chamber of the assist device until an upper portion of the autoinjector device contacts a chamber ceiling of the assist device; and

applying a distal force toward the injection device on the assist device to actuate the autoinjector device and deliver an injection.

14. The method of claim 13, wherein the autoinjector device is a button-actuated autoinjector device, and wherein applying a distal force on the assist device to activate the autoinjector device causes the button on the autoinjector device to be depressed, initiating an injection.

15. The method of claim 13, wherein upon inserting the autoinjector device into the assist device chamber, at least one protrusion on an outer surface of the autoinjector device is longitudinally aligned with a notch on the assist device.

16. The method of claim 15, further comprising rotating the assist device until the at least one protrusion of the autoinjector device is removably received within the notch of the assist device.

17. The method of claim 13 wherein the autoinjector device is a shroud-actuated autoinjector device, and wherein applying a distal force on the assist device to activate the autoinjector device causes retraction of the shroud into the autoinjector device, initiating an injection.

18. The method of claim 13, wherein a protrusion on the autoinjector device is aligned with a device receipt indicator prior to insertion into the chamber.

19. The method of claim 18, wherein the device receipt indicator provides feedback based on alignment or receipt of the device, said feedback includes visual, auditory and/or tactile feedback.

20. The injection actuation assist device of claim 1, further comprising a plurality of ribs extending into the chamber for contacting the injection device to secure the injection device within the injection actuation assist device.

21. The injection actuation assist device of claim 3, wherein the ribs extend from the first end to the second end of the chamber.

22. An injection actuation assist device, comprising:

a top side, a bottom side, an opening in the bottom side for receiving an injection device, and a shaft extending between the top side and the bottom side; and

a chamber comprising a first end and a second end, the chamber and terminating at the opening, said chamber configured to receive and secure a portion of the injection device;

wherein receipt of the injection device within the chamber and a distal movement of the actuation assist device toward the injection device actuates the injection device to deliver an injection.

