EUROPEAN PATENT SPECIFICATION

AUTO-INJECTOR WITH FILLING MEANS
AUTO-INJEKTOR MIT FÜLLMITTEL
AUTO-INJECTEUR AVEC MOYEN DE REMPLISSAGE

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WO-A2-2008/047372 DE-A1- 3 604 826

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Description

Field of the Invention

[0001] The present invention relates to an auto-injector for use with a vial.

Background of the Invention

[0002] Subcutaneous drugs can be supplied to patients in a vial for home injection. The current method is for the patient to draw the drug from the vial into a syringe and perform a manual injection. The market is moving towards auto-injectors to carry out home injection. Auto-injectors which are manufactured and assembled including a pre-filled syringe of drug are known, for example from international patent application publication no. 2006/106295, which is incorporated herein by reference. There is currently no easy way for a patient to transfer a subcutaneous drug from a vial into an auto-injector.

[0003] US patent publication no. 2003/0105430 discloses an injector which is automatic in that the needle is injected automatically into the injection site (e.g., a patient’s skin), delivery is initiated upon activation of the injector, and the needle is retracted after the end of delivery. The injector includes a housing, a syringe, a piston rod, a control unit, a driving unit and a retracting unit or spring. The injector may also include a back rod that moves the piston rod before activation of the injector for titration and reconstitution and automatically disengages from the piston rod upon activation of the injector. US patent publication no. 2003/0105430 also describes an adapter includes a vial recess and a spike. The vial is inserted into the vial recess of the adapter. The adapter spike penetrates the vial stopper to open the fluid path between the vial and the syringe. Pulling back rod pulls piston rod, creating a vacuum for sucking the drug liquid from the vial. The vial and adapter are removed from the injector and drug titration is provided by pushing the back rod, into the housing which urges the piston rod into the barrel, thereby pushing excess liquid out of the syringe.

[0004] WO 2008047372 discloses an injection device for injecting a fluid into an object, the injection device including a plunger assembly for operative engagement with a syringe adapted to contain the fluid and permit ejection of the fluid therefrom via a syringe outlet, the plunger assembly being displacable in a first direction which causes at least some of the fluid contained in the syringe to be ejected from the syringe via the syringe outlet and an inadvertent fluid ejection prevention assembly coupled to the plunger assembly for preventing ejection of fluid from the syringe in situations where the syringe outlet is neither in operative engagement with a vial adaptor suitable for providing fluid communication with the interior of a vial nor in fluid communication with an injection site within the object. The injection device further comprising rear and forward housing, a needle guard element operative to engage at a front end, the drug vial adaptor, the drug vial adaptor comprising a generally circular cylindrical forward facing sleeve 200, which is configured to generally enclose drug vial 10 (Fig. 1) and is sized such as to render it difficult, if not impossible, to remove drug vial 10 from sleeve 200, following full insertion of the drug vial 10 into the sleeve 200. Sleeve 200 is preferably formed with a pair of oppositely placed windows 202 to enable a user to view the contents of the vial 10 following insertion thereof into sleeve 200.

Summary of the Invention

[0005] The present invention is defined in claim 1 and aims to provide an auto-injector where the user can easily transfer drugs from a vial into the auto-injector. In a first aspect of the invention, there is provided an auto-injector comprising:

a housing adapted to receive a fluid container having a discharge nozzle and a dispensing piston moveable in the fluid container to expel the contents of the fluid container out of the discharge nozzle; a drive adapted on activation to act on the fluid container to advance it from a retracted position in which the discharge nozzle is contained within the housing to an extended position in which the discharge nozzle extends from the housing and act on the dispensing piston to expel the contents of the fluid container out of the discharge nozzle;

characterised by:

a connector adapted to receive a vial containing fluid and connect it to the discharge nozzle; and

means to move the dispensing piston relative to the fluid container from a first position in which the dispensing piston is located in the fluid container adjacent the discharge nozzle to a second position in which the dispensing piston has been drawn away from the discharge nozzle, thereby drawing fluid from the vial into the fluid container.

