(19) DANMARK

(10) DK/EP 3452146 T3

(12) Oversættelse af europæisk patentskrift

Patent- og Varemærkestyrelsen

(51) Int.Cl.: *A 61 M 5/20 (2006.01)* *A 61 M 5/315 (2006.01)*

(45) Oversættelsen bekendtgjort den: **2024-05-27**

(80) Dato for Den Europæiske Patentmyndigheds bekendtgørelse om meddelelse af patentet: **2024-04-24**

(86) Europæisk ansøgning nr.: **17721367.5**

(86) Europæisk indleveringsdag: **2017-05-03**

(87) Den europæiske ansøgnings publiceringsdag: **2019-03-13**

(86) International ansøgning nr.: **EP2017060471**

(87) Internationalt publikationsnr.: **WO2017191159**

(30) Prioritet: **2016-05-06 SE 1650616**

(84) Designerede stater: **AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR**

(73) Patenthaver: **SHL Medical AG, Gubelstrasse 22 , PO Box 7710, 6302 Zug, Schweiz**

(72) Opfinder: **CHU, Chun, 3F-1, No. 178 Sec. 5 Misheng East Rd., Songshan, Taipei 105, Taiwan**
Holmqvist, Anders, Björnklostigen 4, 13940 Värmdö, Sverige
LEANDER, Pär, Serenadvägen 18, 131 40 Nacka, Sverige
ODELBERG, Linda, Parkslingan 18, 178 51 Ekerö, Sverige
ANDRÉ, Erika, Tollareslingan 3, 132 49 Saltsjö-Boo, Sverige

(74) Fuldmægtig i Danmark: **Novagraaf Brevets, Bâtiment O2, 2 rue Sarah Bernhardt CS90017, F-92665 Asnières-sur-Seine cedex, Frankrig**

(54) Benævnelse: **DRIVENHED TIL EN MEDIKAMENTTILFØRSELSANORDNING**

(56) Fremdragne publikationer:
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DESCRIPTION

Description

TECHNICAL AREA

[0001] The present invention relates to a power pack for a medicament delivery device capable of providing energy for expelling doses of medicament from medicament containers.

BACKGROUND OF INVENTION

[0002] Many medicament delivery devices on the market have been developed for self-administration of medicament to users. Since many of these users generally are not experienced in handling medicament delivery devices and there often is an amount of anxiety and reluctance in the self-administration, especially regarding injection medicament delivery devices, the developers of medicament delivery devices often try to design them with a large degree of functionality as well as features that conceal or minimize the exposure of e.g. injection needles.

[0003] Another problem often accompanied with medicament delivery devices for self-administration is the correct handling in order to ascertain that the user receives the full and intended dose of medicament as well as to minimize the risk of failures and even accidents. In that regard it is important that the device is easy to handle but also that the user receives information both before and during use. For instance it is important that the medicament delivery device is not removed prematurely from a dose delivery site, which may be a problem as such because of the discomfort of using the device wherein the user wants to remove the medicament delivery device as soon as possible.

[0004] For this purpose a number of signalling or information providing solutions have been developed, where many of these concern information during and/or at the end of a dose delivery sequence in order to provide the user when it is safe to remove the medicament delivery device.

[0005] Document WO 2016/034407 discloses a signal delaying assembly for a medicament delivery device. The assembly comprising a delay female member containing a fluid, a delay male member having at least one passage and a delay unit connected to the delay female member or to the delay male member. A relative movement between the male member and the female member and towards each other causes the transfer of said fluid from said female

member through the at least one passage for slowing movement. The delay unit is releasable connected to a signal generating assembly for delaying at least one feedback signal.

[0006] Document US 2010/137801 discloses an auto injector which includes a housing, an actuating sleeve movable relative to the housing. An injection needle extendable from the end of the injection device when the injection device is in the position for injection and moveable into the injection device. An actuating cam arranged in an axially fixed manner relative to the injection needle and engages in a locking recess when the injection device is in the position to inject preventing the injection needle from being moved into the injection device. The actuation cam is releasable from engagement with the locking recess by the actuating sleeve, thereby releasing the injection needle for movement into the injection device.

[0007] Document US 7,758,550 discloses a medicament delivery device with a signalling unit. The signalling unit comprises a catch rod connected to a switch sleeve, and an engaging sleeve which surrounds the catch rod and is axially and fixedly connected, e.g. latched with a first latching element, to a piston rod.

[0008] At the start of the delivery movement, the catch rod and the engaging sleeve, provided with an engaging element, are drawn even further apart, such that the engaging element is moved over a section that is provided with latching elements, such that the latching elements are respectively passed over by the engaging element. A brief clicking signal is emitted as each of the latching elements is passed over by the engaging element.

[0009] The drawback with the solution according to US 7,758,550 is that in order to provide the signal, a number of additional components are needed apart from the components that are normally present in medicament delivery devices.

BRIEF DESCRIPTION OF INVENTION

[0010] In the present application, the term "distal part/end" refers to the part/end of the device, or the parts/ends of the members thereof, which under use of the device, is located the furthest away from a delivery site of a user. Correspondingly, the term "proximal part/end" refers to the part/end of the device, or the parts/ends of the members thereof, which under use of the device is located closest to the delivery site of the user.

[0011] The aim of the present invention is to remedy the drawbacks of the state of the art medicament delivery devices and to provide a medicament delivery device having a signalling function that is reliable, clearly understandable and that minimizes the need and use of additional components.

[0012] The aim is solved by a medicament delivery device provided with the features according to the independent patent claim. Preferable embodiments form the subject of the dependent patent claims.

[0013] According to the invention the power pack that is to be used with a medicament delivery device comprises a plunger rod movable along a longitudinal axis, a drive spring operably connected to said plunger rod, a plunger rod sleeve arranged with holding elements for releasably holding said plunger rod with said drive spring in a tensioned state.

[0014] These features are common in many different medicament delivery devices that use pre-tensioned drive springs for delivering doses of medicament. The activation of the power pack may be performed in many ways, manually automatically or semi-automatically.

[0015] Signal initiating elements are arranged on the plunger rod and there are further provided signal generating elements that are configured to cooperate with the signal initiating elements for providing information to a user of a medicament delivery device about the movement of said plunger rod.

[0016] With this solution, the plunger rod is used directly for initiating signals to a user for informing him or her about movement of the plunger rod, which is a clear indication of a dose delivery operation. It is an advantage to use the plunger rod more or less directly, which reduces the number of components while providing additional functionality besides the dose delivery function.

[0017] The signalling elements comprise a number of protrusions. These protrusions may be produced directly on the surface of the plunger rod when manufactured. In this respect, the protrusions may be arranged with equal distance after each other. On the other hand, the protrusions may instead be arranged with decreased distance after each other in the proximal direction, or there could be a mix of the two depending on the intended information to the user. For instance, equal distance between the protrusions will result in a decreasing signal frequency because the power from the spring will decrease as the dose delivery sequence progresses.

[0018] On the other hand, a decreased distance between the protrusions may, with the same spring, create a constant signal frequency depending on the balance between the decrease in force and decrease in distance. A further scenario is that the frequency increases at the end of a dose delivery sequence, again depending on the balance between the force of the spring and the decrease in distance.

[0019] In order to provide distinct signals, the protrusions may be designed with wedge-shapes. With this type of shape and when the signal generating elements may comprise mechanical flexible elements that mechanically engage with said signal initiating elements for providing information, then a very clear and distinct signalling is obtained.

[0020] In order to provide a good grip for holding the plunger rod, as well as providing clear and distinct signals, the holding elements may comprise generally longitudinally extending, flexible, arms, where the arms may be arranged with ledges designed to engage recesses of

the plunger rod, which ledges are arranged to cooperate with the signal initiating elements. Moreover, the signal generating elements may comprise a plurality of mechanical flexible elements placed after each other in the longitudinal direction in at least one row. With this solution the number of signal generating elements is higher than the number of signal initiating elements, i.e. it requires only one protrusion for generating signals when passing and contacting the row of signal generating elements.

[0021] With the solutions described above, the information may comprise audible information as well as tactile information in that both sound and vibrations may be created by the signal generating elements cooperating with the signal initiating elements.

[0022] According to a further feasible solution of the power pack, it may further comprise an actuator arranged coaxially outside the plunger rod sleeve, where the actuator is movable from a blocking position to a release position. The movement of the actuator from the blocking position to the release position may be rotatable and/or movable along the longitudinal axis.

[0023] These and other aspects of, and advantages with, the present invention will become apparent from the following detailed description of the invention and from the accompanying drawings.