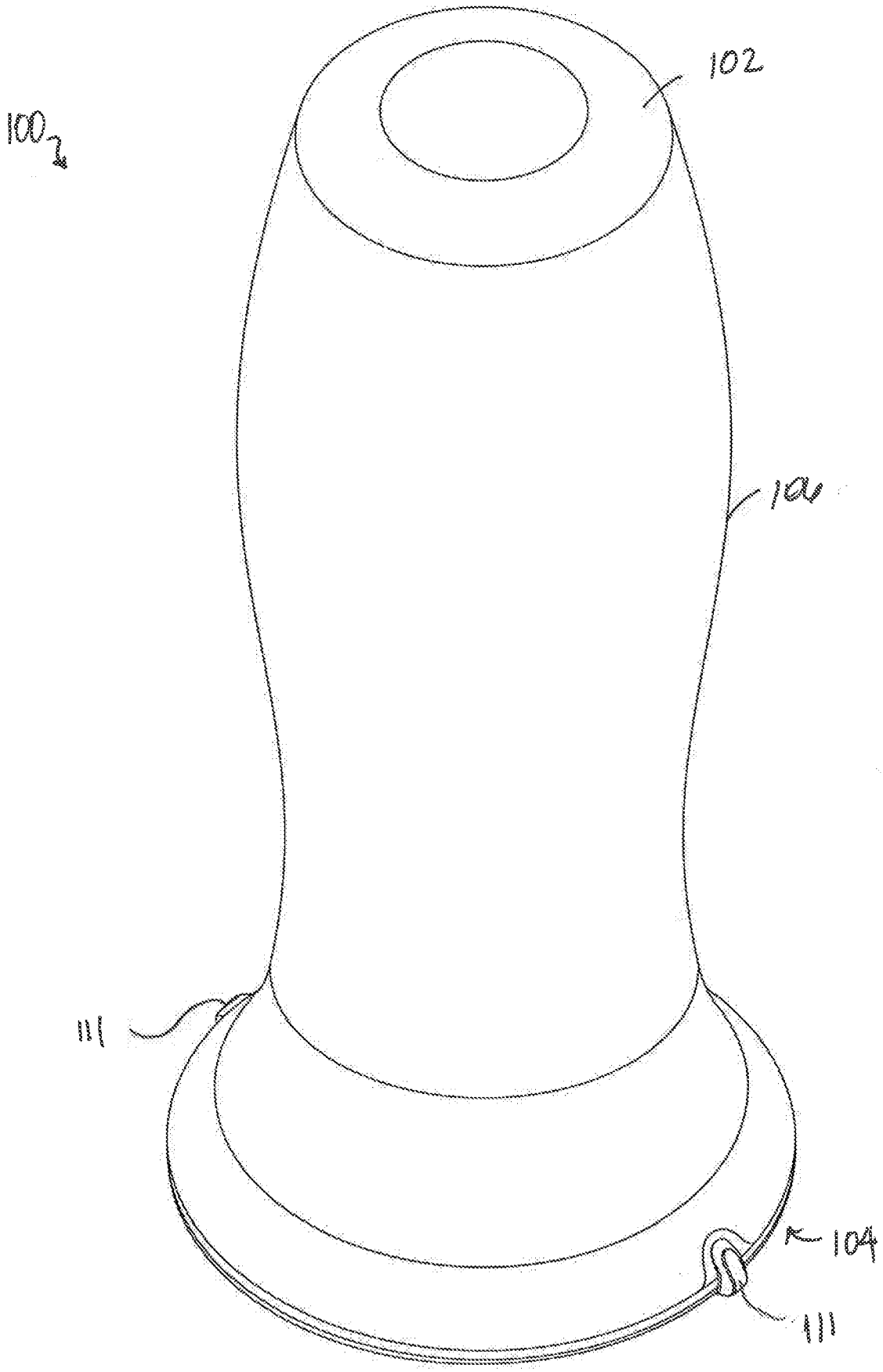

FIG. 1

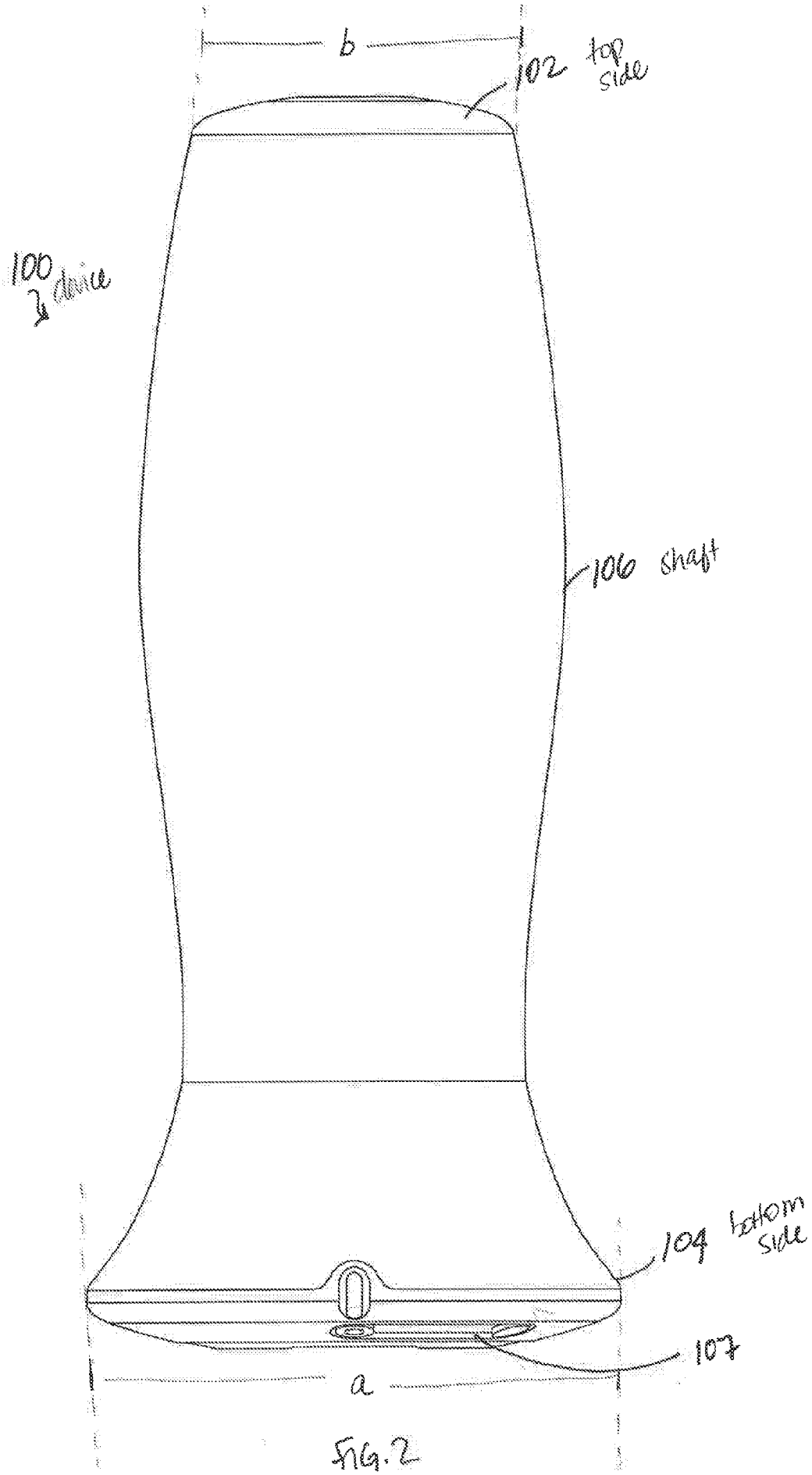

FIG. 2

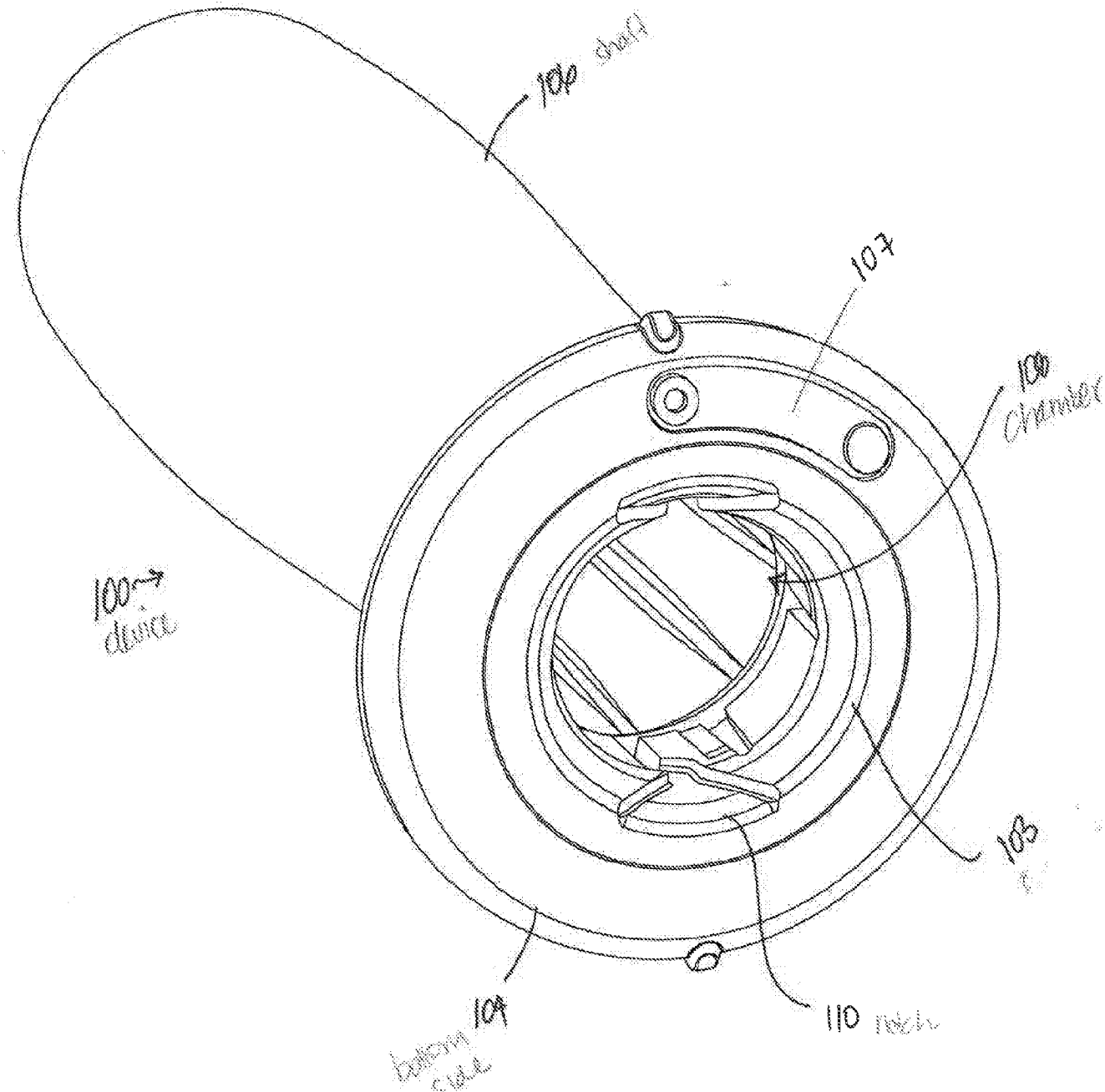

FIG. 3

