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(54) Benævnelse: **MEDIKAMENTBEHOLDER**

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WO-A1-2008/153769
JP-A- 2004 283 359
US-A- 4 518 384
US-A- 5 474 527
US-A1- 2002 107 472

DESCRIPTION

Technical Field

[0001] The invention relates to a medicament container for a liquid medicament, the medicament comprising a bag with an outlet.

Background of the Invention

[0002] Many medicaments have to be injected into the body. This applies in particular to medicaments, which are deactivated or have their efficiency remarkably decreased by oral administration, e.g. proteins (such as insulin, growth hormones, interferons), carbohydrates (e.g. heparin), antibodies and the majority of vaccines. Such medicaments are predominantly injected by means of syringes, medicament pens or medicament pumps.

[0003] Some medicaments have to be administered by inhaling them from so called inhalers.

[0004] WO 2009/069518 A1 discloses an inhaler, wherein the medicament to be inhaled is stored in a bag shaped medicament container.

[0005] US 5,474,527 discloses a microprocessor controlled transdermal medication patch system wherein the medication is dispensed internally by positive displacement from multiple reservoirs within the patch so as to vary the drug selection, sequence, and concentration and thereby the regimen and release rate. In a preferred embodiment, electric resistance heating elements activate multiple heat-shrink polymer reservoirs to dispense beneficial fluids into a common absorbent layer for transdermal passage.

[0006] JP 2004 283359 A discloses a flexible container in which a dead space caused by the deformation limit of a container wall is reduced by arranging a cannonball-shaped member inside a discharging port part in order to reduce the quantity of a remaining liquid after discharging a medical liquid in a container filled with the medical liquid such as insulin. This medical container is composed of: an insertion member having a bottom surface, a cylinder part extending from the bottom surface, a trunk part tapered from the cylinder part toward a tip and a sharp tip part; a cap to which a needle can be stuck; a mouth part closely sealed with the cap; and the soft container be deformed following by discharging of the chemical inside. The insertion member is arranged in the soft container with its bottom surface opposing the cap. Inside of the insertion member, a channel is included. On the surface of the insertion member, a chemical take-out port communicated with the channel is formed. On the surface of the insertion member, a groove communicated with the chemical take-out port is formed from the tip part of the insertion member.

Summary of the Invention

[0007] It is an object of the present invention to provide an improved medicament container.

[0008] The object is achieved by a medicament container according to claim 1.

[0009] Preferred embodiments of the invention are given in the dependent claims.

[0010] A medicament container for a liquid medicament according to the invention comprises a bag with an outlet. The bag is compressible or shrinkable by subjection of at least a part of the medicament container to an energy source. The bag may be flexible. By compressing or shrinking the bag the liquid medicament stored inside is displaced and thereby delivered through the outlet. The inventive design allows for setting aside external displacing mechanisms like piston rods. Friction is avoided since no movable parts are required. Due to the small part count the medicament container may be easily produced. In order to avoid dead volume the bag has a rigid core arranged inside.

[0011] In a preferred embodiment of the invention the bag is compressible or shrinkable by subjection of at least a part of the medicament container to a heat source. This may be achieved by application of heat shrink materials which are known from heat shrink tubings or the like. Heat shrink materials are thermoplastic materials such as polyolefin, fluoropolymer (such as FEP, PTFE or Kynar), PVC, neoprene, silicone elastomer or Viton. The heat shrinking effect may be based on monomers contained in the material which polymerise when heated. Thus the density of the material is increased as the monomers become bonded together, therefore taking up less space. Consequently, the volume of the material shrinks.

[0012] Alternatively, heat shrinking may be expansion-based. In this case the material is produced, heated to just above the polymer's crystalline melting point, mechanically stretched and rapidly cooled while still stretched. When heated the material will return to a relaxed state and shrink. The mechanical stretching in the case of a tube or bag may be achieved by inflating with a gas.

[0013] In one embodiment according to the invention the bag consists of a thermoplastic heat shrink material being configured to shrink when subjected to heat. This embodiment is particularly advantageous in terms of part count and costs.

[0014] In an alternative embodiment according to the invention an actor made of the heat shrinking material is at least partially arranged around the bag. This embodiment as opposed to the aforementioned one avoids subjecting the medicament stored in the bag to heat which could otherwise affect the quality of the medicament.

