Documents US 5,713,208, US 5, 865,032 discloses further examples of cooling devices for medicaments that comprise thermoelectric elements.

There are medicaments that are stored in a medicament container which can be connected to a hollow needle for administering a medicament dose. Thus, if a patient is to be supplied with a medicament, the hollow needle is attached to the medicament container for example by means of a screwing process with corresponding threads. Thereafter, a desired dose can be injected using the medicament container, which has now been converted into a syringe. Such a medicament container usually contains several times the amount of a single dose. After a dose has been administered, the medicament container with the remaining content therefore has to be cooled again until the next dose is administered.

Such a medicament container which can be converted into a syringe at the same time can comprise a mechanism in order to be able to inject or administer a desired quantity of a medicament in a precise manner, even by a patient, i.e. a layman. Subsequent to an administration of a medicament dose, the used needle must be replaced with a sterile needle to administer a next dose, so as to avoid inflammation. Due to idleness, many patients do not replace the needle in this manner, which can promote inflammation, for example.

Embodiments of t~~T~~he invention seek to provide~~is based on the object of providing~~ an improved mobile temperature-regulating apparatus of the type mentioned in the introduction.

According to an aspect of the present invention, there is provided a temperature-regulating apparatus for medicaments, comprising a housing with at least one accommodating chamber for a medicament container, wherein the accommodating chamber is preferably positively adapted to a medicament container located in the accommodating chamber, with a temperature-regulating device, in particular a thermoelectric temperature-regulating device, wherein the temperature-regulating device can temperature-regulate only a partial area of the accommodating chamber, and wherein the apparatus comprises an alignment device which permits an insertion of the medicament container in only one direction.

There is disclosed~~In order to achieve the object,~~ a temperature-regulating apparatus for medicaments ~~is provided~~ which comprises a housing with at least one accommodating chamber for a medicament container. Thus, the accommodating chamber is intended and suitable to accommodate a medicament container. Subsequent to inserting the medicament container into the accommodating chamber, the accommodating chamber can be closed in order to minimize energy loss during a temperature-regulating process. The

accommodating chamber, i.e. the inner space of the accommodating chamber, is preferably positively adapted to a medicament container located in the accommodating chamber in order to minimize the energy required for temperature regulation of the medicament located in the medicament container. In order to regulate the temperature of a medicament located in a medicament container located in the accommodating chamber, the temperature-regulating apparatus comprises a temperature-regulating device, particularly a thermoelectric temperature-regulating device. In principle, the temperature-regulating device comprises a power source, in particular an electrical power source in the form of a battery or of a rechargeable battery. Preferably, this temperature-regulating apparatus serves for regulating the temperature of medicament containers that are simultaneously designed as administering containers for administering a dose of a medicament, with the medicament container initially containing several times the amount of such a dose. Subsequent to the administration of a dose, such a medicament container must therefore be temperature-regulated again. In particular, the temperature-regulating apparatus serves for regulating the temperature of medicament containers that can be converted into syringes. Therefore, the invention in one embodiment also relates to a temperature-regulating apparatus in which a medicament container is disposed for temperature regulation, wherein the medicament container, at the same time, is an administering container or can be configured as an administering container.

This temperature-regulating apparatus according to embodiments of the invention comprises at least one of the features mentioned below, or is configured in at least one of the ways mentioned below ~~in order to achieve the object of the invention~~.

In one embodiment the temperature-regulating device is configured in such a way that it is capable of regulating the temperature of only a partial area of the accommodating chamber.

temperature regulation independently from a stationary power source, for example by means of a battery of the temperature-regulating apparatus, then the temperature can be regulated over a particularly long period of time independently from a stationary power source. Long operating times are therefore possible. The mobility of the temperature-regulating apparatus is improved accordingly.

Generally, the accommodating chamber has an elongate shape. In that case, the temperature-regulating device is basically configured in such a way that it is temperature-regulated only over a partial distance along the extended form, generally starting at one end of the elongate form up to a middle area located between the two end areas of the elongate form. One or more cooling and/or heating elements, preferably Peltier elements, i.e. thermoelectric elements, are in that case disposed along a section adjacent to the accommodating chamber, and not along the entire elongate form. In that case, the temperature-regulating device is configured in such a way that not the entire length of the accommodating chamber is or can be temperature-regulated, but only a section thereof. The one or more cooling and/or heating elements, which can preferably be operated electrically, can be disposed distributed around the circumference of the accommodating chamber, or only at one long side of the accommodating chamber. Particularly the area or section of the accommodating chamber that is to be temperature-regulated and to which the one or more cooling and/or heating elements is adjacent consists of metal or a material with a comparably good thermal conductivity. Copper or aluminum is preferably provided as a metal. Furthermore, the accommodating chamber is formed by a material of relatively poor thermal conductivity, particularly by plastic, in order to keep the weight of the temperature-regulating apparatus low and thus increase mobility.