[0006] The provision of means to move the dispensing piston relative to the fluid container permits the syringe in the injection device to be filled from a standard vial which greatly facilitates home use of the injection device for drugs that are contained in vials.

[0007] In one embodiment of the present invention, the auto-injector comprises a drive sub-assembly including the drive and dispensing piston and a dispensing sub-assembly including the connector and fluid container,

wherein the dispensing piston is connected to the drive,

wherein the drive sub-assembly and dispensing sub-assembly are adapted to slide relative to each other,

wherein the drive sub-assembly and dispensing sub-assembly are arranged such that when they are pulled apart from each other, the dispensing piston...
moves from its first position into its second position thereby transferring fluid from the vial into the fluid container.

[0008] Preferably, the dispensing sub-assembly is adapted to slide, in part, inside the drive sub-assembly.

[0009] Preferably, the dispensing sub-assembly and drive sub-assembly are adapted to rotate relative to each other from an unlocked position in which the dispensing sub-assembly can slide relative to the drive sub-assembly to a locked position in which the dispensing sub-assembly cannot slide relative to the dispensing sub-assembly. In order to facilitate this, locking protrusions may be provided on one of the dispensing sub-assembly or drive sub-assembly and corresponding grooves are provided on the other.

[0010] In an alternative embodiment of the invention, the moving means comprises a slider located in the housing in communication with the dispensing piston. The slider may comprise a user-actuable movement element which protrudes from the housing. The slider may be in magnetic communication with the dispensing piston. Alternatively, the slider may be integrally connected to the dispensing piston.

[0011] The connector is a removable cap located over the discharge nozzle on the injection device, wherein the cap has an open end which is adapted to receive the vial, wherein the removable cap is adapted such that removal of the cap from the housing detaches the vial from the discharge nozzle. The removable cap comprises a removable cover element over the open end, wherein the removable cover element is adapted to be removed prior to insertion of a vial into the open end. The removable cover element holds a shield which is located over the discharge nozzle when the removable cover element is in place on the removable cap and which becomes removed from the discharge nozzle when the removable cover element is removed from the removable cap.

[0012] On insertion of the vial into the connector, the discharge nozzle pierces a closure element of the vial to form a fluid pathway between the vial and the fluid container.

[0013] Preferably, the fluid container is a syringe and the discharge nozzle is a needle.

[0014] Preferably, the injection device comprises a release mechanism adapted on activation to release the drive to act on the dispensing piston to move the syringe to its extended position and eject fluid via the discharge nozzle.

[0015] In one embodiment of the invention, there is provided a retraction mechanism adapted to move the fluid container from its extended position to its retracted position after the contents of the fluid container has been expelled.

Brief Description of Drawings

[0016] One or more embodiments of the present invention are described below with reference to the accompanying drawings, in which:

Fig. 1 shows a perspective view of sub-assemblies of the auto-injector according to one embodiment of the present invention;

Fig. 2 shows an exploded view of components of the auto-injector according to embodiment of Fig. 1;

Figs. 3a to 3d show side cross-sectional views of an auto-injector according to Fig. 1; and

Figs. 4a to 4d show side cross-sectional views of an auto-injector according to an alternative embodiment of the invention.

Detailed Description of the Drawings

[0017] Figs. 1 and 2 show a delivery device 110 according to the present invention, having a delivery device housing 112 with a proximal end 110b and a distal end 110a. The distal end 110a of the housing 112 has an exit aperture 128, through which the end of a sleeve 119 can emerge.

[0018] The delivery device 110 is assembled from two sub-assemblies as shown in Fig. 1. A delivery sub-assembly 210 comprises nose portion 102, a syringe carrier 150, an interchangeable release element 155, sleeve 119 and spring 126, as well as an end-cap 101. The nose portion 102 surrounds and supports the syringe carrier 150 and connects to the 101 cap by a screw and twist connection.

[0019] A drive sub-assembly 220 comprises the housing 112 and drive elements and actuators of the injection device 110 as will be discussed below. Upon assembly of the two sub-assemblies 220, 210 to form the injection device 110, the drive assembly 220 is able to actuate the syringe 114 held by the delivery sub-assembly 210. After actuation, the two sub-assemblies can be separated and the drive elements and actuators of the drive assembly 220 reset for further use.