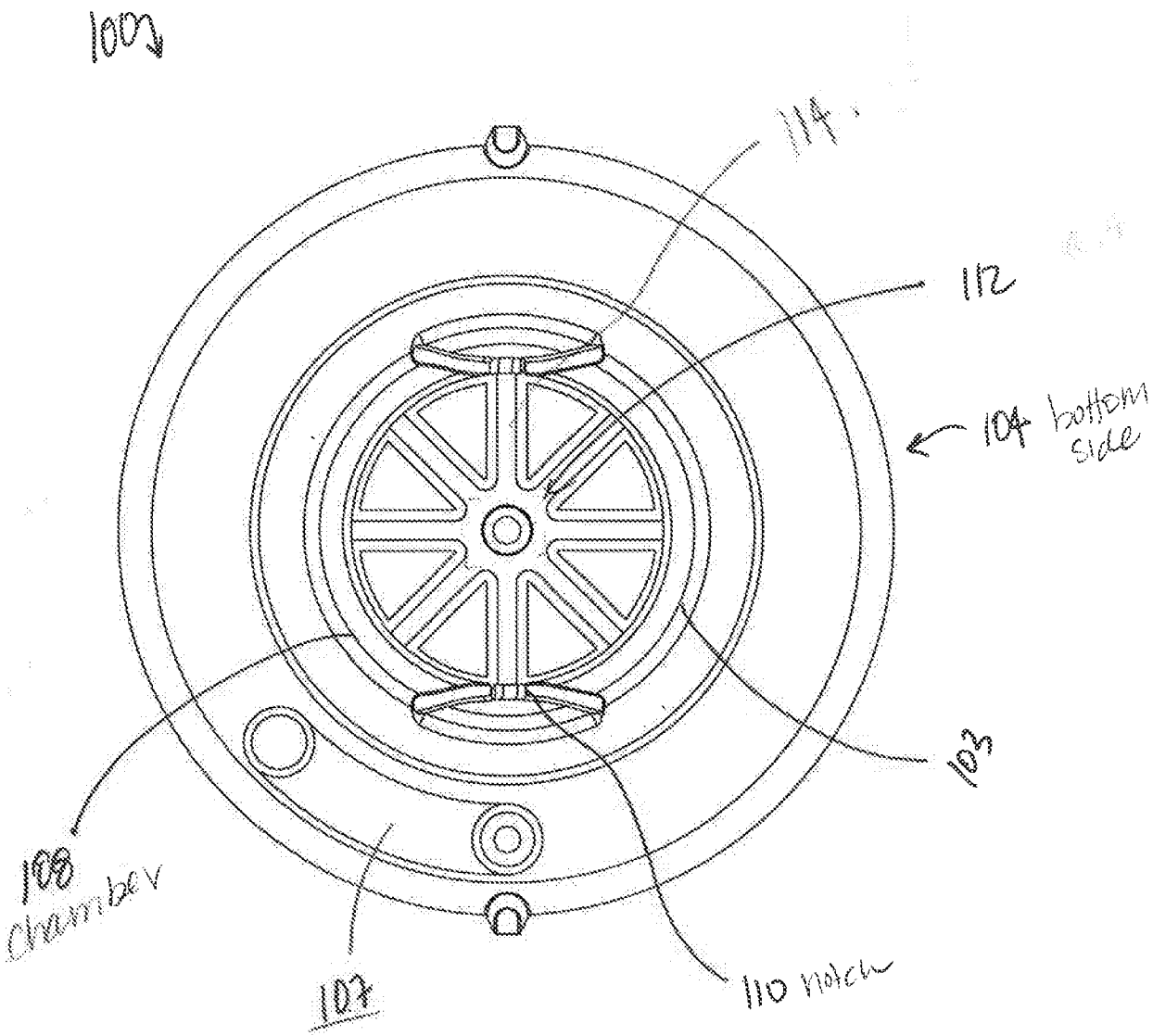

FIG. 4

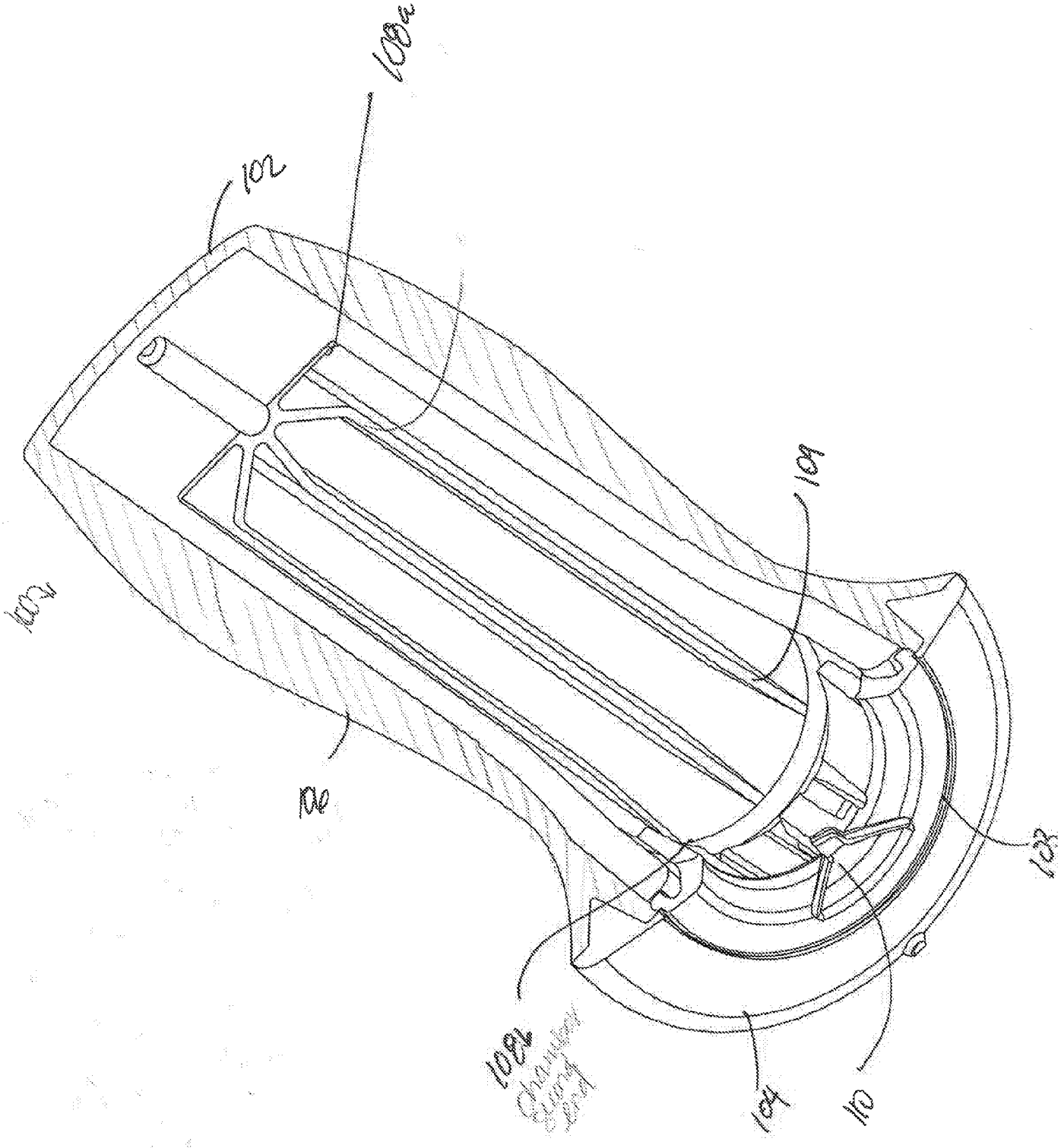

FIG. 5

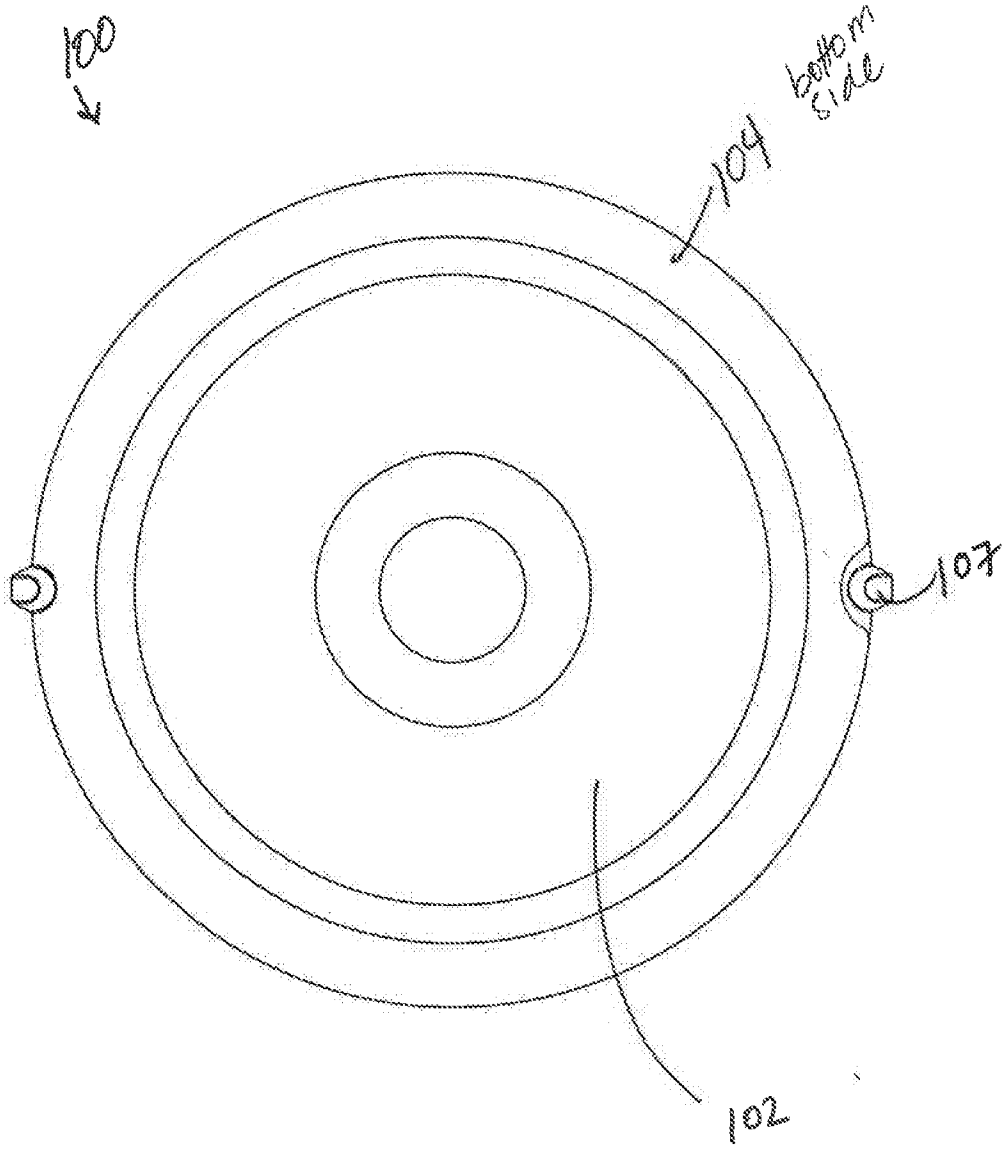

FIG. 4