There is disclosed that~~In one embodiment~~ the temperature-regulating apparatus comprises an alignment device which permits an insertion of the medicament container in only one direction or exactly one manner. The~~It is thus ensured that the~~ area or section of an inserted medicament container in which the medicament is

located can be or is temperature-regulated. The medicament container can therefore not be brought into the accommodating chamber in such a way that an area of the medicament container is subsequently temperature-regulated in which no medicament is located.

In one embodiment, the alignment device comprises a fastening means, in particular a thread, a bayonet connecting means or a latching means for detachably fastening the medicament container. Fastening the medicament container in the accommodating chamber limits the mobility within the accommodating chamber. Thus, ~~It is thus ensured in a further improved manner that~~ the area of the inserted medicament container comprising the medicament may be~~is~~ temperature-regulated.

If the medicament container is configured in such a way that it can be converted into a syringe, then the medicament container comprises a section to which a hollow needle can be detachably fastened. This section comprises, for example, an external thread onto which the internal thread of a hollow needle can be screwed. In particular, the fastening means of the medicament container is configured in such a way that this section of the medicament container at the same time serves for fastening in the accommodating chamber. Thus, if a hollow needle is, for example, screwed onto the medicament container by means of a thread, then the fastening means of the temperature-regulating apparatus comprises a thread corresponding therewith, in particular an internal thread, in order to be able to connect the thread of the medicament container to the thread of the fastening means by screwing.

If, for example, a hollow needle is connected to the medicament container by means of a latching connection in order to convert the medicament container into a syringe, then the fastening means comprises a latching means corresponding therewith. The same applies, mutatis mutandis, for the case of a bayonet connection or another manner of connection which is provided for fastening a hollow needle to a medicament container in such a way that there is a syringe with which the medicament stored in the medic-

ment container in the accommodating chamber, can be temperature-regulated.

In one embodiment of the invention, the temperature-regulating apparatus comprises a storage chamber for storing one or more needles. The reliable availability to the patient of unused needles is thus promoted, which promotes the use of a new needle as soon as a next medicament dose is to be administered.

The fastening means preferably comprises a detector that is capable of detecting the fastening of a medicament container. The detector can be, for example, a micro switch which is actuated once the medicament container is fastened. A capacitive or inductive detector can be used as a detector. Temperature regulation can be carried out only subsequent to such an actuation of the detector, as well as preferably only for the duration of the actuation. In this embodiment, it is avoided that temperature regulation is carried out if no medicament container is disposed in the temperature-regulating apparatus.

There is also disclosed that ~~In one embodiment of the invention~~ the accommodating chamber comprises a replaceable insert which preferably consists entirely or partially of metal. This embodiment makes it possible to select and use an insert depending on the geometry of the medicament container. If the geometry of the medicament container to be temperature-regulated changes, it is sufficient if the insert in the accommodating chamber is replaced in order to be able to temperature-regulate a medicament container with a modified geometry. Every single insert is preferably adapted to the geometry of every single medicament container, i.e. shaped inside so as to be complementary to the medicament container in order thus to minimize the volume to be temperature-regulated. Every single insert thus surrounds the medicament container in a preferably positive manner and has a geometry that is complementary thereto. This configuration is not to be combined mandatorily with the above-mentioned embodiments, but represents an independent invention. It may solves the problem that a temperature-regulating apparatus

can be modified with minimal effort in such a way that, depending on the geometry of a medicament container, the geometry in the accommodating chamber can be suitably adapted in order to minimize the energy demand for temperature regulation. This temperature-regulating apparatus, ~~which relates to an independent invention,~~ furthermore comprises a housing with at least one accommodating chamber for a medicament container, wherein the accommodating chamber is preferably positively adapted to a medicament container located in the accommodating chamber, as well as a temperature-regulating device with which the accommodating chamber can be temperature-regulated. Advantageously, the insert can simultaneously comprise the aforementioned fastening means to which a medicament container can be fastened. In that case, a fastening means can be replaced together with the insert. The insert can advantageously be equipped with one or more cooling and/or heating elements, which can therefore be replaced together with the insert.

The aforementioned insert, which is at least a part of the accommodating chamber, in particular consists of a metal which is coated on the inside with gold in order to be protected well against corrosion and have good thermal conductivity at the same time. Copper is preferred as the metal. If the insert consists only partially of metal, then that area and section of the insert consists of metal into which a section of the medicament holder comes which comprises the medicament. In this embodiment, the insert furthermore preferably consists of a material that has poor thermal conductivity in comparison to the metal, particularly of plastic, for weight-related reasons, in order thus to keep the weight low.

On the whole, it is thus possible to provide a temperature-regulating apparatus which enables long operating times and/or which has a low weight and can therefore be handled in a mobile manner. The weight of a temperature-regulating apparatus according to embodiments of the invention is, in particular, up to 3 kg, preferably up to 2 kg, particularly preferably up to 1 kg. It may even be possible to provide a temperature-regulating apparatus which (without the medicament container) weighs less than 500 g.