[0020] The housing 112 is adapted to receive 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 and at the other in a flange 120. The syringe body 116 is of substantially constant diameter along the length of the reservoir, and is of significantly smaller diameter close to the end of the syringe 114 which terminates in the hypodermic needle. A drive coupling 134 acts through the bung of the syringe 114 to discharge the contents of the syringe 114 through the needle 118. This drive coupling 134 constrains a drug to be administered via a plunger 104 within the reservoir defined by syringe body and also permits the drug to be loaded into the syringe 114. Whilst the syringe 114 illustrated is of hypodermic type, this need not necessarily be so. Transcutaneous or ballistic dermal and subcuta-
neous syringes may also be used with the injection device of the present invention.

[0021] As illustrated, the syringe 114 is housed in the syringe carrier 150 within the delivery sub-assembly 210. The syringe carrier 150 has a proximal end 151 through which the needle 118 of the syringe protrudes. The return spring 126, via the return spring support 160 and the syringe carrier 150 biases the syringe 114 from an extended position in which the needle 118 extends from the aperture 128 in the housing 112 to a retracted position in which the needle 118 is contained within the housing 112.

[0022] The syringe carrier 150 comprises a sheath (not shown) into which the syringe 114 can be inserted from a distal end 170. The syringe 114 is provided with a boot 101a over the needle 118. If the syringe were to fail or break, the sheath, which surrounds the syringe 114 along its length, would contain the broken pieces of syringe and reduce the likelihood of them from escaping from the injection device 110.

[0023] The boot 101a protects the needle 118 and seals it against contamination prior to removal of the boot 101a. The boot 101a is gripped, after the syringe 118 has been inserted into delivery sub-assembly 210, by cap 101, which is removably located on the housing 112 over the exit aperture 128. The boot 101a is gripped in cap 101 by cover element 101b which is removable from the cap 101 so that the boot 101a is also removed, thereby exposing a port 101c, which is an opening formed in an open end of the cap 101.

[0024] The housing 112 of the drive assembly 220 also includes an actuator 214, and a drive which here takes the form of a compression drive spring 130. Drive from the drive spring 130 is transmitted via a multi-component drive to the piston of the syringe 114 to advance the syringe 114 from its retracted position to its extended position and discharge its contents through the needle 118.

The drive accomplishes this task by acting directly on the drug and the syringe 114. Static friction between the drive coupling 134 and the syringe body 116 initially ensures that they advance together, until the return spring 126 bottoms out or the syringe body 116 meets some other obstruction (not shown) that retards its motion.

[0025] The multi-component drive between the drive spring 130 and the syringe 114 consists of three principal components. A drive sleeve 131 takes drive from the drive spring 130 and transmits it to a drive element 132. This in turn transmits drive to the drive coupling 134 already mentioned.

[0026] The drive element 132 includes a user-actuatable syringe loading element 133 which engages with the drive coupling 134 internally via locking elements 133c and extends via a first arm 133a through the drive element 132. On assembly, in an unloaded position, a distal end 235 of the drive coupling 134 sits against a plunger 104 within the syringe 114 at its distal end adjacent the connection to the needle 118. The first arm 133a is connected at its proximal end to a second arm 133b which comprises a user-actuatable protrusion 133d. On assembly, the user-actuatable protrusion 133d extends out of the housing via slot 190. A further slot (not shown) on the proximal end of the housing 112 permits the first and second arms 133a, 133b to extend out of the housing 112 when the syringe loading element 133 and plunger 104 is moved by sliding user-actuatable protrusion 133a proximally to a proximal position, adjacent the open end 114a of the syringe 114. In the loaded position, the drive element 132 becomes locked to drive coupling 134 via latching arms 132a, 134a on the drive element 132 and drive coupling 134. Thus, the drive coupling 134 can now move with the drive element 132 and drive sleeve 131 on release of the drive spring 130. In an alternative embodiment of the invention, the syringe loading element 133 may be connected directly to the plunger through a bore in the first arm 133a and the drive coupling 134 may be in a proximal position at the open end 114a of the syringe 114. The syringe loading element 133 is then actuated to slide the plunger 104 to wards a proximal position at the open end 114a of the syringe 114 adjacent the syringe coupling 134.