[0015] The actor material may comprise a section arranged around the bag and a remote

section, which is not in contact with the bag and which is arranged for being subjected to heat while the section arranged around the bag remains cold. Thus the contents of the bag are even more effectively kept from warming.

[0016] In a further embodiment, the actor material may comprise several sections which may be heated separately. Preferably, each section corresponds with a predetermined dose. Thus, a multi-injection device is easily provided.

[0017] Since the shrinking of the heat shrink material in either embodiment is limited there may remain a dead volume in the bag after subjection to heat. In order to avoid the dead volume the bag has a rigid core arranged inside. Preferably, an outline of the rigid core essentially equals an internal diameter of the bag after heating.

[0018] The bag may be designed in different manner that a single dose with the total capacity, a plurality of dose with predetermined dose rate or a plurality of dose with arbitrary dose rate may be delivered.

[0019] The outlet may comprise an interface for receiving a hollow injection needle. Alternatively, the needle may be integrated with the medicament container.

[0020] The medicament container may be part of an injection arrangement or an inhaler arrangement for delivering a liquid medicament to a human or an animal.

[0021] The injection arrangement may comprise a valve and a hollow needle for piercing a patient's skin, the valve and needle being arranged at the outlet of the medicament container. In case of a jet injector, instead of the needle, a jet nozzle may be arranged.

[0022] At least one drain channel may be arranged in the rigid core in a manner to connect at least one opening on a surface of the rigid core to the outlet. After application of energy or heat the bag shrinks and displaces virtually all of the liquid medicament. Non-uniform heating or subjection to energy may lead to non-uniform shrinking in such a manner that the shrunk bag seals against the rigid core near the outlet while residual medicament is still trapped in more remote areas. This problem is avoided by the drain channels in the rigid core allowing the bag to shrink until being flush with the rigid core so as to be reliably emptied irrespective of the uniformity of the shrinking process.

[0023] The bag may be subdivided into at least two consecutive bag chambers, wherein the rigid core comprises a respective segment for each bag chamber, wherein each segment exhibits at least one opening of the drain channel. The bag chambers may be interconnected for fluid communication. Alternatively, the bag chambers may be separate from each other. The separate bag chambers may contain the same or different medicaments. In the case of different medicaments the drain channel may comprise valves for keeping the different medicaments separate before application, wherein the valves are arranged to allow flow of medicament when the pressure of the medicament exceeds a predefined threshold when the

bag chamber is shrunk. The bag chambers may have the same or different volumes. These volumes may be used for fixed doses and/or variable doses, i.e. the volumes of the chambers may be partially or entirely emptied.

[0024] Each segment may comprise a central bulge, in particular if the bag chambers have a spheroid outline. Thus, when the bag chamber is shrunk the it becomes essentially simultaneous flush with the rigid core so as to avoid cavities with residual fluid.

[0025] At least one sensor may be integrated in the rigid core. The sensor may serve for determining the state of the liquid medicament.

[0026] An energy store, such as a battery, may be arranged or integrated in the rigid core. The energy store may be arranged for powering the sensor and/or for providing the energy required to shrink the bag.

[0027] An end of the rigid core opposite the outlet may be arranged as an interface for exchanging data of the sensor and/or energy from the energy store between the medicament container and at least one external component.

[0028] The medicament container may preferably be used for delivering one of an analgetic, an anticoagulant, insulin, an insulin derivate, heparin, Lovenox, a vaccine, a growth hormone, a peptide hormone, a proteine, antibodies and complex carbohydrates.

[0029] Further scope of applicability of the present invention will become apparent from the detailed description given hereinafter. However, it should be understood that the detailed description and specific examples, while indicating preferred embodiments of the invention, are given by way of illustration only, since various changes and modifications within the scope of the invention will become apparent to those skilled in the art from this detailed description within the scope of the appended claims.

Brief Description of the Drawings

[0030] The present invention will become more fully understood from the detailed description given herein below and the accompanying drawings which are given by way of illustration only, and thus, are not limitive of the present invention, and wherein:

Figure 1
: is a schematic lateral view of a medicament container comprising a bag consisting of a heat shrink material before subjected to heat,

Figure 2
: is a schematic lateral view of the medicament container of fig. 1 after subjection to heat,

Figure 3
: is a schematic lateral view of an embodiment of the medicament container with a rigid

core arranged inside the bag before subjection to heat,

Figure 4
is a schematic lateral view of the medicament container of fig. 3 after subjection to heat,

Figure 5
is a schematic cross section of an embodiment of a medicament container with a compressible bag and an external heat shrink actor material partially arranged around the bag before subjection to heat,

Figure 6
is a schematic cross section of the medicament container of fig. 5 after subjection to heat,

Figure 7
is a schematic longitudinal section of a medicament container with a rigid core having drain channels, an integrated sensor and an energy store, and

Figure 8
is a schematic lateral section of a subdivided medicament container with a segmented rigid core.