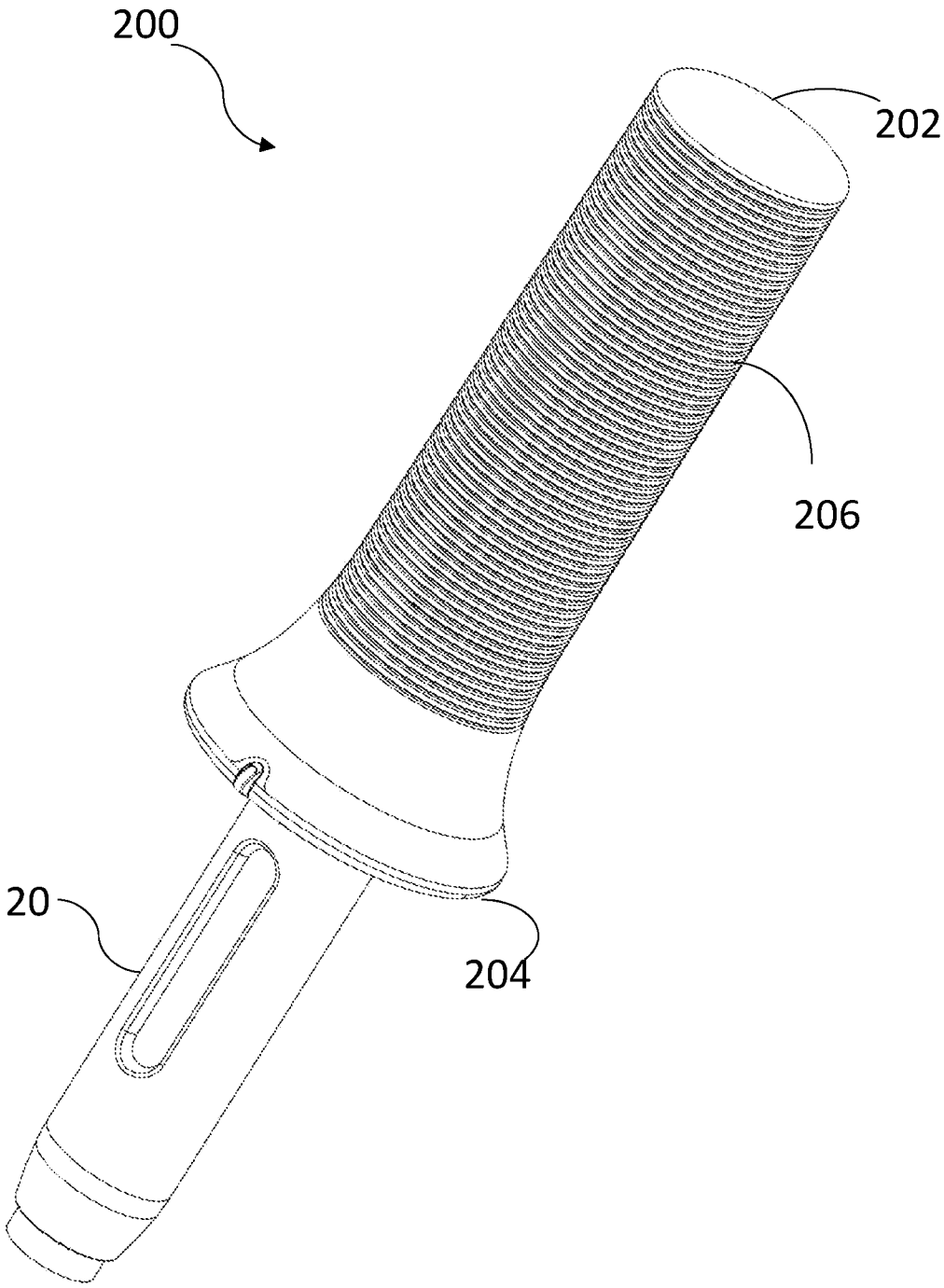

FIG. 7

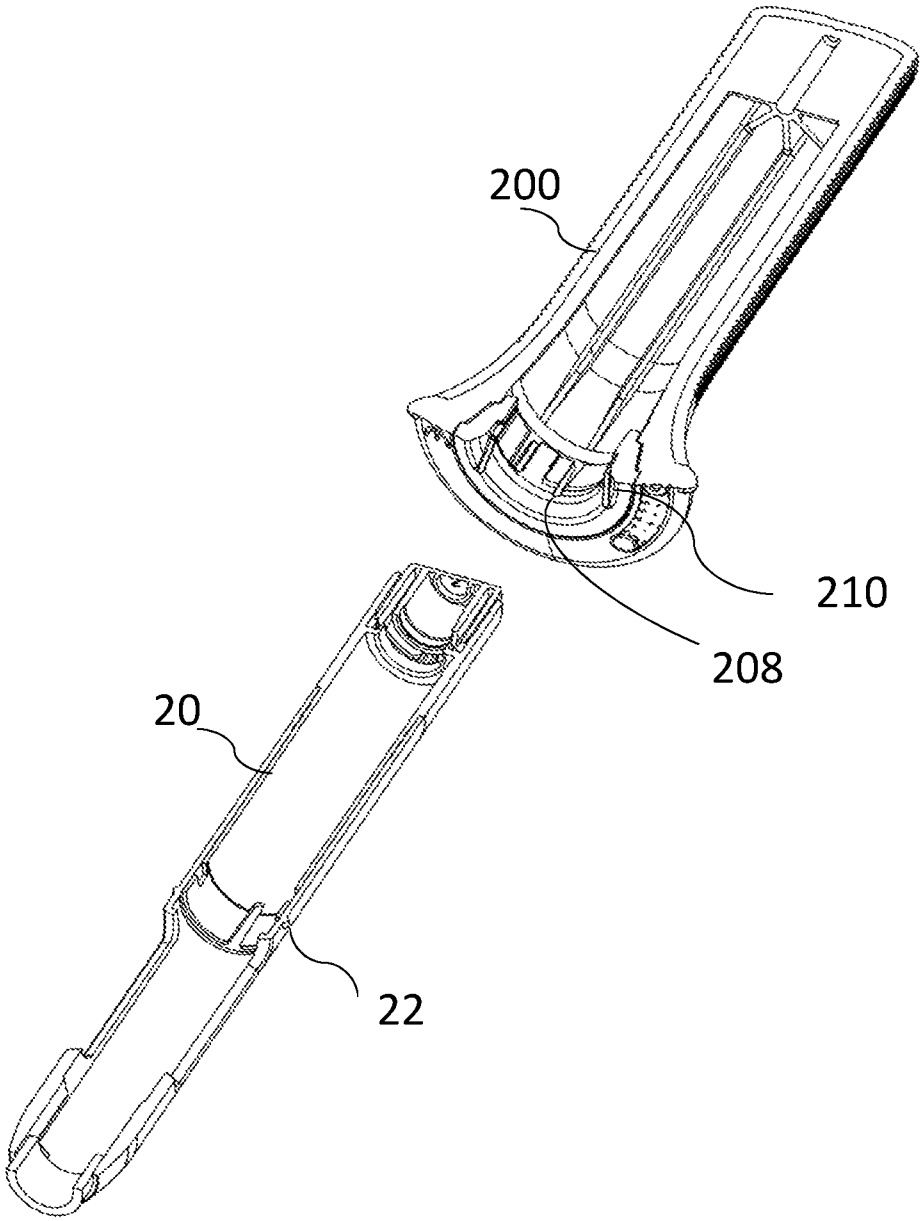

FIG. 8

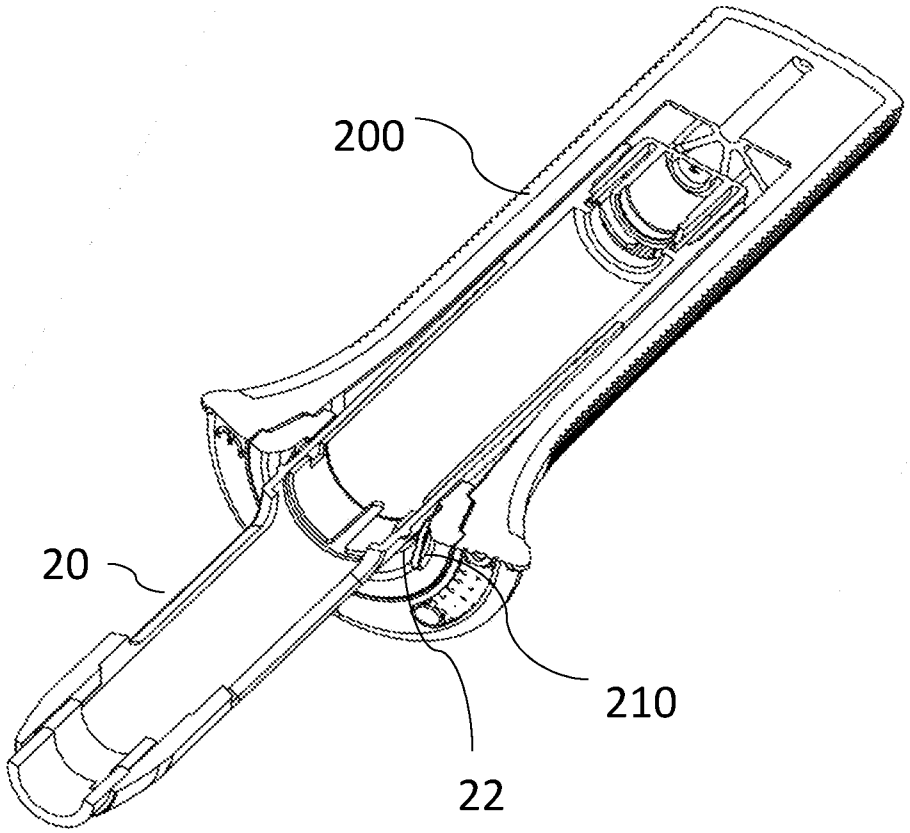

FIG. 9

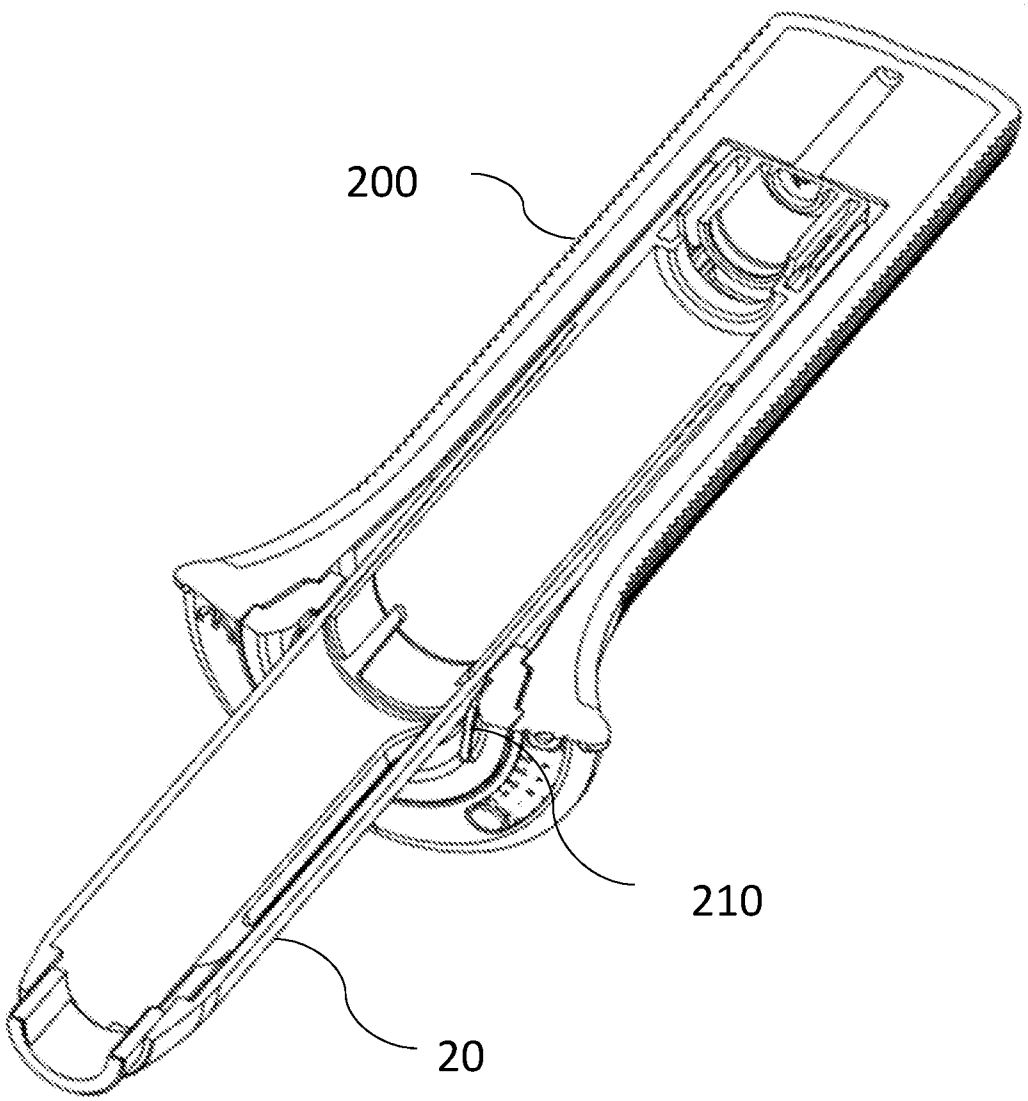

FIG. 10

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US 20/12630

A. CLASSIFICATION OF SUBJECT MATTER

IPC - A61M 37/00, A61M 5/19, A61M 5/20, A61M 5/24, A61M 5/30 (2020.01)

CPC - A61M 5/2033, A61M 5/2066, A61M 5/2466, A61M 5/3202, A61M 5/3204, A61M 5/326, A61M 2005/2013, A61M 2005/2073, A61M 2005/3125, A61M 5/19, A61M 5/30, A61M 5/31596, A61M 2005/2474

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)
See Search History document