[0027] The actuator 214, in the form of a trigger, is provided on the housing 112 remote from the exit aperture 128. The trigger, when operated, serves to decouple the drive sleeve 131 from the housing 112, allowing it to move relative to the housing 112 under the influence of the drive spring 130. The operation of the device is then as follows. The actuator 214 is prevented from being actuated by sliding sleeve 119 and sliding sleeve locking element 119a when the sliding sleeve 119 is in its most distal position extending out of the exit aperture 128. When the distal end of the sliding sleeve is placed against tissue or pushed into the exit aperture, the locking element 119a no longer acts on the actuator 214 and the actuator can be actuated.

[0028] The actuator is then depressed and the drive spring 130 is released. The drive spring 130 moves the drive sleeve 131, the drive sleeve 131 moves the drive element 132 and the drive element 132 moves the drive coupling 134. The drive coupling 134 moves and, by virtue of static friction and hydrostatic forces acting through the drug to be administered, moves the syringe body 114 against the action of the return spring 126. The syringe body 114 moves the syringe carrier 150, which in turn moves the return spring support 160 and compresses the return spring 126. The hypodermic needle 118 emerges from the exit aperture 128 of the housing 112. This continues until the return spring 126 bottoms out or the syringe body 114 meets some other obstruction (not shown) that retards its motion. Because the static friction between the drive coupling 134 and the syringe body 116 and the hydrostatic forces acting through the drug to be administered are not sufficient to resist the full drive force developed by the drive spring 130, at this point the drive coupling 134 begins to move within the syringe body 116 and the drug begins to be discharged. Dynamic friction between the drive coupling 134 and the syringe body 116...
and hydrostatic and hydrodynamic forces now acting through the drug to be administered are, however, sufficient to retain the return spring 126 in its compressed state, so the hypodermic needle 118 remains extended.

Before the drive coupling 134 reaches the end of its travel within the syringe body 116, so before the contents of the syringe have fully discharged, flexible latch arms 134b linking the first and drive couplings 132, 134 reach an interchangeable release element 155 connected to the distal end of the syringe carrier 150.

The interchangeable release element 155 is essentially a constriction which moves the flexible latch arms 132b to a position so that they no longer couple the drive element 132 to the drive coupling 134. Once this happens, the drive element 132 acts no longer on the drive coupling 134, allowing the drive element 132 to move relative to the drive coupling 134. Consequently, the drive coupling 134 continues to move within the syringe body 116 and the drug continues to be discharged. Thus, the return spring 126 remains compressed and the hypodermic needle remains extended.

After a time, the drive coupling 134 completes its travel within the syringe body 116 and can go no further. At this point, the contents of the syringe 114 are completely discharged and the force exerted by the drive spring 130 acts to retain the drive coupling 134 in its terminal position, allowing the drive element 132 to continue its movement.

Flexible latch arms linking the drive sleeve 131 with the drive element 132 reach another constriction within the housing 112. The constriction moves the flexible latch arms so that they no longer couple the drive sleeve 131 to the drive element 132. Once this happens, the drive sleeve 131 acts no longer on the drive element 132, allowing them to move relative each other. At this point, the forces developed by the drive spring 130 are no longer being transmitted to the syringe 114. The only force acting on the syringe will be the return force from the return spring 126 which acts on the end of the syringe 114 nearest to the needle 118 via the return spring support 160 and the syringe carrier 150. Consequently, the syringe is returned to its retracted position and the injection cycle is complete.

Figs. 3a to 3d show one embodiment of the injection device 110 and the steps by which it is loaded with fluid from a vial 300 prior to injection. The vial 300 is of standard size and comprises a closure element 301 which seals the vial. The closure element 301 may be in the form of a flexible membrane which can be pierced by the needle 118. The port 101c in the cap 101 is sized and dimensioned to receive the vial 300 and support it whilst fluid is extracted from the vial into syringe 114. The process for doing this is as follows.