[0031] Corresponding parts are marked with the same reference symbols in all figures.

Detailed Description of Preferred Embodiments

[0032] Figure 1 shows a schematic lateral view of a medicament container 1 comprising a bag 2 consisting of a heat shrink material. The bag stores a liquid medicament 3. One end of the elongate bag 2 has an outlet 4 comprising an interface for attaching a hollow injection needle or an array of needles (not shown).

[0033] When the bag 2 is subjected to heat Q it is caused to shrink and the liquid medicament 3 stored inside is displaced and thereby delivered through the outlet 4. Figure 2 shows the medicament container 1 after subjection to heat Q.

[0034] In order to avoid the dead volume shown in figure 2 the bag 2 may have a rigid core 5 arranged inside, as shown in figure 3.

[0035] After application of heat Q the bag 2 shrinks and displaces virtually all of the liquid medicament 3, so residual volume is avoided which is particularly important with expensive medicaments. The situation after heating is shown in figure 4. Preferably an outline of the rigid core 5 essentially equals an internal diameter of the bag 2 after heating.

[0036] Figure 5 is a schematic cross section of an alternative embodiment of a medicament container 1 with a compressible bag 2 and an external heat shrink actor material 6 partially arranged around the bag 2. Figure 5 shows the medicament container 1 before being heated.

The ends of the actor material 6 are held in fixing points 7 and the actor material 6 is guided over a guide roll 8. When heating a remote section 6.1 of the actor material 6 the actor material 6 shrinks, i.e. shortens and compresses the bag 2, as shown in figure 6.

[0037] The bag 2 may be arranged to be compressible or shrinkable by subjection of at least a part of the medicament container 1 to an energy source other than heat Q, e.g. radiation or a mechanical impact. The bag 2 may be flexible.

[0038] The heat shrink material may be a thermoplastic material such as polyolefin, fluoropolymer (such as FEP, PTFE or Kynar), PVC, neoprene, silicone elastomer or Viton.

[0039] The actor material 6 may be alternatively entirely heated.

[0040] In a further alternative, the actor material 6 may comprise several sections which may be heated separately (not shown), whereby each section corresponds with a predetermined injection dose.
The embodiment shown in figures 5 and 6 may be combined with the rigid core 5 shown in figures 3 and 4.

[0041] The hollow injection needle may be integrated with the medicament container 1.

[0042] The medicament container 1 may be part of an injection arrangement or an inhaler arrangement for delivering a liquid medicament to a human or an animal.

[0043] The medicament container 1 may also be part of a jet injector having a jet nozzle instead of the needle.

[0044] Figure 7 is a schematic longitudinal section of a medicament container 1 with a rigid core 5 similar to the medicament container 1 of figure 3. Additionally, the medicament container 1 of figure 7 exhibits drain channels 9 in the rigid core 5. After application of heat Q the bag 2 shrinks and displaces virtually all of the liquid medicament 3. Non-uniform heating or subjection to energy may lead to non-uniform shrinking in such a manner that the shrunk bag seals against the rigid core 5 near the outlet 4 while residual medicament 3 is still trapped in more remote areas. This problem is avoided by the drain channels 9 in the rigid core 5 allowing the bag 2 to shrink until being flush with the rigid core 5 so as to be reliably emptied irrespective of the uniformity of the shrinking process.

[0045] The medicament container 1 of figure 7 furthermore exhibits a sensor 10 integrated in the rigid core 5. The sensor 10 may serve for determining the state of the liquid medicament 3, e.g. by acquiring a pressure and/or a temperature and/or a pH-value of the medicament.

[0046] An energy store 11, such as a battery, may be arranged in the rigid core 5. The energy store 11 may be arranged for powering the sensor and/or for providing the energy required to shrink the bag 2.

[0047] An end of the rigid core 5 in figure 7 opposite the outlet 4 is arranged as an interface 12 for exchanging data of the sensor 10 and/or energy from the energy store 11 between the medicament container 1 and at least one external component (not illustrated).