BRIEF DESCRIPTION OF DRAWINGS

[0024] In the following detailed description of the invention, reference will be made to the accompanying drawings, of which

Fig. 1
: is a perspective view of a power pack according to the invention,

Fig. 2
: is an exploded view of a first example of a power pack not according to the invention,

Figs. 3a, b
: are cross-sectional views of the power pack of Fig. 2,

Fig. 4
: is a cross-sectional view during activation of the power pack of Fig. 2,

Fig. 5
: is an exploded view of a second example of a power pack not according to the invention,

Fig. 6
: is a cross-sectional view of the power pack of Fig. 5,

Fig. 7
: is an exploded view of a third example of a power pack not according to the invention,

Figs. 8-9
: are detailed views of a plunger rod sleeve comprised in the third example,

Fig. 10
: is a cross-sectional view of the power pack of Fig. 7,

Fig. 11
is an exploded view of a power pack according to the invention ,
Figs. 12-13
are cross-sectional views of the power pack of Fig. 11,
Fig. 14
is an exploded view of a fifth example of a power pack not according to the invention,
Fig. 15
is a detailed view of a signal generating mechanism of the power pack of Fig. 14, and
Figs. 16-17
are cross-sectional views of the power pack of Fig. 14.

DETAILED DESCRIPTION OF THE INVENTION

[0025] A power pack 10 shown in the drawings is designed to fit into a medicament delivery device designed to deliver a dose of medicament to a patient or user. The power pack 10, Figs. 1 and 2, comprises an elongated plunger rod 12 arranged to act on a stopper of a medicament container (not shown) for expelling a dose of medicament. The plunger rod 12 is arranged with recesses 14 on its side surfaces, two in the example shown and placed on opposite sides of the plunger rod 12. Outside and coaxial with the plunger rod 12 is a plunger rod holder 16 arranged. It comprises a generally tubular proximal part 18, which proximal part 18 is arranged with holding elements 20 in the form of arms that are flexible in the generally radial direction. The free ends of the arms 20 are arranged with radially inwardly extending ledges 22, which ledges 22 are arranged to fit into the recesses 14 of the plunger rod 12, for releasably holding the plunger rod 12. The free ends of the arms 20 are further arranged with radially outwardly directed protrusions 24. The inner surface of the proximal part 18 of the plunger rod holder 16 is arranged with longitudinally extending ledges 26, which ledges 26 are configured to interact with longitudinal grooves 28 on the outer surface of the plunger rod 12, providing a rotational lock between the plunger rod holder 16 and the plunger rod 12, yet allowing longitudinal movement between them. Further, the plunger rod 12 is arranged with signal initiating elements 30 that in the example shown are arranged as rows of wedge-shaped protrusions, which wedge-shaped protrusions 30 are intended to interact with the inwardly extending ledges 22 of the arms 20 of the plunger rod holder 16 as will be described.

[0026] The distal end of the plunger rod holder 16 is arranged with attachment elements 32 that are designed to attach the plunger rod holder 16 to a suitable housing of the medicament delivery device. The distal end of the plunger rod holder 16 may then be arranged with an end cap 34 that fits with the housing. A drive spring 36, Fig. 3, that in the example shown is a compression spring is provided inside the hollow plunger rod 12 between a distally directed surface 38 of a proximal end wall 40 of the plunger rod 12 and a proximally directed surface 42 of the end cap 34, which is fixed in relation to the plunger rod holder 16. A guide rod 44 is further arranged inside the drive spring 36 for preventing buckling of the drive spring 36 during

activation.

[0027] Outside and coaxial with the actuator is a generally tubular actuator 46, which actuator sleeve will act as an activator of the power pack as will be described. The actuator 46 is on its inner surface arranged with inwardly directed surfaces 48 that will function as blocking elements for the holding elements as will be described. Further the inner surface of the actuator 46 is arranged with longitudinally extending recesses 50, in the example two recesses 50, that are arranged on opposite sides of the inner surface. The outer surface of the actuator 46 is further arranged with guide ledges 52, where some sections of the guide ledges 52 are extending longitudinally, and some sections are arranged with an inclination in relation to a longitudinal axis L.

[0028] The device is intended to function as follows. When the power pack 10 is in its powered, ready to use state, the plunger rod 12 is pushed into the plunger rod holder 16 from the proximal end, tensioning the drive spring 36. The arms 20 of the plunger rod holder 16 then enter the recesses 14 of the plunger rod 12, thereby holding the plunger rod 12 in the tensioned state. In order for the arms 20 not to flex out of engagement with the recesses 14 of the plunger rod 12, the actuator 46 is placed outside the plunger rod holder 16, whereby the outwardly directed protrusions 24 of the arms 20 of the actuator abut the inwardly directed surfaces 48 of the actuator 46, thereby preventing radial outward movement of the arms, Fig. 3a.

[0029] The power pack 10 is then assembled with a suitable housing accommodating a medicament container, which in turn is provided with a medicament delivery member. When the power pack 10 is to be activated, preferably after a medicament delivery member has been placed at a dose delivery site, such as an injection needle penetrating the skin of a patient or user, the actuator 46 is operated, functioning as an activator. This is done by turning the actuator 46 in relation to the plunger rod holder 16. The turning may be performed in many ways, such as by an activation button operated manually by a user or by a medicament delivery member guard that is contacting the dose delivery site and is moved distally in relation to the medicament delivery device and the actuator sleeve. Appropriate elements may then cooperate with the inclined guide ledges of the actuator 46 for providing a rotation of the latter.

[0030] The turning of the actuator 46 will cause the longitudinal recesses 50 of the actuator sleeve 46 to be moved in line with the arms 20 with their outwardly directed protrusions 24, Fig. 3b. This releases the arms 20 so that they can flex outwards whereby the inwardly directed ledges 22 will move out of engagement with the recesses 14 of the plunger rod 12. The plunger rod 12 is now urged in the proximal direction by the force of the drive spring 36 whereby the plunger rod 12 will act on the stopper of the medicament container such that a dose of medicament is delivered.

[0031] During the movement of the plunger rod 12 in the proximal direction during the dose delivery sequence, the inwardly directed ledges 22 of the arms 20 will be in contact with and slide along the plunger rod 12, Fig. 4. The ledges 22 will then come in contact with the rows of

wedge-shaped protrusions 30 and will move along these, causing a rattling sound as well as vibration, i.e. audible and tactile information to the user during the dose delivery sequence. The longitudinal ledges 26 on the plunger rod holder 16 cooperate with the grooves 28 on the plunger rod 12 for preventing the plunger rod 12 from turning during the movement, which otherwise would risk that the ledges 22 of the arms 20 would be moved out of engagement with rows of protrusions 30.

[0032] In the example shown, the row of wedge-shaped protrusions 30 extends along a majority of the length of the plunger rod 12. It is however to be understood that the row of protrusions 30 may be arranged such that they engage with the ledges 22 of the arms 20 only at the end of a dose delivery sequence or during the latter half of the dose delivery sequence for just informing the user that the dose delivery sequence is about to terminate. It is of course to be understood that the signalling elements may have other shapes for creating the desired signalling to a user. Also the length between each subsequent protrusion, and thus the frequency of the sound, or vibration, may be modified in order to vary the signalling. In this respect the frequency may be altered during the dose delivery sequence, e.g. increasing the frequency during the progress of the dose delivery sequence.

[0033] A second alternative is shown in figures 5-6. Here the signal initiating elements comprise at least one row of cut-outs 60 along the plunger rod 12^{II}. The signal generating elements are here arms 62 that are flexible in the generally radial direction and directed proximally. The free ends of the arms 62 are arranged with inwardly directed protrusions 64 that will engage the cut-outs 60. The signal generating elements 62 are attached to or made integral with a generally tubular and elongated plunger rod sleeve 66. He outer surfaces of the arms 62 will cooperate with an actuator 46" for releasingly holding the arms and thereby the tensioned plunger rod 12". Moreover, there could be a second row of cut-outs 60^{II}, for example on the opposite side of the plunger rod 12". This could be used for creating a more frequent sound generation wherein one row is displaced half a step in the axial direction. With this solution the sounds appear twice as many times.

[0034] Further in order to ensure the relative positions between the row or rows of cut-outs and the protrusions on the arms, the plunger rod 12" is arranged with a number of laterally extending protrusions or wings 68, which wings fit into longitudinal guide slots 70 in the plunger rod sleeve 66. The guide slots 70 are further preferably arranged with stop surfaces 72 at a proximal area of the plunger rod sleeve 66. This ensures that a tensioned plunger rod 12" cannot shoot out of the plunger rod sleeve 66 during assembly of the power pack.

[0035] Further, even though it is an advantage to use the arms of the plunger rod holder not only for holding the plunger rod, but also to create the information to the user, in some instances there could be separate elements that are in contact with the rows of protrusions, causing the sound and the vibrations.

[0036] This variant is displayed in Figures 7 - 10 that show a third example of a power pack.