As shown in Fig. 3b, the closure element 101b is removed from the cap 101 whilst the cap 101 remains in place on the housing 112. This removes the boot 101a from the needle 118 and opens the port 101c, in which the needle 118 is exposed.
The vial 400 is inserted into the port 401c end first, i.e. the end which includes the closure element 401. As the vial 400 is inserted, the needle 118 pierces the closure element 401 and extends into the vial 400 so that its end point resides in the fluid contained within the vial 400. Preferably, the injection device 110 should now be positioned so that its longitudinal axis extends vertically with the vial 300 located nearest the ground. Gravity acts on the fluid in the vial 400 to keep it in the bottom of the vial, so that the fluid can be extracted.

The user can now slide the delivery sub-assembly 210 relative to the drive sub-assembly 220 by, for example, pulling on the flange 401d to cause the cap 401 and nose portion 402, including the syringe 114, to extend away from the proximal end of the drive sub-assembly 220. This causes the plunger 104, held by the drive coupling 134, in the syringe 114 to move from its unloaded position towards the proximal open end 114a of the syringe 114 into its loaded position and extract fluid from the vial 400 into the syringe 114 via a reduction of pressure in the syringe 114. When the delivery sub-assembly 210 is fully extended from the drive sub-assembly 220, the cap 401 and nose portion 402 can be rotated to lock and prevent further longitudinal movement of the delivery sub-assembly 210 relative to the drive sub-assembly 220. The syringe 114 has now been loaded with fluid from the vial 400. The vial 400 can now be removed from the injection device 110 by removing the cap 101, for example by further rotation, so that the injection device 110 is ready for use, by placing the distal end of the sliding 119 sleeve against tissue and activating the actuator 214.

It will of course be understood that the present invention has been described above purely by way of example and modifications of detail can be made within the scope of the invention.

Claims

1. An auto-injector (110) comprising:

- a housing (112) adapted to receive a fluid container (114) having a discharge nozzle (118) and a dispensing piston (104) moveable in the fluid container to expel the contents of the fluid container out of the discharge nozzle;
- a drive (130) adapted on activation to act on the fluid container to advance it from a retracted position in which the discharge nozzle is contained within the housing to an extended position in which the discharge nozzle extends from the housing and act on the dispensing piston to expel the contents of the fluid container out of the discharge nozzle;
- a connector adapted to receive a vial (300; 400) containing fluid and connect it to the discharge nozzle; and
- means to move the dispensing piston relative to the fluid container from a first position in which the dispensing piston is located in the fluid container adjacent the discharge nozzle to a second position in which the dispensing piston has been drawn away from the discharge nozzle, thereby drawing fluid from the vial into the fluid container, and characterised in that the connector is a removable cap (101; 401) located over the discharge nozzle on the auto-injector, wherein the cap has an open end (101c; 401c) which is adapted to receive the vial, wherein the removable cap is adapted such that removal of the cap from the housing detaches the vial from the discharge nozzle, wherein the removable cover element comprises a removable cover element (101b; 401b) over the open end, wherein the removable cover element is adapted to be removed prior to insertion of a vial into the open end, wherein the removable cover element holds a shield (101a) which is located over the discharge nozzle when the removable cover element is in place on the removable cap and which is removed from the discharge nozzle when the removable cover element is removed from the removable cap.

2. The auto-injector of claim 1, comprising a drive sub-assembly (220) including the drive and dispensing piston and a dispensing sub-assembly (210) including the connector and fluid container, wherein the dispensing piston is connected to the drive, wherein the drive sub-assembly and dispensing sub-assembly are adapted to slide relative to each other, wherein the drive sub-assembly and dispensing sub-assembly are arranged such that when they are pulled apart from each other, the dispensing piston moves from its first position into its second position thereby transferring fluid from the vial into the fluid container.

3. The auto-injector of claim 2, wherein the dispensing sub-assembly is adapted to slide, in part, inside the drive sub-assembly.