[0048] Figure 8 is a schematic lateral section of another embodiment of the medicament container 1. The bag 2 is subdivided into a multitude of bag chambers 2.1 to 2.5. The bag chambers 2.1 to 2.5 may be interconnected for fluid communication as in figure 8. Alternatively, the bag chambers 2.1 to 2.5 may be separate from each other. The separate bag chambers 2.1 to 2.5 may contain different medicaments 3. The bag chambers 2.1 to 2.5 may have the same or different volumes. These volumes may be used for fixed doses and/or variable doses.

[0049] The rigid core 5 of figure 8 is segmented so as to account for the bag 2 being subdivided into bag chambers 2.1 to 2.5. Each segment exhibits an opening of the drain channel 9. Each segment may comprise has a central bulge 5.1.

[0050] The rigid core 5 may have a variety of shapes, such as cylindrical, spherical, cuboid, etc.

[0051] Preferably, the volume of the rigid core 5 is greater than the remaining volume of the bag 2 after shrinking so as to avoid residual medicament. The remaining volume of the bag 2 after shrinking may be calculated by means of a shrinking factor of the bag material.

[0052] The length of the rigid core 5 may differ from the length of the bag 2.

[0053] In another embodiment the bag 2 may be subjected to heat or another energy source by means of an annular component arranged for partially surrounding the bag 2. The bag 2 is shrunk by controlled, stepwise or continuous advancement of the annular component, starting from the end opposite the outlet 4 towards the outlet 4. This prevents formation of cavities with residual medicament. Dosage accuracy may be likewise increased.
The embodiment shown in figures 5 and 6 may likewise be combined with the rigid cores 5 shown in figures 7 and 8.

[0054] The medicament container 1 may preferably be used for delivering one of an analgetic, an anticoagulant, insulin, insulin derivate, heparin, Lovenox, a vaccine, a growth hormone, a peptide hormone, a protein, antibodies and complex carbohydrates.

[0055] The term "medicament", as used herein, means a pharmaceutical formulation containing at least one pharmaceutically active compound,
wherein in one embodiment the pharmaceutically active compound has a molecular weight up to 1500 Da and/or is a peptide, a proteine, a polysaccharide, a vaccine, a DNA, a RNA, a antibody, an enzyme, an antibody, a hormone or an oligonucleotide, or a mixture of the above-mentioned pharmaceutically active compound,
wherein in a further embodiment the pharmaceutically active compound is useful for the

treatment and/or prophylaxis of diabetes mellitus or complications associated with diabetes mellitus such as diabetic retinopathy, thromboembolism disorders such as deep vein or pulmonary thromboembolism, acute coronary syndrome (ACS), angina, myocardial infarction, cancer, macular degeneration, inflammation, hay fever, atherosclerosis and/or rheumatoid arthritis,
wherein in a further embodiment the pharmaceutically active compound comprises at least one peptide for the treatment and/or prophylaxis of diabetes mellitus or complications associated with diabetes mellitus such as diabetic retinopathy,
wherein in a further embodiment the pharmaceutically active compound comprises at least one human insulin or a human insulin analogue or derivative, glucagon-like peptide (GLP-1) or an analogue or derivative thereof, or exedin-3 or exedin-4 or an analogue or derivative of exedin-3 or exedin-4.

[0056] Insulin analogues are for example Gly(A21), Arg(B31), Arg(B32) human insulin; Lys(B3), Glu(B29) human insulin; Lys(B28), Pro(B29) human insulin; Asp(B28) human insulin; human insulin, wherein proline in position B28 is replaced by Asp, Lys, Leu, Val or Ala and wherein in position B29 Lys may be replaced by Pro; Ala(B26) human insulin; Des(B28-B30) human insulin; Des(B27) human insulin and Des(B30) human insulin.

[0057] Insulin derivates are for example B29-N-myristoyl-des(B30) human insulin; B29-N-palmitoyl-des(B30) human insulin; B29-N-myristoyl human insulin; B29-N-palmitoyl human insulin; B28-N-myristoyl LysB28ProB29 human insulin; B28-N-palmitoyl-LysB28ProB29 human insulin; B30-N-myristoyl-ThrB29LysB30 human insulin; B30-N-palmitoyl- ThrB29LysB30 human insulin; B29-N-(N-palmitoyl-Y-glutamyl)-des(B30) human insulin; B29-N-(N-lithocholyl-Y-glutamyl)-des(B30) human insulin; B29-N-(ω-carboxyheptadecanoyl)-des(B30) human insulin and B29-N-(ω-carboxyhepta¬decanoyl) human insulin.