As with the second example, a plunger rod 12^{III} is provided with a number of signal initiating elements in the form of a number of cut-outs 80 placed in rows in the longitudinal direction of the plunger rod 12^{III}, in the example shown two rows of cut-outs 80 placed on opposite sides of the plunger rod 12^{III}. The plunger rod 12^{III} is arranged to slide in a plunger rod sleeve 82. Moreover, the plunger rod sleeve 82 is arranged with proximally directed signal generating elements in the form of proximally directed arms 84, Figs. 8 and 9, which arms 84 are provided with inwardly directed protrusions 86 that are to interact with the cut-outs 80 of the plunger rod 12^{III} for creating sound during movement of the plunger rod 12^{III}. In contrast to the previous example, the plunger rod sleeve 82 is provided with a separate set of arms 88 that are directed in the distal direction and that are flexible in the generally radial direction. The free ends of the arms 88 are provided with inwardly directed ledges 90, which ledges 90 are designed to interact with certain cut-outs 80^{I} in the rows of cut-outs 80 of the plunger rod12^{III}. The ledges 90 are arranged to hold the plunger rod 12^{III} with a drive spring 36 tensioned as seen in Fig. 10.

[0037] The outer ends of the arms 88 are arranged with protrusions 92 that are to interact with an actuator 93 that in the example shown has a tubular body 94 with two distally directed arms 95 slidable inside a housing 96 of a medicament delivery device. When the proximal end of the housing 96 with its extended actuator 93 is pressed against a dose delivery site, the actuator 93 will move in the distal direction and the distal ends of the arms 95 will act on the protrusions 92 and move the arms 88 of the plunger rod sleeve 82 outwardly for releasing the plunger rod 12^{III}. Moreover, the distal end of the plunger rod 12^{III} is provided with a number of outwardly directed guide elements 98, which guide elements 98 are designed to fit into longitudinally extending grooves 99 of the plunger rod sleeve 82 for preventing rotation of the plunger rod 12^{III} in relation to the plunger rod sleeve 82.

[0038] Figures 11 - 13 show a power pack according to the invention. In this embodiment a plunger rod sleeve 100 is arranged with two proximally directed arms 102 that are flexible in the generally radial direction. The free ends of the arms 102 are arranged with inwardly directed protrusions 104, Fig. 13, which protrusions 104 fit into recesses 106 of a plunger rod 12^{IV} that is slidable inside the plunger rod sleeve 100 for holding the plunger rod 12^{IV} in a tensioned state by a drive spring 36. The arms 102 cooperate with an actuator 46^{IV} in the same manner as described above.

[0039] The plunger rod sleeve 100 is further arranged with signal generating elements in the form of a plurality of proximally directed arms 108 that are flexible in a generally radial direction. The free ends of the arms 108 are arranged with inwardly directed protrusions 110. The plurality of arms 108 is placed in rows after each other in the longitudinal direction of the plunger rod sleeve 100. In the embodiment shown, there are two rows of arms 108 that are placed on opposite sides. The plurality of arms 108 of the signal generating elements is to cooperate with signal initiating elements that are in the form of outwardly directed protrusions 112 on a distal area of the plunger rod 12^{IV}. The protrusions 112 are placed such that when

the plunger rod 12^{IV} is released, the protrusions 112 will come in contact with the inwardly directed protrusions 110 of the arms 108 of the signal generating elements, causing an audible feedback that the plunger rod 12^{IV} is moving, e.g. during a dose delivery sequence. As with the previous embodiment, if more than one row of arms 108 is used, one row may be placed offset half a step in relation to the other row, creating a higher frequency of the sounds generated.

[0040] Figures 14 - 17 show a fifth example of a power pack. As with some of the previous examples, a generally tubular plunger rod sleeve 120 is provided with proximally directed arms 122 that are flexible in a generally radial direction. The free ends of the arms 122 are provided with inwardly directed protrusions 124, which protrusions 124 are designed to fit into cut-outs 126 in a generally elongated plunger rod 12^{V}, for holding the plunger rod 12^{V} in a tensioned state with a drive spring 36. Also here, an actuator 46^{V} is arranged for interacting with the arms as described above. The proximal end of the plunger rod sleeve 120 is provided with a seat 128 in which a metal clip 130, Fig. 15, can be attached. The metal clip 130 is bent with a certain shape so as to have two arc-shaped sections 132 integrated with inwardly inclined legs 134, which in turn transform into flat sections 136 that attach to the seat. The design provides a flexing action of the arc-shaped sections in a generally longitudinal direction, where the intention is for the arc-shaped sections to be in contact with a distal end of a syringe or the like medicament container for providing a biasing force on the medicament container, thereby minimizing any rattling or movement of the medicament container. In addition, the flat sections 136 are provided with inwardly extending and proximally inclined tongues 138 that constitute signal generating elements.

[0041] Further, the plunger rod 12^{V} is arranged with a plurality of circumferentially extending, wedge-shaped, protrusions 140, being sound initiating elements. Thus, when the plunger rod 12^{V} is released and is moved in the proximal direction by a drive spring 34 for performing a dose delivery sequence, the inclined tongues 138 will be in contact with and be tensionally biased by the passing wedge-shaped protrusions 140, hitting subsequent protrusions when leaving previous protrusions, causing tactile and audible information to the user of the ongoing sequence. Since the wedge-shaped protrusions 140 are positioned around the whole circumference of the plunger rod 12^{V}, there is no need for guiding elements that orientate the plunger rod 12^{V} in relation to the signal generating element, i.e. the tongues 138.

[0042] It is to be understood that the embodiment described above and shown in the drawings is to be regarded only as a non-limiting example of the invention and that it may be modified in many ways within the scope of the patent claims.

REFERENCES CITED IN THE DESCRIPTION

Cited references

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- US2010137801A **[0006]**
- US7758550B **[0007]** **[0009]**

PATENTKRAV

1. Strømforsyningsenhed (10) til anvendelse med en medikamenttilførselsanordning, hvilken strømforsyningsenhed omfatter:

- en stempelstang (12^{IV}), der er bevægelig langs en longitudinal akse (L);

- en drivfjeder (36), der er funktionsmæssigt forbundet med stempelstangen (12^{IV});

- et stempelstanghylster (100), der er indrettet med holdeelementer (102, 104) til frigørligt at holde stempelstangen (12^{IV}) med drivfjederen (36) i en spændt tilstand;

- hvor stempelstangen (12^{IV}) er indrettet med signalinitierende elementer (112);

- signalgenererende elementer (108, 110), der er indrettet på stempelstanghylsteret (100), og som er konfigureret til at virke sammen med de signalinitierende elementer (112) for at tilvejebringe hørbar og/eller taktil information til en bruger af medikamenttilførselsanordningen om bevægelse af stempelstangen (12), når stempelstanghylsteret (100) er blevet aktiveret for at frigøre stempelstangen (12^{IV}) fra holdeelementerne (102, 104), der er **kendetegnet ved, at**

de signalinitierende elementer (112) omfatter et antal udadrettede fremspring (112), der er indrettet på et distalt område af stempelstangen (12^{IV}), hvor de signalgenererende elementer (108, 110) omfatter mekanisk fleksible elementer, der mekanisk går i indgreb med de signalinitierende elementer (112) med henblik på tilvejebringelse af informationen, hvor de signalgenererende elementer (108; 110) omfatter en flerhed af mekanisk fleksible elementer (108, 110), der er anbragt efter hinanden i den longitudinale retning (L) i mindst én række.

2. Strømforsyningsenhed (10) ifølge krav 1, hvor stempelstanghylsteret (100) er indrettet med to proksimalt rettede arme (102), der er fleksible i den generelt radiale retning.

3. Strømforsyningsenhed (10) ifølge krav 2, hvor de frie ender af armene (102) er indrettet med indadrettede fremspring (104).

4. Strømforsyningsenhed (10) ifølge krav 1, hvor stempelstanghylsteret (100) endvidere er indrettet med signalgenererende elementer i form af en flerhed af proksimalt rettede arme (108), der er fleksible i en generelt radial retning.

5. Strømforsyningsenhed (10) ifølge krav 3, hvor fremspringene (104) passer ind i fordybninger (106) på en stempelstang (12^{IV}), der er glidbar inde i stempelstanghylsteret (100), for at holde stempelstangen (12^{IV}) i en spændt tilstand ved hjælp af drivfjederen (36).

6. Strømforsyningsenhed (10) ifølge krav 4, hvor flerheden af arme (108) af de signalgenererende elementer skal virke sammen med signalinitierende elementer, der er i form af udadrettede fremspring (112) på et distalt område af stempelstangen (12^{IV}).

7. Strømforsyningsenhed (10) ifølge krav 1, hvor de signalinitierende elementer (112) er anbragt således, at de signalinitierende elementer (112), når stempelstangen (12^{IV}) frigøres, vil komme i kontakt med de indadrettede fremspring (110) på armene (108) af de signalgenererende elementer og dermed forårsage en hørbar tilbagemelding om, at stempelstangen (12^{IV}) bevæger sig.

8. Strømforsyningsenhed (10) ifølge krav 1, hvor flerheden af arme (108) er anbragt i rækker efter hinanden i den longitudinale retning af stempelstanghylsteret (100).