4. The auto-injector of claim 2 or claim 3, wherein the dispensing sub-assembly and drive sub-assembly are adapted to rotate relative to each other from an unlocked position in which the dispensing sub-assembly can slide relative to the drive sub-assembly to a locked position in which the dispensing sub-assembly cannot slide relative to the drive sub-assembly.

5. The auto-injector of claim 1, wherein the moving means comprises a slider (133) located in the housing in communication with the dispensing piston.
6. The auto-injector of claim 5, wherein the slider comprises a user-actuatable movement element (133d) which protrudes from the housing.

7. The auto-injector of claim 5 or claim 6, wherein the slider is in magnetic communication with the dispensing piston.

8. The auto-injector of claim 5 or claim 6, wherein the slider is integrally connected to the dispensing piston.

9. The auto-injector of any one of the preceding claims, wherein, on insertion of the vial into the connector, the discharge nozzle pierces a closure element (301; 405) of the vial to form a fluid pathway between the vial and the fluid container.

10. The auto-injector of any one of the preceding claims, wherein the fluid container is a syringe and the discharge nozzle is a needle.

11. The auto-injector of any one of the preceding claims, comprising a release mechanism adapted on activation to release the drive to act on the dispensing piston to move the syringe to its extended position and eject fluid via the discharge nozzle.

12. The auto-injector of any one of the preceding claims, comprising a retraction mechanism adapted to move the fluid container from its extended position to its retracted position after the contents of the fluid container has been expelled.

Patentansprüche

1. Autoinjektor (110), umfassend:

   ein Gehäuse (112), das zur Aufnahme eines Fluidbehälters (114) geeignet ist, der eine Austragdüse (118) und einen Ausgabekolben (104) hat, der in dem Fluidbehälter beweglich ist, um den Inhalt des Fluidbehälters aus der Austragdüse heraus auszustoßen,

   einen Antrieb (130), der geeignet ist, bei Aktivierung auf den Fluidbehälter zu wirken, um ihn aus einer zurückgezogenen Position, in der die Austragdüse im Gehäuse enthalten ist, in eine ausgefahren Position, in der sich die Austragdüse aus dem Gehäuse erstreckt, vorzuschließen, und auf den Ausgabekolben zu wirken, um den Inhalt des Fluidbehälters aus der Austragdüse heraus auszustoßen,

   einen Verbinder, der geeignet ist, ein Fluid enthaltendes Vial (300; 400) aufzunehmen und es mit der Austragdüse zu verbinden, und

   ein Mittel, um den Ausgabekolben bezüglich des Fluidbehälters aus einer ersten Position, in der der Ausgabekolben in dem Fluidbehälter zu der Austragdüse benachbart angeordnet ist, in eine zweite Position zu bewegen, in der der Ausgabekolben von der Austragdüse weggezogen worden ist, wodurch Fluid aus dem Vial in den Fluidbehälter gezogen wird, dadurch gekennzeichnet, dass der Verbinder eine entfernbare Kappe (101; 401) ist, die über der Austragdüse auf dem Autoinjektor angeordnet ist, wobei die Kappe ein offenes Ende (101c; 401c) hat, das zur Aufnahme des Vials geeignet ist, wobei die entfernbare Kappe so ausgelegt ist, dass durch das Entfernen der Kappe vom Gehäuse das Vial von der Austragdüse gelöst wird, wobei die entfernbare Kappe ein entfernbares Abdeckelement (101b; 401b) über dem offenen Ende umfasst, wobei das entfernbare Abdeckelement angeordnet ist, vor dem Einführen eines Vials in das offene Ende entfernt zu werden, wobei das entfernbare Abdeckelement einen Schutz (101a) hält, der über der Austragdüse angeordnet ist, wenn das entfernbare Abdeckelement auf der entfernaren Kappe platziert ist, und der von der Austragdüse entfernt wird, wenn das entfernbare Abdeckelement von der entfernbaren Kappe entfernt wird.