[0058] Exendin-4 for example means Exendin-4(1-39), a peptide of the sequence H His-Gly-Glu-Gly-Thr-Phe-Thr-Ser-Asp-Leu-Ser-Lys-Gln-Met-Glu-Glu-Glu-Ala-Val-Arg-Leu-Phe-Ile-Glu-Trp-Leu-Lys-Asn-Gly-Gly-Pro-Ser-Ser-Gly-Ala-Pro-Pro-Pro-Ser-NH2.

[0059] Exendin-4 derivatives are for example selected from the following list of compounds:

H-(Lys)4-des Pro36, des Pro37 Exendin-4(1-39)-NH2,

H-(Lys)5-des Pro36, des Pro37 Exendin-4(1-39)-NH2,

des Pro36 [Asp28] Exendin-4(1-39),

des Pro36 [IsoAsp28] Exendin-4(1-39),

des Pro36 [Met(O)14, Asp28] Exendin-4(1-39),

des Pro36 [Met(O)14, IsoAsp28] Exendin-4(1-39),

des Pro36 [Trp(O2)25, Asp28] Exendin-4(1-39),

des Pro36 [Trp(O2)25, IsoAsp28] Exendin-4(1-39),

des Pro36 [Met(O)14 Trp(O2)25, Asp28] Exendin-4(1-39),

des Pro36 [Met(O)14 Trp(O2)25, IsoAsp28] Exendin-4(1-39); or

des Pro36 [Asp28] Exendin-4(1-39),

des Pro36 [IsoAsp28] Exendin-4(1-39),

des Pro36 [Met(O)14, Asp28] Exendin-4(1-39),

des Pro36 [Met(O)14, IsoAsp28] Exendin-4(1-39),

des Pro36 [Trp(O2)25, Asp28] Exendin-4(1-39),

des Pro36 [Trp(O2)25, IsoAsp28] Exendin-4(1-39),

des Pro36 [Met(O)14 Trp(O2)25, Asp28] Exendin-4(1-39),

des Pro36 [Met(O)14 Trp(O2)25, IsoAsp28] Exendin-4(1-39),

wherein the group -Lys6-NH2 may be bound to the C-terminus of the Exendin-4 derivative;

or an Exendin-4 derivative of the sequence

H-(Lys)6-des Pro36 [Asp28] Exendin-4(1-39)-Lys6-NH2,

des Asp28 Pro36, Pro37, Pro38Exendin-4(1-39)-NH2,

H-(Lys)6-des Pro36, Pro38 [Asp28] Exendin-4(1-39)-NH2,

H-Asn-(Glu)5des Pro36, Pro37, Pro38 [Asp28] Exendin-4(1-39)-NH2,

des Pro36, Pro37, Pro38 [Asp28] Exendin-4(1-39)-(Lys)6-NH2,

H-(Lys)6-des Pro36, Pro37, Pro38 [Asp28] Exendin-4(1-39)-(Lys)6-NH2,

H-Asn-(Glu)5-des Pro36, Pro37, Pro38 [Asp28] Exendin-4(1-39)-(Lys)6-NH2,

H-(Lys)6-des Pro36 [Trp(O2)25, Asp28] Exendin-4(1-39)-Lys6-NH2,

H-des Asp28 Pro36, Pro37, Pro38 [Trp(O2)25] Exendin-4(1-39)-NH2,

H-(Lys)6-des Pro36, Pro37, Pro38 [Trp(O2)25, Asp28] Exendin-4(1-39)-NH2,

H-Asn-(Glu)5-des Pro36, Pro37, Pro38 [Trp(O2)25, Asp28] Exendin-4(1-39)-NH2,

des Pro36, Pro37, Pro38 [Trp(O2)25, Asp28] Exendin-4(1-39)-(Lys)6-NH2,

H-(Lys)6-des Pro36, Pro37, Pro38 [Trp(O2)25, Asp28] Exendin-4(1-39)-(Lys)6-NH2,

H-Asn-(Glu)5-des Pro36, Pro37, Pro38 [Trp(O2)25, Asp28] Exendin-4(1-39)-(Lys)6-NH2,