9. Strømforsyningsenhed (10) ifølge krav 1, hvor én række, hvis der anvendes mere end én række arme (108), kan anbringes et halvt trin forskudt i forhold til den anden række, så der dannes en højere frekvens af de genererede lyde.

10. Strømforsyningsenhed (10) ifølge kravene 1 til 9, der endvidere omfatter en aktuator (46), der er indrettet koaksialt uden for stempelstanghylsteret (100), hvilken aktuator (46) er bevægelig fra en spærreposition til en frigørelsesposition.

11. Strømforsyningsenhed (10) ifølge krav 1, hvor aktuatoren (46) er indrettet roterbart mellem spærrepositionen og frigørelsespositionen.

12. Strømforsyningsenhed (10) ifølge krav 1, hvor aktuatoren (46) er bevægelig langs den longitudinale akse (L) og/eller roterbar.

13. Medikamenttilførselsanordning med en signaleringsfunktion, hvilken medikamenttilførselsanordning omfatter strømforsyningsenheden (10) ifølge et hvilket som helst af kravene 1-10.

DRAWINGS

Drawing

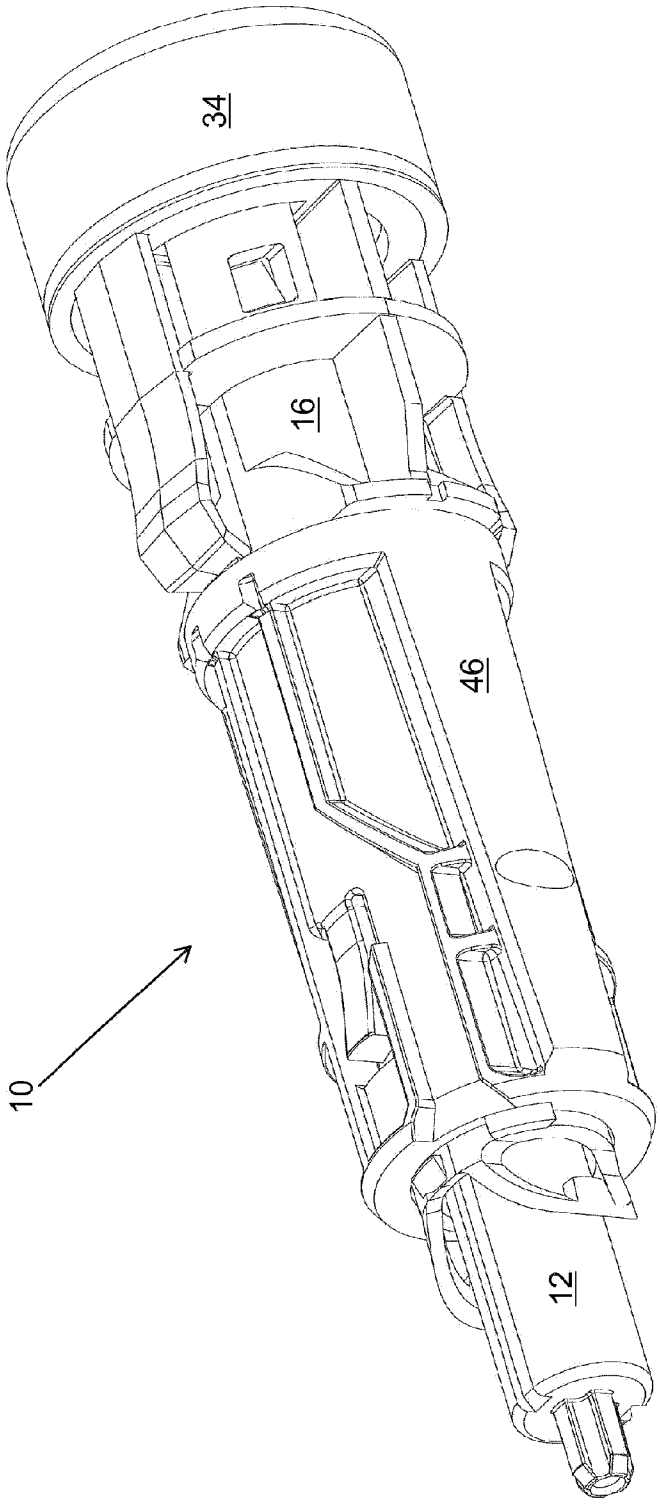

Fig. 1

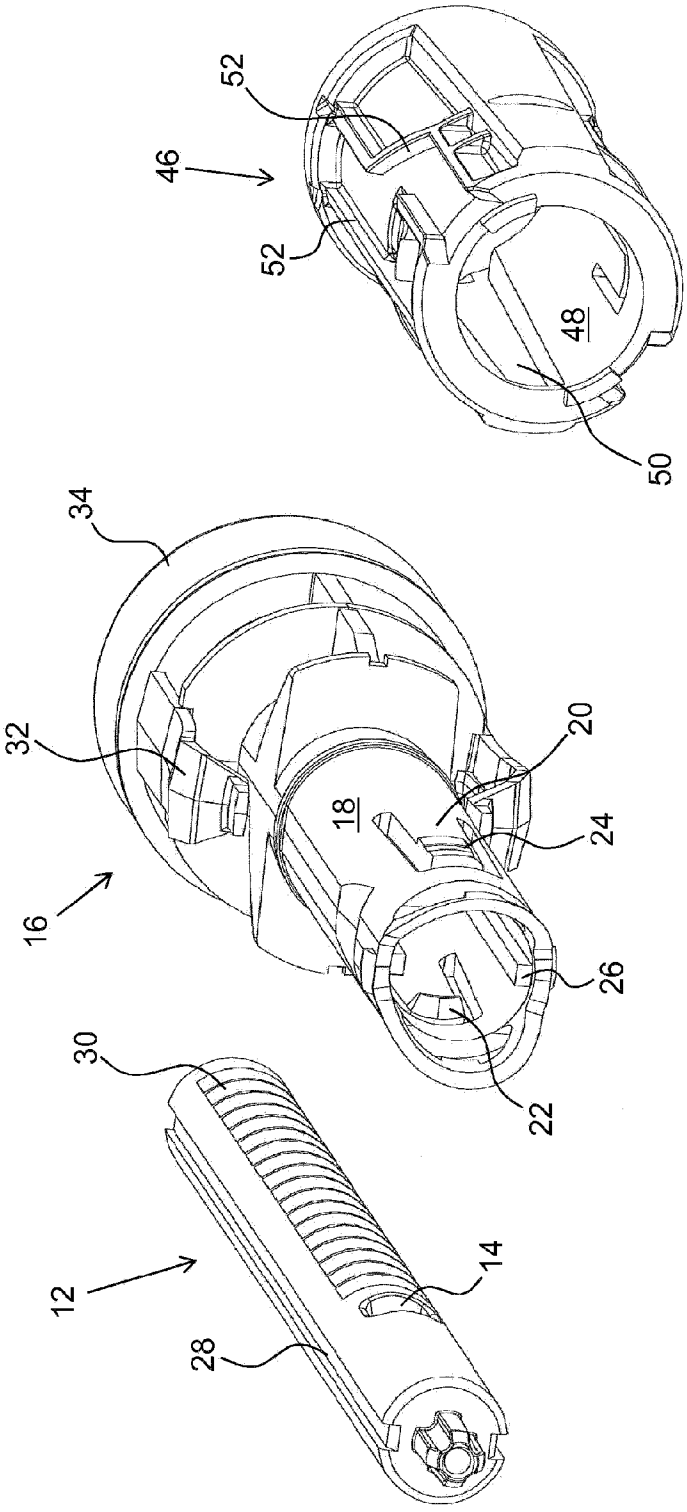

Fig. 2

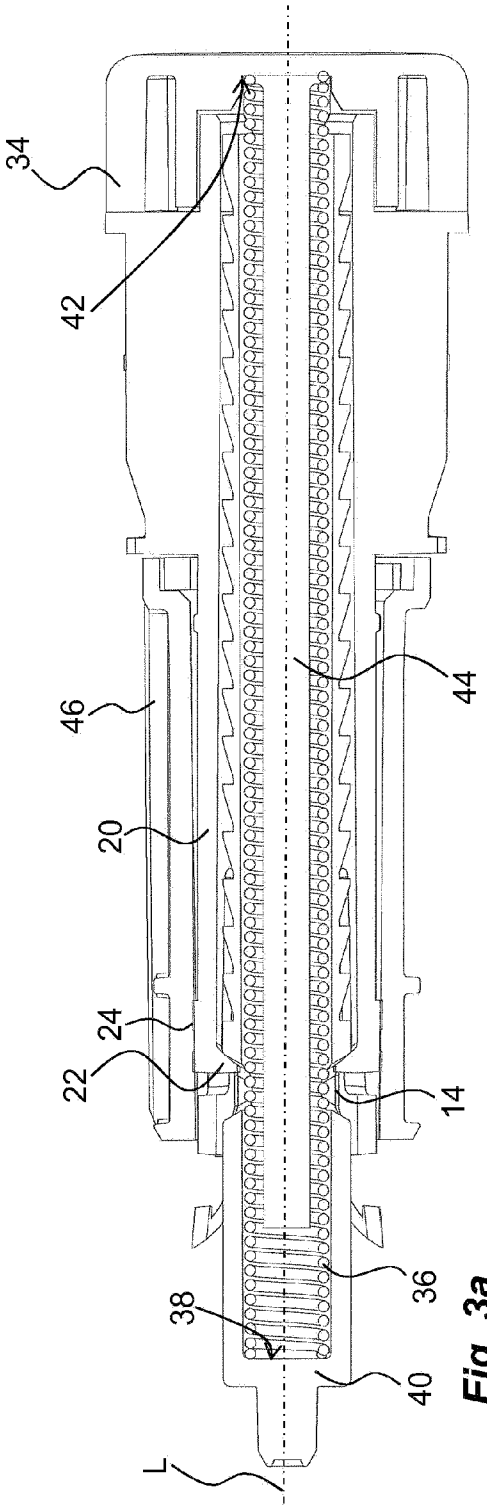