2. Autoinjektor nach Anspruch 1, umfassend eine Antriebsunterbaugruppe (220), die den Antrieb und den Ausgabekolben aufweist, und eine Ausgabeunterbaugruppe (210), die den Verbinder und den Fluidbehälter aufweist, wobei der Ausgabekolben mit dem Antrieb verbunden ist, wobei die Antriebsunterbaugruppe und die Ausgabeunterbaugruppe geeignet sind, bezüglich einander zu gleiten, wobei die Antriebsunterbaugruppe und die Ausgabeunterbaugruppe so angeordnet sind, dass sich der Ausgabekolben, wenn sie voneinander weggezogen werden, aus seiner ersten Position in seine zweite Position bewegt, wodurch er Fluid aus dem Vial in den Fluidbehälter transferiert.

3. Autoinjektor nach Anspruch 2, wobei die Ausgabeunterbaugruppe geeignet ist, teilweise in der Antriebsunterbaugruppe zu gleiten.

4. Autoinjektor nach Anspruch 2 oder Anspruch 3, wobei die Ausgabeunterbaugruppe und die Antriebsunterbaugruppe geeignet sind, sich bezüglich einander aus einer entriegelten Position, in der die Ausgabeunterbaugruppe bezüglich der Antriebsunterbaugruppe gelegen ist, in eine verriegelte Position, in der die Ausgabeunterbaugruppe bezüglich der Antriebsunterbaugruppe gelegen kann, in eine verriegelte Position, in der die Ausgabeunterbaugruppe nicht bezüglich der Antriebsunterbaugruppe gelegen kann, zu drehen.
5. Autoinjektor nach Anspruch 1, wobei das Bewegungsmittel einen im Gehäuse angeordneten Schieber (133) umfasst, der mit dem Ausgabekolben in Verbindung steht.

6. Autoinjektor nach Anspruch 5, wobei der Schieber ein durch den Benutzer betätigbares Bewegungssegment (133d) umfasst, das aus dem Gehäuse vorrat.

7. Autoinjektor nach Anspruch 5 oder Anspruch 6, wobei der Schieber in magnetischer Verbindung mit dem Ausgabekolben steht.

8. Autoinjektor nach Anspruch 5 oder Anspruch 6, wobei der Schieber integral mit dem Ausgabekolben verbunden ist.


10. Autoinjektor nach einem der vorhergehenden Ansprüche, wobei der Fluidbehälter eine Spritze ist und die Austragdüse eine Nadel ist.

11. Autoinjektor nach einem der vorhergehenden Ansprüche, umfassend einen Freigabemechanismus, der geeignet ist, bei Aktivierung den Antrieb freizugeben, so dass er auf den Ausgabekolben wirkt, um die Spritze in ihre ausgefahren Position zu bewegen und Fluid über die Austragdüse auszustoßen.


Revendications

1. Injecteur automatique (110) comprenant :

un logement (112) conçu pour recevoir un réceptacle à fluide (114) comportant une buse d’éjection (118) et un piston de distribution (104) mobile dans le réceptacle à fluide afin d’expulser le contenu du réceptacle à fluide par la buse d’éjection ;

un mécanisme d’entraînement (130) conçu, lors de son activation, pour agir sur le réceptacle à fluide de façon à l’avancer d’une position rétrac-tée, dans laquelle la buse d’éjection se trouve à l’intérieur du logement, à une position déployée, dans laquelle la buse d’éjection s’étend hors du logement et agir sur le piston de distribution de façon à expulser le contenu du réceptacle à fluide par la buse d’éjection ;

un raccord conçu pour recevoir un flacon (300 ; 400) contenant un fluide et le raccorder à la buse d’éjection ; et