H-(Lys)6-des Pro36 [Met(O)14, Asp28] Exendin-4(1-39)-Lys6-NH2,

des Met(O)14 Asp28 Pro36, Pro37, Pro38 Exendin-4(1-39)-NH2,

H-(Lys)6-desPro36, Pro37, Pro38 [Met(O)14, Asp28] Exendin-4(1-39)-NH2,

H-Asn-(Glu)5-des Pro36, Pro37, Pro38 [Met(0)14, Asp28] Exendin-4(1-39)-NH2,

des Pro36, Pro37, Pro38 [Met(O)14, Asp28] Exendin-4(1-39)-(Lys)6-NH2,

H-(Lys)6-des Pro36, Pro37, Pro38 [Met(O)14, Asp28] Exendin-4(1-39)-(Lys)6-NH2,

H-Asn-(Glu)5 des Pro36, Pro37, Pro38 [Met(O)14, Asp28] Exendin-4(1-39)-(Lys)6-NH2,

H-Lys6-des Pro36 [Met(O)14, Trp(O2)25, Asp28] Exendin-4(1-39)-Lys6-NH2,

H-des Asp28 Pro36, Pro37, Pro38 [Met(O)14, Trp(O2)25] Exendin-4(1-39)-NH2,

H-(Lys)6-des Pro36, Pro37, Pro38 [Met(O)14, Asp28] Exendin-4(1-39)-NH2,

H-Asn-(Glu)5-des Pro36, Pro37, Pro38 [Met(0)14, Trp(O2)25, Asp28] Exendin-4(1-39)-NH2,

des Pro36, Pro37, Pro38 [Met(O)14, Trp(O2)25, Asp28] Exendin-4(1-39)-(Lys)6-NH2,

H-(Lys)6-des Pro36, Pro37, Pro38 [Met(O)14, Trp(O2)25, Asp28] Exendin-4(S1-39)-(Lys)6-NH2,

H-Asn-(Glu)5-des Pro36, Pro37, Pro38 [Met(O)14, Trp(O2)25, Asp28] Exendin-4(1-39)-(Lys)6-NH2;

or a pharmaceutically acceptable salt or solvate of any one of the afore-mentioned Exedin-4 derivative.

[0060] Hormones are for example hypophysis hormones or hypothalamus hormones or regulatory active peptides and their antagonists as listed in Rote Liste, ed. 2008, Chapter 50, such as Gonadotropine (Follitropin, Lutropin, Choriongonadotropin, Menotropin), Somatropine (Somatropin), Desmopressin, Terlipressin, Gonadorelin, Triptorelin, Leuprorelin, Buserelin, Nafarelin, Goserelin.

[0061] A polysaccharide is for example a glucosaminoglycane, a hyaluronic acid, a heparin, a low molecular weight heparin or an ultra low molecular weight heparin or a derivative thereof, or a sulphated, e.g. a poly-sulphated form of the above-mentioned polysaccharides, and/or a pharmaceutically acceptable salt thereof. An example of a pharmaceutically acceptable salt of a poly-sulphated low molecular weight heparin is enoxaparin sodium.

[0062] Pharmaceutically acceptable salts are for example acid addition salts and basic salts. Acid addition salts are e.g. HCl or HBr salts. Basic salts are e.g. salts having a cation selected from alkali or alkaline, e.g. Na+, or K+, or Ca2+, or an ammonium ion N+(R1)(R2)(R3)(R4),

wherein R1 to R4 independently of each other mean: hydrogen, an optionally substituted C1 C6-alkyl group, an optionally substituted C2-C6-alkenyl group, an optionally substituted C6-C10-aryl group, or an optionally substituted C6-C10-heteroaryl group. Further examples of pharmaceutically acceptable salts are described in "Remington's Pharmaceutical Sciences" 17. ed. Alfonso R. Gennaro (Ed.), Mark Publishing Company, Easton, Pa., U.S.A., 1985 and in Encyclopedia of Pharmaceutical Technology.

[0063] Pharmaceutically acceptable solvates are for example hydrates.