Fig. 3a

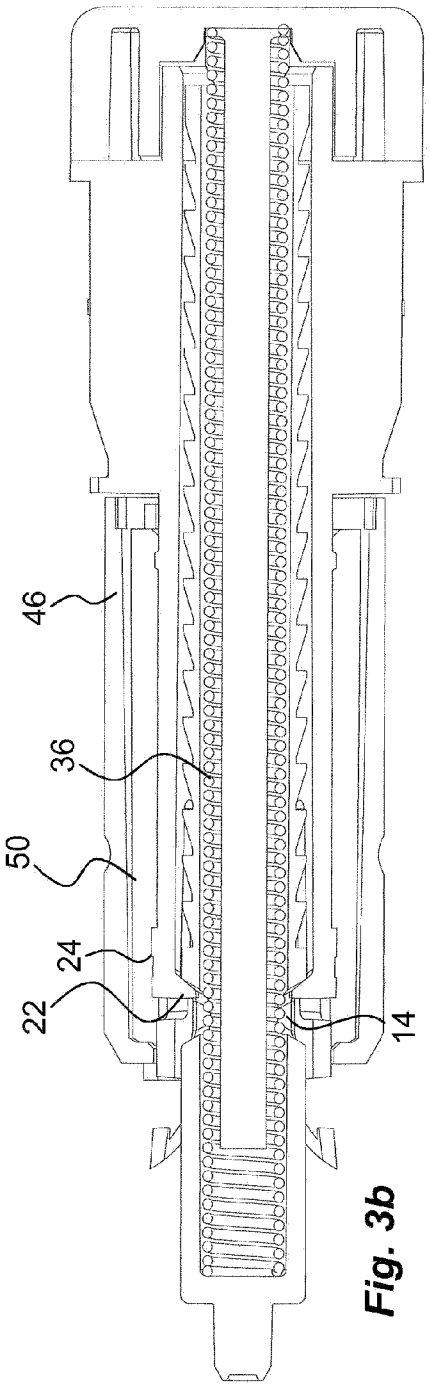

Fig. 3b

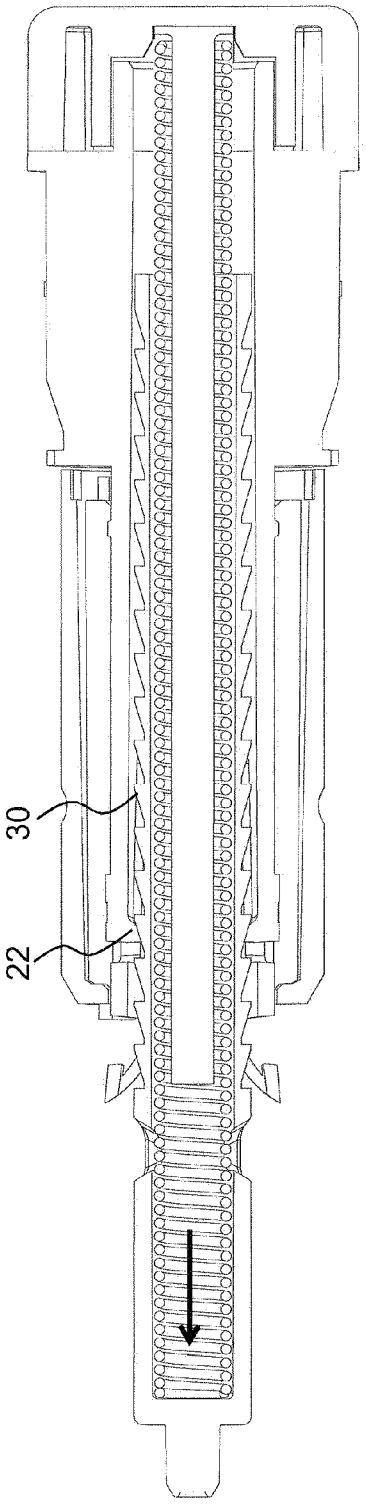

Fig. 4

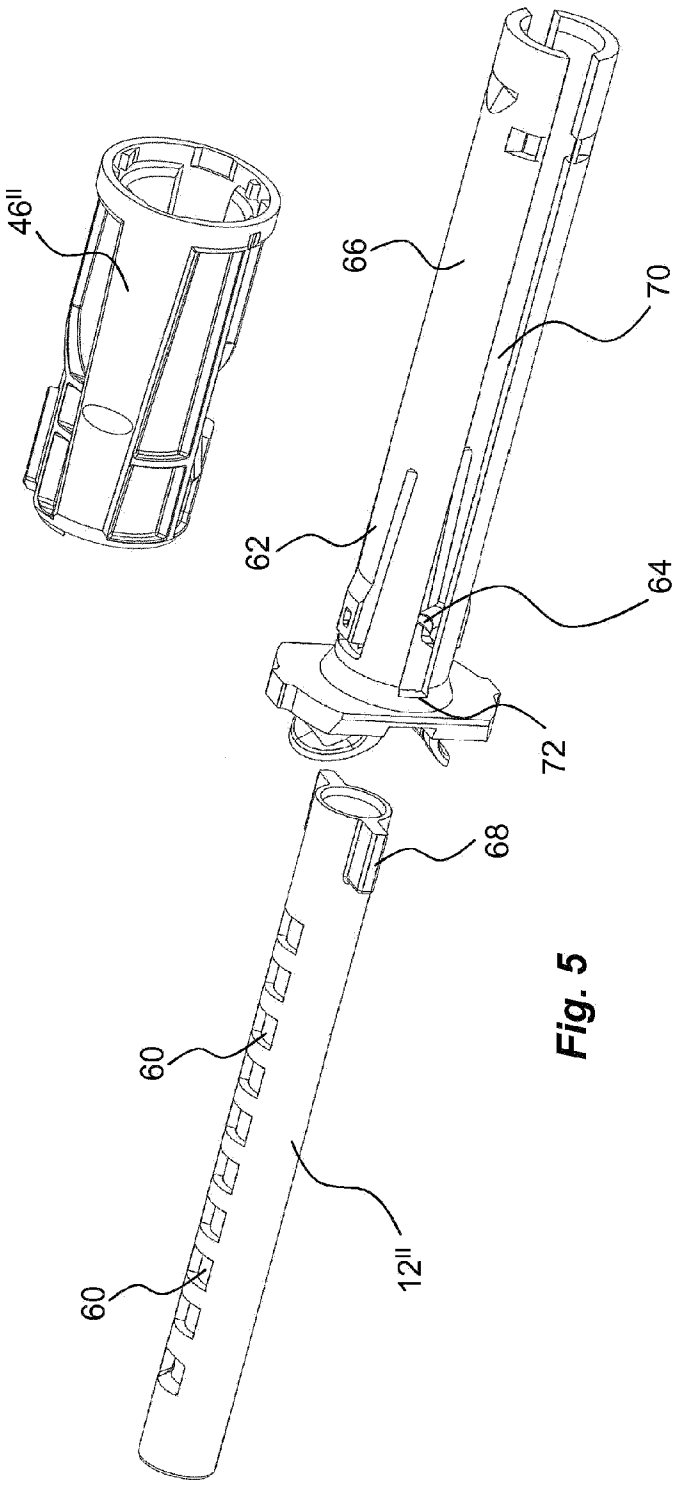

Fig. 5

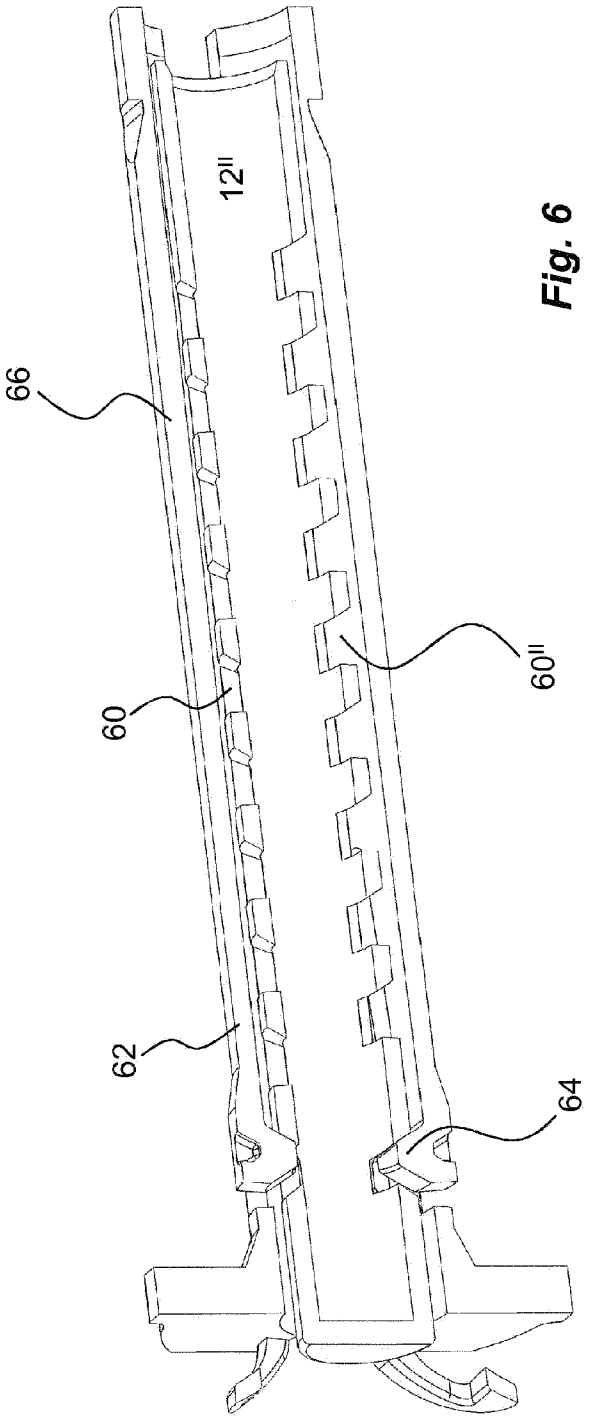

Fig. 6

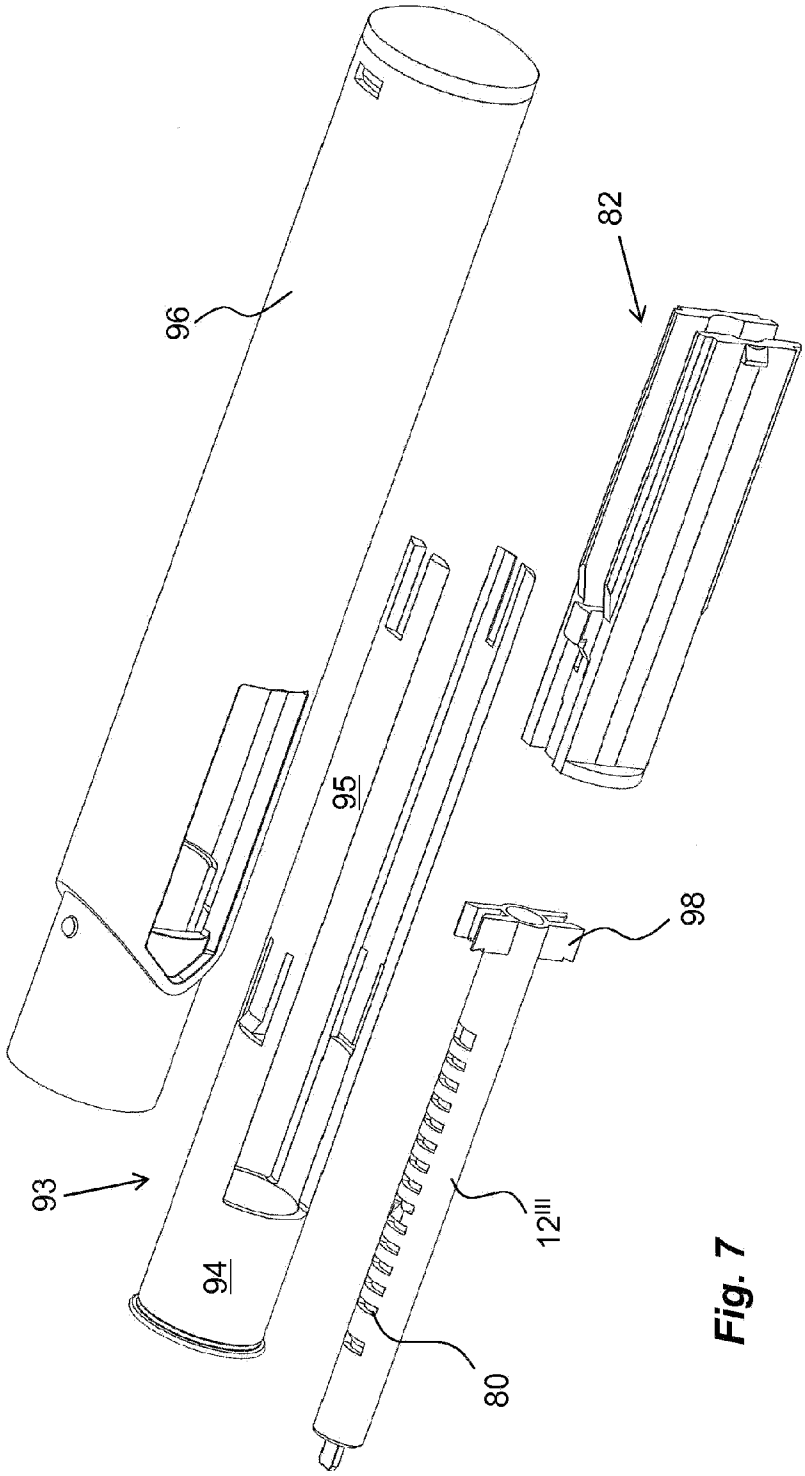

Fig. 7

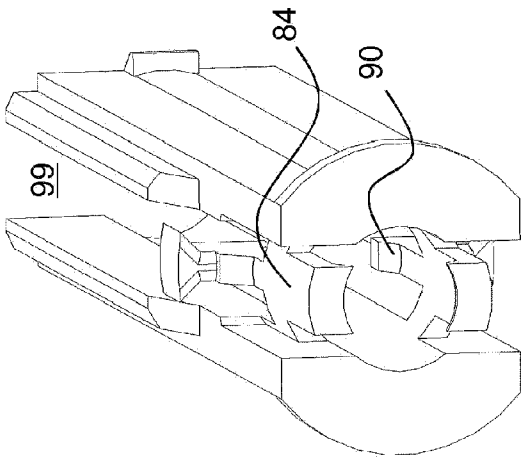

Fig. 8

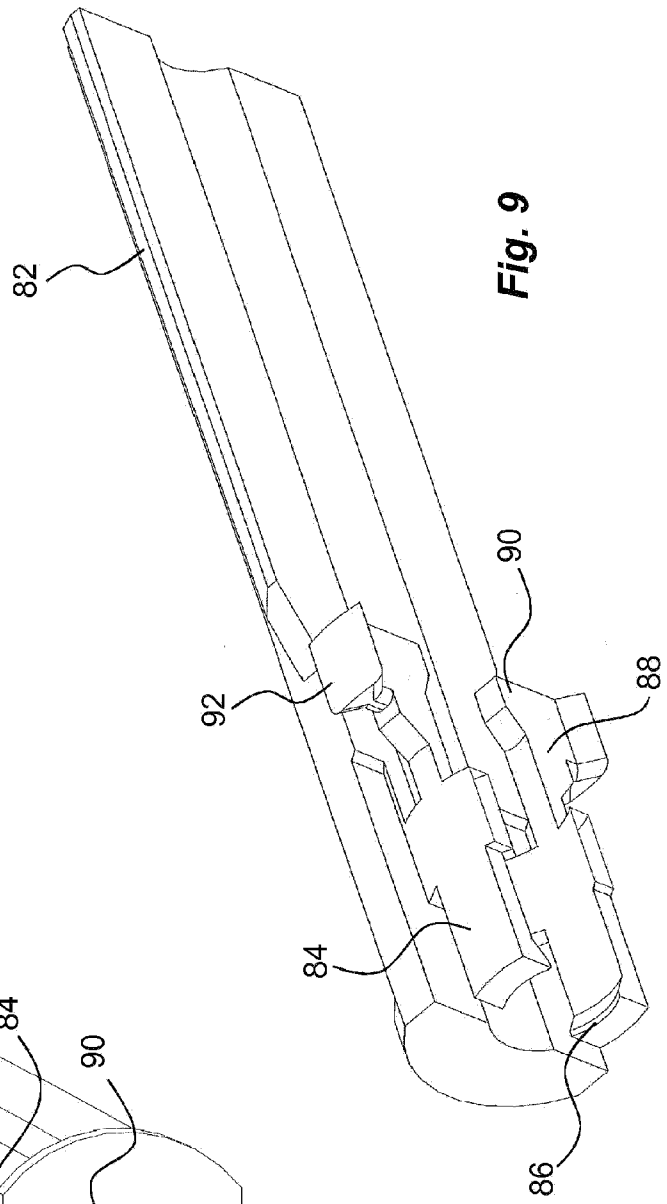

Fig. 9