un moyen pour déplacer le piston de distribution par rapport au réceptacle à fluide d’une première position, dans laquelle le piston de distribution est situé dans le réceptacle à fluide en position adjacente à la buse d’éjection, à une seconde position, dans laquelle le piston de distribution a été tiré de façon à l’éloigner de la buse d’éjection, de façon à aspirer ainsi du fluide depuis le flacon dans le réceptacle à fluide, et caractérisé en ce que le raccord est un bouchon amovible (101 ; 401) placé sur la buse d’éjection sur l’in-jecteur automatique, le bouchon comportant une extrémité ouverte (101c ; 401c) qui est con-cue pour recevoir le flacon, le bouchon amovible étant conçu de telle sorte que le fait d’ôter le bouchon du logement détache le flacon de la buse d’éjection, le bouchon amovible compre-nant un élément formant couvercle amovible (101b ; 401b) sur l’extrémité ouverte, l’élément formant couvercle amovible étant conçu pour être ôté avant l’insertion d’un flacon dans l’ex-trémité ouverte, l’élément formant couvercle amovible supportant un élément de protection (101a) qui est placé sur la buse d’éjection lors-que l’élément formant couvercle amovible est en place sur le bouchon amovible et qui est ôté de la buse d’éjection lorsque l’élément formant couvercle amovible est ôté du bouchon amovi-ble.

2. Injecteur automatique selon la revendication 1, comprenant un sous-ensemble d’entraînement (220) comprenant le mécanisme d’entraînement et le piston de distribution et un sous-ensemble de distribution (210) comprenant le raccord et le réceptacle à fluide, dans lequel le piston de distribution est raccordé au mécanisme d’entraînement, dans lequel le sous-ensemble d’entraînement et le sous-ensemble de distribution sont conçus pour coulisser l’un vis-à-vis de l’autre, dans lequel le sous-ensemble d’entraînement et le sous-ensemble de distribution sont prévus de telle sorte que, lorsqu’ils sont tirés de façon à les éloigner l’un de l’autre, le piston de distribution se déplace de sa première position à sa seconde position et trans-fère ainsi du fluide du flacon dans le réceptacle à fluide.

3. Injecteur automatique selon la revendication 2, dans lequel le sous-ensemble de distribution est conçu...
4. Injecteur automatique selon la revendication 2 ou la revendication 3, dans lequel le sous-ensemble de distribution et le sous-ensemble d’entraînement sont conçus pour tourner l’un par rapport à l’autre d’une position déverrouillée, dans laquelle le sous-ensemble de distribution peut coulisser par rapport au sous-ensemble d’entraînement, à une position verrouillée, dans laquelle le sous-ensemble de distribution ne peut pas coulisser par rapport au sous-ensemble d’entraînement.

5. Injecteur automatique selon la revendication 1, dans lequel le moyen de déplacement comprend un coulisseau (133) situé dans le logement en communication avec le piston de distribution.

6. Injecteur automatique selon la revendication 5, dans lequel le coulisseau comprend un élément de déplacement actionnable par l’utilisateur (133d) qui fait saillie à partir du logement.

7. Injecteur automatique selon la revendication 5 ou la revendication 6, dans lequel le coulisseau est en communication magnétique avec le piston de distribution.

8. Injecteur automatique selon la revendication 5 ou la revendication 6, dans lequel le coulisseau est raccordé d’un seul tenant avec le piston de distribution.

9. Injecteur automatique selon l’une quelconque des revendications précédentes, dans lequel, lors de l’insertion du flacon dans le raccord, la buse d’éjection perfore un élément de fermeture (301 ; 405) du flacon de façon à former un passage pour fluide entre le flacon et le réceptacle à fluide.

10. Injecteur automatique selon l’une quelconque des revendications précédentes, dans lequel le réceptacle à fluide est une seringue et la buse d’éjection est une aiguille.

11. Injecteur automatique selon l’une quelconque des revendications précédentes, comprenant un mécanisme de libération conçu pour, lors de son activation, libérer le mécanisme d’entraînement de sorte qu’il agisse sur le piston de distribution afin de déplacer la seringue jusqu’à sa position déployée et d’éjecter du fluide par le biais de la buse d’éjection.

12. Injecteur automatique selon l’une quelconque des revendications précédentes, comprenant un mécanisme de rétraction conçu pour déplacer le réceptacle à fluide de sa position déployée à sa position rétractée une fois que le contenu du réceptacle a été expulsé.
REFERENCES CITED IN THE DESCRIPTION

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