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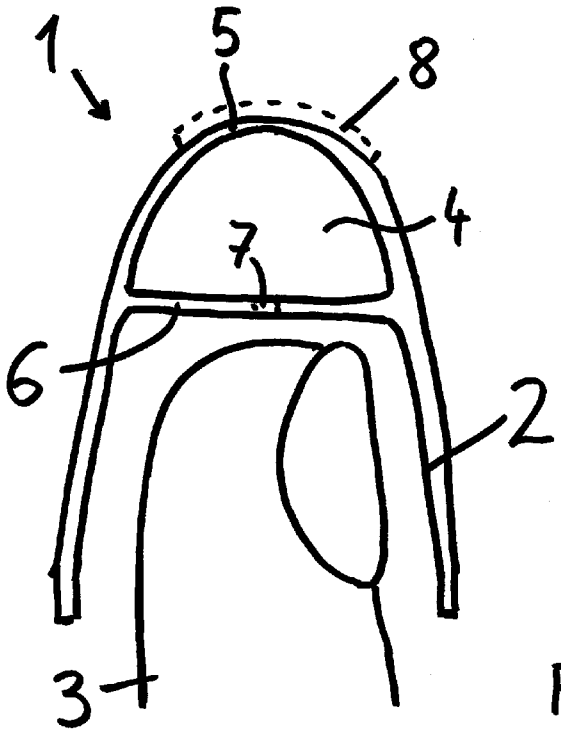

Fig. 1a

(57) Abstract: A treatment device (1) is described. The treatment device (1) comprises a receptable (2) located at a lower portion of the treatment device (1), the receptable (2) being configured for being put onto a finger (3). The treatment device (1) further comprises a compartment (4) configured for encompassing a volume of a chemical compound, with the compartment (4) located in an upper portion of the treatment device (1) above the receptable (2), and an upper covering layer (5). The compartment (4) is disposed such that a volume of a chemical compound contained in the compartment (4) is in immediate contact with the upper covering layer (5) of the treatment device (1), with the compartment (4) not containing any intact or destroyed partition walls or membranes.

Treatment Device for Applying a local Cooling Effect

Description

Field of the Invention

The invention relates to a treatment device for locally cooling a person's skin. The invention also relates to a method for preparing a treatment device for locally cooling a patient's skin, and to a method for cooling a patient's skin using a treatment device.

Background of the Invention

In international patent application WO 2013/174818 A1, a device for local cold generation is described, wherein the device has at least one reservoir in a housing, and also a take-up pad which can be placed onto a local area that is to be cooled, wherein the at least one reservoir is separated from the take-up pad by a partition wall.

In international patent application WO 2005/092257 A1, a cooling sheet and a cooling container capable of easily relieving pain is described. The cooling sheet is formed by partitioning the inside of a bag body into a first space and a second space through a partition part formed by bending the bag body so as to allow communication if necessary. A first substance is stored in the first space, and a second substance producing endothermic reaction by the contact thereof with the first substance is stored in the second space.

In UK patent application GB 2 457 077 A, a cooling system, primarily for use with protective headwear such as motorcycle helmets is described. The cooling system comprises an endothermic reactor and a trigger to initiate the endothermic reaction in the reactor whilst being worn on the wearer's head. The trigger is preferably arranged to initiate the reaction in response to detection of an impact or imminent impact. The endothermic reactor may comprise two or more reagents which are initially stored in separate respective reservoirs and which react in an endothermic reaction when mixed through action of the trigger.

German utility model DE 20 2008 004 176 U1 describes an instantaneous cold and instantaneous heat generating element with at least a first inner compartment and at least a

second inner compartment, wherein the at least one first inner compartment is separated from the at least one second inner compartment by a destructible foil or membrane and wherein one of these inner compartments contains water and the other compartment contains one or more compounds that can be dissolved in water in an endothermic or exothermic solvation process.

Object of the Invention

Thus, the object of the invention is to provide a treatment device for locally cooling a person's skin that is simpler and cheaper than cooling devices of the prior art.

Summary of the Invention

According to the invention, a treatment device is provided, the treatment device comprising a receptable located at a lower portion of the treatment device, the receptable being configured for being put onto a finger. The treatment device further comprises a compartment configured for encompassing a volume of a chemical compound, with the compartment located in an upper portion of the treatment device above the receptable, and an upper covering layer. The compartment is disposed such that a volume of a chemical compound contained in the compartment is in immediate contact with the upper covering layer of the treatment device, with the compartment not containing any intact or destroyed partition walls or membranes.

In the following, the terms „upper" and "lower" with regard to the treatment device will be explained. The treatment device comprises a receptable configured for being put onto a finger. When the treatment device is put on the finger, the "lower portion" with the receptable is oriented in the direction towards the palm. The "upper portion" and the "upper surface" of the treatment device are oriented in the outward direction relative to the palm. Thus, the terms "upper" and "lower" are defined in view of the treatment device's orientation relative to the hand of the user.

When the treatment device is cooled or frozen, the volume of the chemical compound in the compartment is cooled or frozen as well. The volume of the chemical compound contained in

the compartment is adapted for cooling the upper covering layer. When the treatment device's upper covering layer is pressed against the patient's skin, a local cooling is provided. The treatment device can be put onto a finger, for example onto a finger of a doctor or a medical staff member, and can be pressed against the person's skin to provide a local cooling. The treatment device may for example be put onto an index finger of a staff member. For example, when giving an injection to a person, the treatment device does not hinder the work of the respective doctor or the respective medical staff member. When local cooling is required, the treatment device is pressed against the person's skin. Thus, handling of the treatment device is simple and does not disturb the medical work.