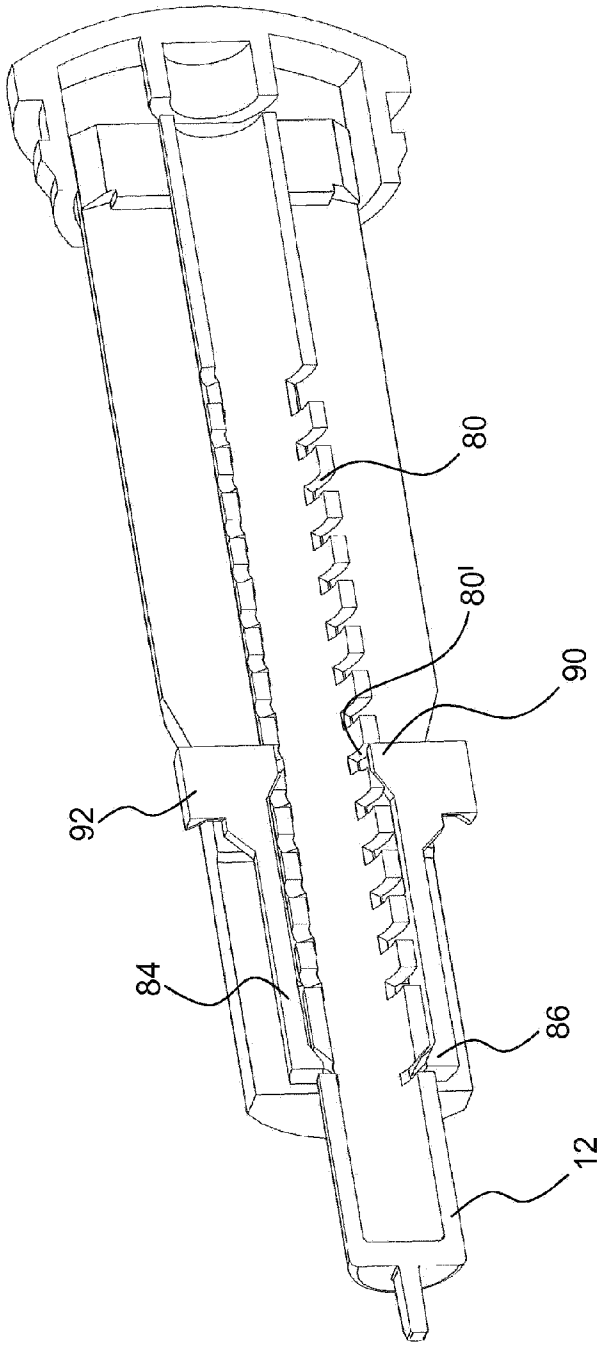

Fig. 10

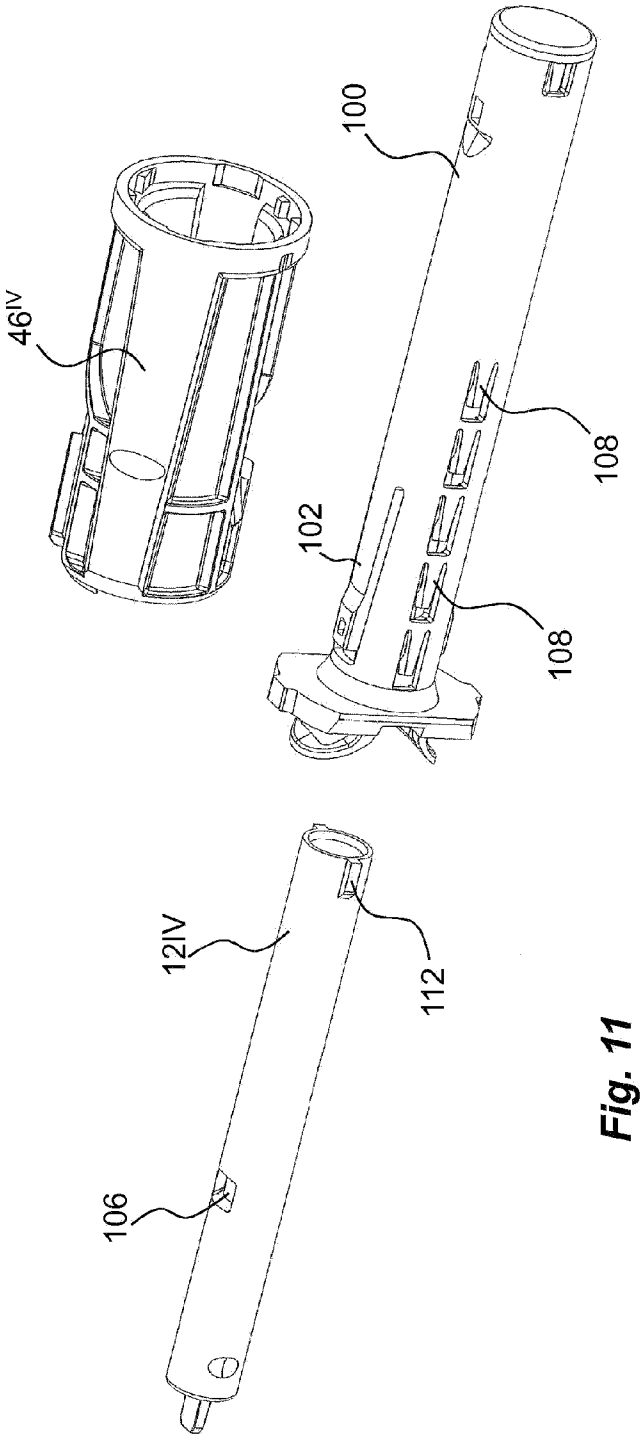

Fig. 11

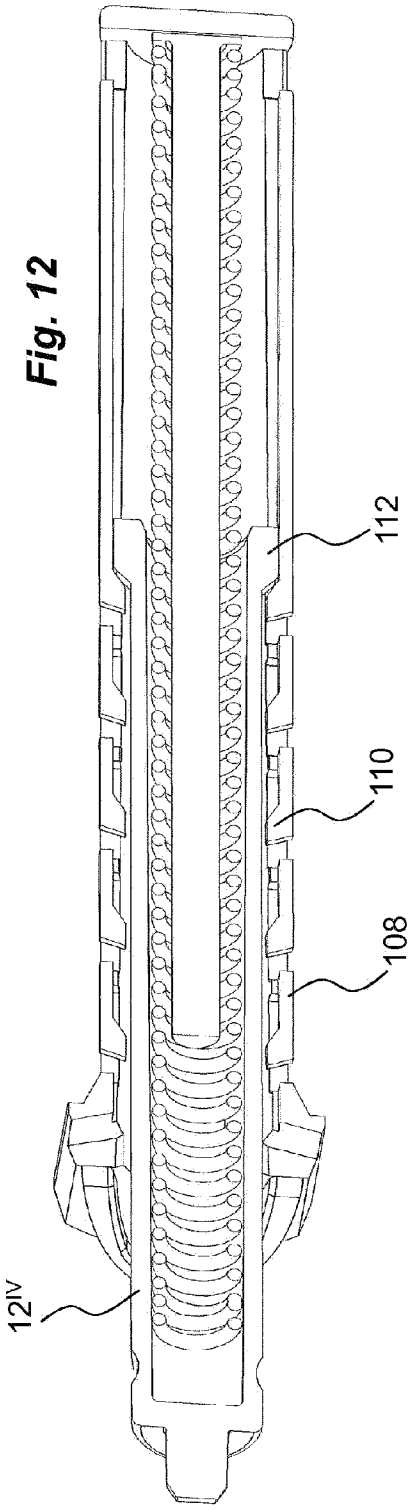

Fig. 12

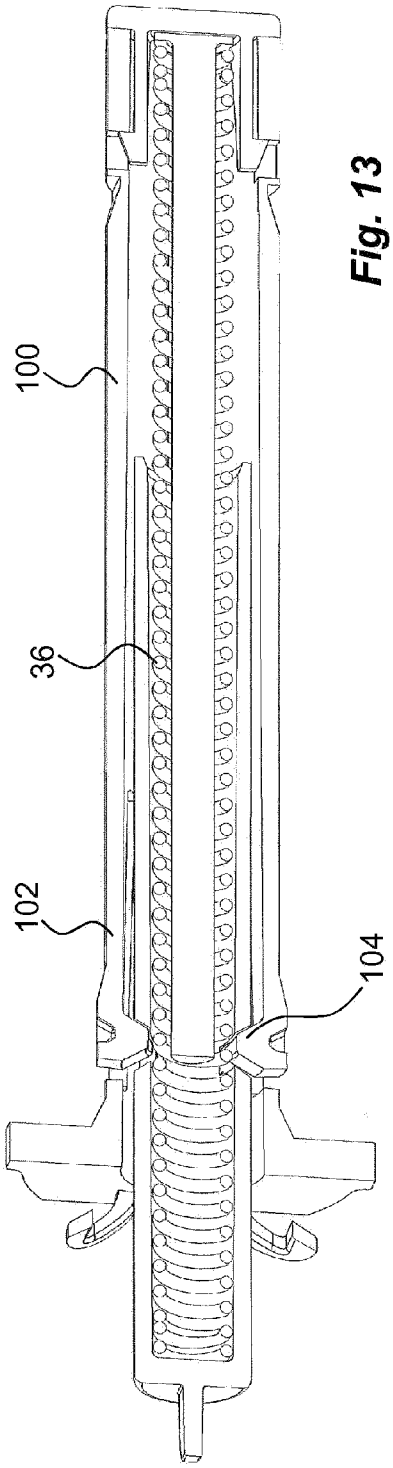

Fig. 13

Fig. 14

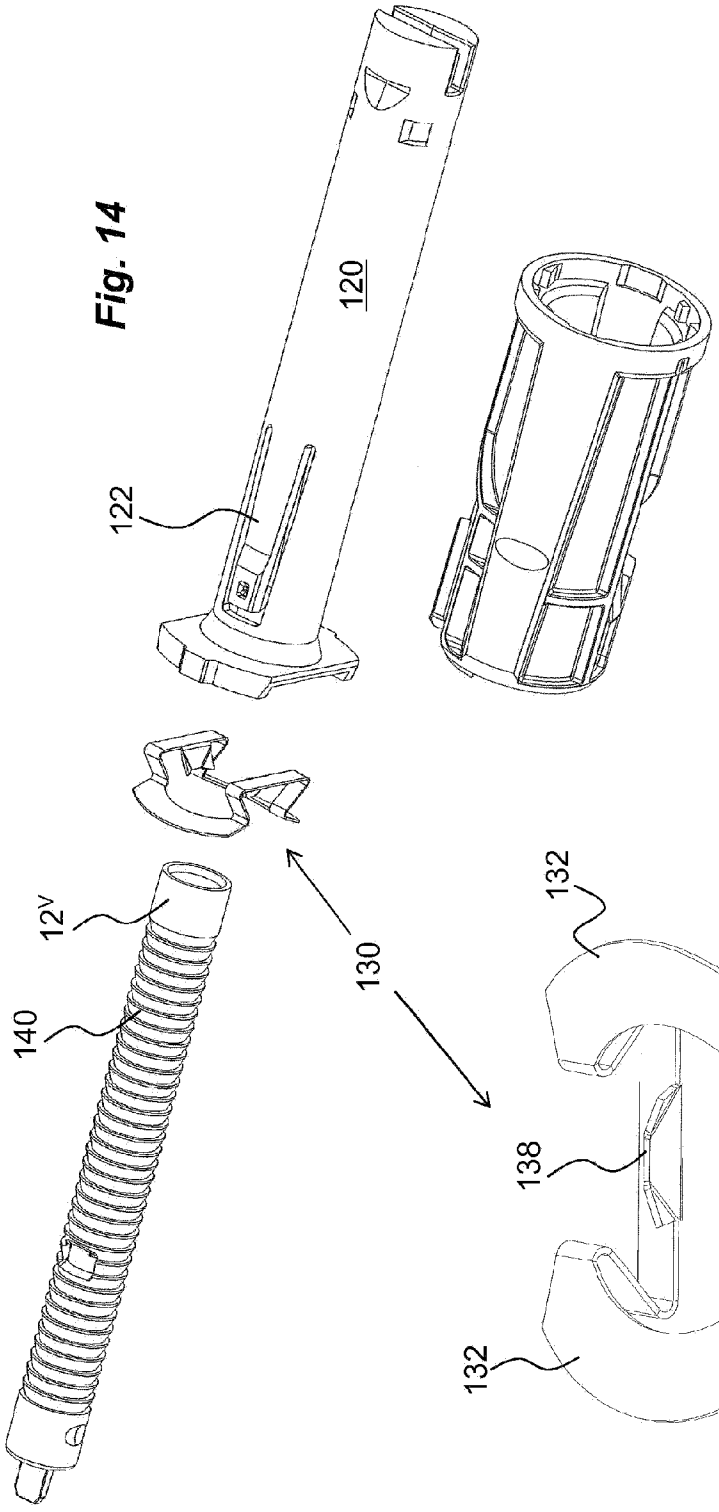

Fig. 15

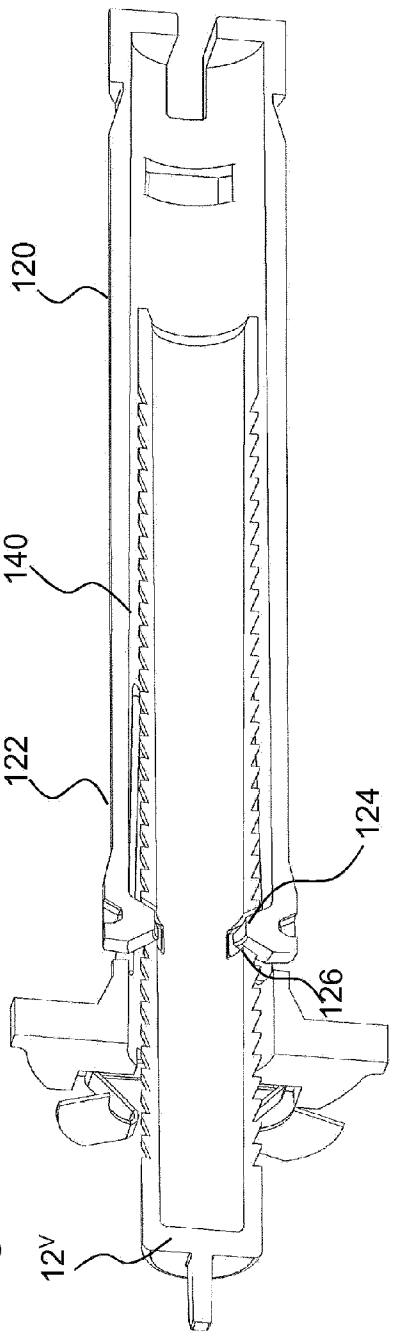

Fig. 16

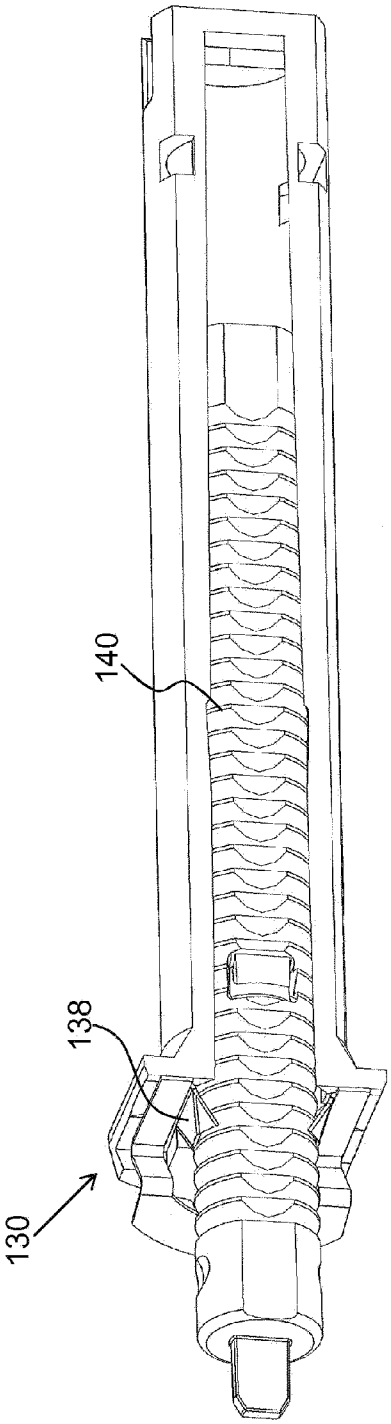

Fig. 17