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

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

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2004/0039337 A1 (LETZING) 26 February 2004 (26.02.2004), entire document	1-3, 7-8, 11, 22
Y		4-6, 9-10, 12, 20-21
Y	US 2017/0239427 A1 (ANTARES PHARMA, INC. et al.) 24 August 2017 (24.08.2017), entire document	4-6, 10, 12, 20-21
Y	US 2012/0191047 A1 (RAYDAY et al.) 26 July 2012 (26.07.2012), entire document	9
A	US 2011/0125100 A1 (SCHWIRTZ et al.) 26 May 2011 (26.05.2011), entire document	1-12, 20-22
A	US 2017/0246400 A1 (SHL GROUP AB et al.) 31 August 2017 (31.08.2017), entire document	1-12, 20-22
A	US 4,403,989 A (CHRISTENSEN et al.) 13 September 1983 (13.09.1983), entire document	1-12, 20-22
A	US 2002/0042592 A1 (WILMOT et al.) 11 April 2002 (11.04.2002), entire document	1-12, 20-22
A	US 2009/0292240 A1 (KRAMER et al.) 26 November 2009 (26.11.2009), entire document	1-12, 20-22

☐ 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
"D" document cited by the applicant in the international application
"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	Date of mailing of the international search report
4 MAY 2020	11 JUN 2020
Name and mailing address of the ISA/US Mail Stop PCT, Attn: ISA/US, Commissioner for Patents P.O. Box 1450, Alexandria, Virginia 22313-1450 Facsimile No. 571-273-8300	Authorized officer Lee Young Telephone No. PCT Helpdesk: 571-272-4300

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US 20/12630

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 Extra 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 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.:
1-12, 20-22

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.

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/US 20/12630

This application contains the following inventions or groups of inventions which are not so linked as to form a single general inventive concept under PCT Rule 13.1. In order for all inventions to be examined, the appropriate additional examination fees must be paid.

Group I: Claims 1-12 and 20-22, directed to an injection actuation assist device.

Group II: Claims 13-19, directed to a method for actuating an autoinjector device, wherein the upper portion of the autoinjector device contacts a chamber ceiling.

The inventions listed as Groups I-II do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons:

SPECIAL TECHNICAL FEATURES

The invention of Group I includes the special technical feature of an injection actuation assist device, not required by the claims of Group II.

The invention of Group II includes the special technical feature of a method for actuating an autoinjector device, wherein the upper portion of the autoinjector device contacts a chamber ceiling, not required by the claims of Group I.

COMMON TECHNICAL FEATURES

Groups I-II share the common technical features of an injection actuation assist device, comprising:
a top side, a bottom side, an opening in the bottom side for receiving an injection device, and a shaft extending between the top side and the bottom side;
a chamber comprising a first end and a second end, the chamber and terminating at the opening, said chamber configured to receive a portion of the injection device; and
a first mating element configured to interface with a second mating element on the injection device;
wherein receipt of the injection device within the chamber and a distal movement of the actuation assist device toward the injection device actuates the injection device to deliver an injection.

However, this shared technical feature does not represent a contribution over prior art as being anticipated by US 2009/0292240 A1 to KRAMER et al. (hereinafter "KRAMER"), which KRAMER discloses an injection actuation assist device (100, Fig.1-2; ABSTRACT), comprising:
a top side (Fig.1 ? see the bottom side of cap 100), a bottom side (Fig.1 ? see the top side of cap 100), an opening (Fig.1 ? see the top opening of cap 100) in the bottom side (Fig.1 ? see the top side of cap 100) for receiving an injection device (10, Fig.1; para[0022], ?A cap 100 is associated with the outer housing 12 at the distal end 8 and is configured for covering an injection conduit, which can be a needle 126, or a jet nozzle, for example. The cap 100 preferably includes engagement portions configured for removable engagement with outer housing 12?), and a shaft (Fig.1 ? see the shaft of cap 100 extending between the top and bottom side of cap 100) extending between the top side (Fig.1 ? see the bottom side of cap 100) and the bottom side (Fig.1 ? see the top side of cap 100);
a chamber (Fig.1 ? see the inner chamber of cap 100) comprising a first end (Fig.1 ? see the bottom end of the inner chamber) and a second end (Fig.1 ? see the top end of the inner chamber), the chamber (Fig.1 ? see the inner chamber of cap 100) and terminating at the opening (Fig.1 ? see the top opening of cap 100), said chamber (Fig.1 ? see the inner chamber of cap 100) configured to receive a portion of the injection device (10, Fig.1; para[0022], ?A cap 100 is associated with the outer housing 12 at the distal end 8 and is configured for covering an injection conduit, which can be a needle 126, or a jet nozzle, for example?); and
a first mating element (102, Fig.1-2; para[0022], ?The engagement portions 102 also preferably include a notch 104 at the proximal end thereof and which is configured for associating with another portion of the outer housing 12?) configured to interface with a second mating element (110, Fig.1-2) on the injection device (10, Fig.1);
wherein receipt of the injection device (10, Fig.1) within the chamber (Fig.1 ? see the inner chamber of cap 100) and a distal movement of the actuation assist device (100, Fig.1-2) toward the injection device (10, Fig.1) actuates the injection device (10, Fig.1) to deliver an injection (Fig.4 ? see how the cap moves with respect to the injection device; para[0037], ?Upon rotation of the threads, the cap 100 moves proximally with respect to the outer housing 112, as shown in FIG. 4. Prefer ably, the cap 100 is able to simultaneously rotate and move proximally. Instead of threads, alternative embodiments can use other mechanisms, such as modified bayonet fittings of the cap to the housing, or by a cam mechanism. The cap 100 is preferably able to move proximally with respect to the outer housing 12 until a proximal portion of the cap 100 contacts the distal end of the engagement portions 106, which can act to limit proximal movement of the cap 100?).

As the common technical features were known in the art at the time of the invention, these cannot be considered special technical feature that would otherwise unify the groups.

Therefore, Groups I-II lack unity under PCT Rule 13 because they do not share a same or corresponding special technical feature.