List of References

[0064]

1
: medicament container

2
: bag

2.1 to 2.n
: bag chamber

3
: liquid medicament

4
: outlet

5
: rigid core

5.1
: bulge

6
: actor material

6.1
: remote section

7
: fixing point

8
: guide roll

9
: drain channel

10
: sensor

11
: energy store

12
: interface

Q

heat

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- WO2009069518A1 [0004]
- US5474527A [0005]
- JP2004283359A [0006]

Non-patent literature cited in the description

- Remington's Pharmaceutical SciencesMark Publishing Company19850000 [0062]

Patentkrav

1. Medikamentbeholder (1) til et væskeformigt medikament (3), hvor medikamentbeholderen (1) omfatter en pose (2) med et udløb (4), hvilken pose (2) kan sammenpresses eller krympes ved eksponering af mindst en del af medikamentbeholderen (1) for en energikilde,
hvor en stiv kerne (5) er anbragt i posen (2),
der er kendetegnet ved, at posen (2) består af et varmekrympemateriale, der er konfigureret til at krympe, når det eksponeres for varme (Q).

2. Medikamentbeholder (1) til et væskeformigt medikament (3), hvor medikamentbeholderen (1) omfatter en pose (2) med et udløb (4), hvilken pose (2) kan sammenpresses eller krympes ved eksponering af mindst en del af medikamentbeholderen (1) for en energikilde,
hvor en stiv kerne (5) er anbragt i posen (2),
der er kendetegnet ved, at et aktørmateriale (6) er mindst delvist anbragt omkring posen (2), hvilket aktørmateriale (6) er konfigureret, så det krymper, når det eksponeres for varme (Q).

3. Medikamentbeholder (1) ifølge krav 2,
der er kendetegnet ved, at aktørmaterialet (6) omfatter adskillige sektioner, der kan opvarmes separat.

4. Medikamentbeholder (1) ifølge et af ovennævnte krav,
der er kendetegnet ved, at den stive kerne (5) er anbragt i en längderetning af posen (2).

5. Medikamentbeholder (1) ifølge et af ovennævnte krav,
der er kendetegnet ved, at udløbet (4) omfatter en grænseflade til modtagelse af en hul injektionskanyle.

6. Medikamentbeholder (1) ifølge et af kravene 2 til 5, når de er underordnet krav 2,
der er kendetegnet ved, at aktørmaterialet (6) omfatter en

fjern sektion (6.1), som ikke er i kontakt med posen (2), og som er beregnet til at blive eksponeret for varme (Q).

7. Medikamentbeholder (1) ifølge et af ovennævnte krav, der er kendetegnet ved, at mindst én drænkanal (9) er anbragt i den stive kerne (5) på en måde, så den forbinder mindst én åbning på en overflade af den stive kerne (5) med udløbet (4).

8. Medikamentbeholder (1) ifølge krav 7, der er kendetegnet ved, at posen (2) er inddelt i mindst to på hinanden følgende posekamre (2.1 to 2.n), hvor den stive kerne (5) omfatter et respektivt segment til hvert posekammer (2.1 to 2.n), idet hvert segment har mindst én åbning i drænkanalen (9).

9. Medikamentbeholder (1) ifølge krav 8, der er kendetegnet ved, at hvert segment omfatter en central udposning (5.1).

10. Medikamentbeholder (1) ifølge et af ovennævnte krav, der er kendetegnet ved, at mindst én sensor (10) er integreret i den stive kerne (5).

11. Medikamentbeholder (1) ifølge et af ovennævnte krav, der er kendetegnet ved, at en energilagerenhed (11) er integreret i den stive kerne (5).

12. Medikamentbeholder (1) ifølge et af kravene 10 eller 11, der er kendetegnet ved, at en ende af den stive kerne (5) modsat udløbet (4) er indrettet som en grænseflade (12) til udveksling af data for sensoren (10) og/eller energi fra energilagerenheden (11) mellem medikamentbeholderen (1) og mindst én ekstern komponent.

13. Injektionsindretning til administration af et væskeformigt medikament (3), som omfatter en medikamentbeholder (1) ifølge et af kravene 1 til 12 og en hul kanyle til gennemboring af en patients hud, der er anbragt i

udløbet (4).

14. Injektionsindretning ifølge krav 13, der er kendetegnet ved, at en ventil og en hul kanyle til gennemboring af en patients hud er anbragt i udløbet (4).

15. Inhalatorindretning til administration af et væskeformigt medikament (3), som omfatter en medikamentbeholder (1) ifølge et af kravene 1 til 12.

DRAWINGS

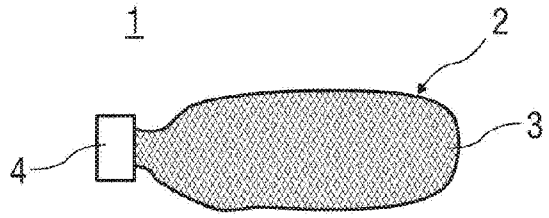

FIG 1

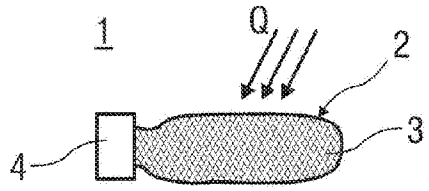

FIG 2

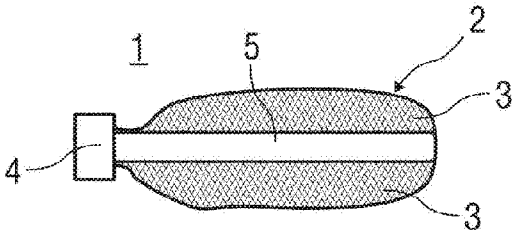

FIG 3

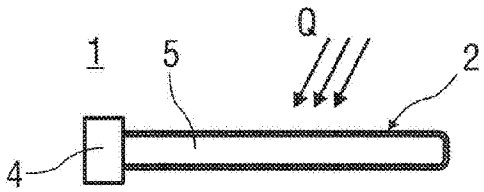

FIG 4

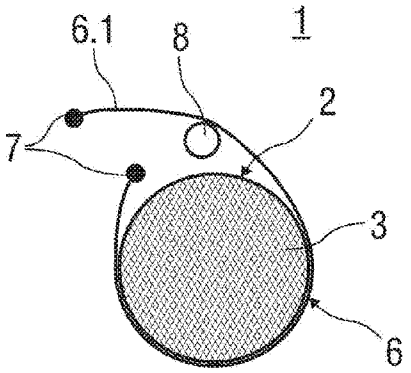

FIG 5

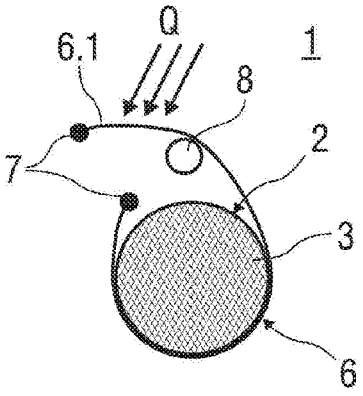

FIG 6

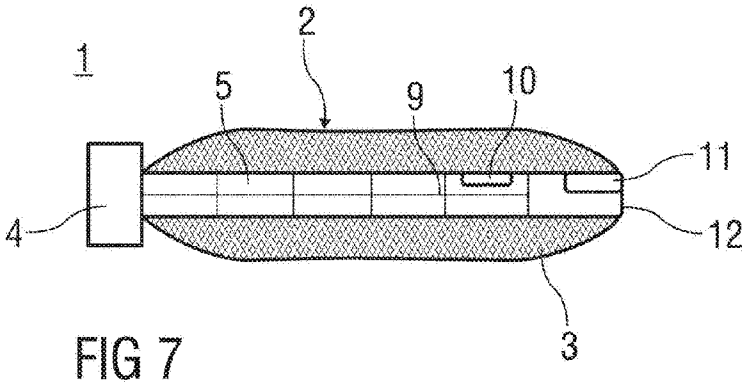

FIG 7

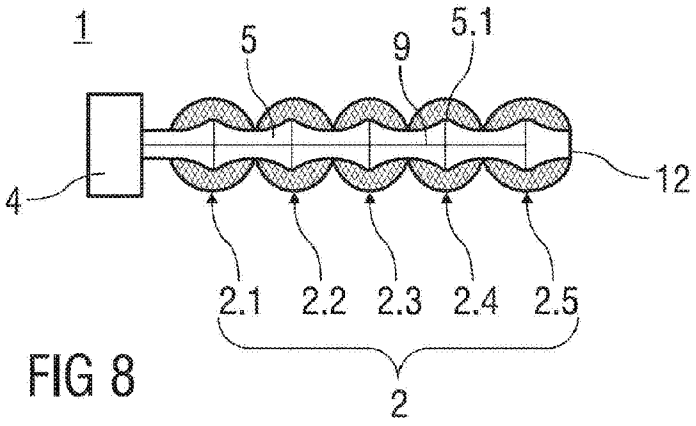

FIG 8