Due to the local cooling of the skin, pain sensitivity is reduced. Accordingly, if the treatment device is applied to the skin before the respective area of the skin is punctured, e.g. when an injection is given, the pain experienced by the treated person will be reduced. By applying the cold treatment device to the person's skin, the skin may even be locally anaesthetised, whereby pain sensitivity of the skin is significantly reduced.

As a further effect, the local cooling provided by the treatment device is capable of providing pain relief and of reducing the sensation of pain. Hence, applying the treatment device to the skin can alleviate an existing pain. For example, after the skin has been punctured by an injection needle or any other medical or cosmetic device, the treatment device with the volume of ice attached to its upper end may be pressed against the puncturing site, in order to relief the pain.

Furthermore, the local cooling provided by the treatment device provides for a disinfection of the area of the patient's skin that is exposed to local cooling. Furthermore, the local cooling provided by the treatment device has a haemostatic effect. Due to the local cooling, the blood vessels contract, and this astringent effect reduces or even stops the bleeding. Hence, when the treatment device is applied to an area of the skin that has been punctured by an injection needle or any other medical or cosmetic device, bleeding is reduced or even stopped.

According to the invention, a treatment device is provided, the treatment device comprising a receptable located at a lower portion of the treatment device, the receptable being configured for being put onto a finger. The treatment device comprises a first compartment configured for encompassing a volume of a first chemical compound and a second

compartment configured for encompassing a volume of a second chemical compound, with the first and the second compartment located in an upper portion of the treatment device above the receptable, with a first partition wall separating the first compartment from the second compartment, and an upper covering layer. The first compartment is disposed such that a volume of a first chemical compound contained in the first compartment is in immediate contact with the upper covering layer of the treatment device, with the first compartment not containing any intact or destroyed partition walls or membranes apart from the first partition wall.

When the first partition wall is disrupted or destroyed, the first chemical compound mixes with the second chemical compound. In case the compounds are chosen such that an endothermic reaction occurs, the mixing of the componds will cause a cooling effect.

According to the invention, a treatment device is provided, the treatment device comprising a receptable located at a lower portion of the treatment device, the receptable being configured for being put onto a finger. The treatment device further comprises a first compartment configured for encompassing a volume of a first chemical compound, with the first compartment located in an upper portion of the treatment device above the receptable. The first compartment contains a second compartment that is located in the interior of the first compartment, the second compartment being configured for encompassing a volume of a second chemical compound and for floating in the first compartment.

By pressing onto the first compartment, the envelope of the second compartment may be destroyed. In case a sufficient pressure is applied, the envelope of the second compartment will burst. If the envelope of the second compartment is disrupted or destroyed, the first chemical compound will mix with the second chemical compound. In case the compounds are chosen such that an endothermic reaction occurs, the mixing of the componds will cause a cooling effect.

According to the invention, a treatment device is provided, the treatment device comprising a receptable located at a lower portion of the treatment device, the receptable being configured for being put onto a finger. The treatment device further comprises a support for a volume of liquid or ice, the support being located at an upper portion of the treatment device and configured for holding a volume of liquid or ice disposed on the support. The support comprises a cavity that preferably is open on top, the cavity being configured for

accommodating at least a part of the volume of liquid or ice disposed on the support, wherein the cavity has a narrow section, with the cavity widening up below the narrow section.

In the following, the term „ice" shall be understood as the solid state of water or any aqueous solution or suspension, wherein the aqueous solution may further comprise other solvents and/or other ingredients. When being brought in contact with the skin, the ice provides a cooling effect to the skin.

In the treatment device according to the invention, the support comprises a cavity with a narrow section. In case a volume of liquid is disposed on the support, the cavity will be filled with liquid. When the treatment device is frozen, the volume of liquid is turned into a volume of ice. Due to the narrow section in the cavity, the volume of ice is fixed to the support and cannot detach. For this reason, a support comprising a cavity with a narrow section is well-suited for accommodating the volume of liquid or ice, because a mechanical connection is established between the treatment device and the volume of ice.

For preparing the treatment device, a volume of liquid is disposed on the support and then, the treatment device together with the volume of liquid is frozen. The freezing of the treatment device can for example be carried out under aseptic conditions. Thus, it can be made sure that the volume of ice attached to the support is sterile.

Furthermore, according to the invention, a treatment device is provided, the treatment device comprising a receptable located at a lower portion of the treatment device, the receptable being configured for being put onto a finger. The treatment device further comprises a support for a volume of liquid or ice, the support being located at an upper surface of the treatment device and configured for holding a volume of liquid or ice. The treatment device further comprises a volume of ice arranged on the support.

As the treatment device comprises a volume of ice arranged on the support, the treatment device is ready for use. For using the treatment device, the treatment device may for example be put onto a finger of a doctor or a medical staff member. When local cooling is required, the treatment device with the volume of ice disposed thereon is pressed against the person's skin.

According to the invention, a method for preparing a treatment device is provided. The treatment device comprises a receptable located at a lower portion of the treatment device, the receptable being configured for being put onto a finger, and a compartment encompassing a volume of a chemical compound, with the compartment located in an upper portion of the treatment device above the receptable. The method comprises freezing the treatment device together with the volume of the chemical compound. The treatment device with the cold volume of the chemical compound may then for example be used for providing a local cooling to a patient's skin.

According to the invention, a method for preparing a treatment device is provided. The treatment device comprises a receptable located at a lower portion of the treatment device, the receptable being configured for being put onto a finger, and a support for a volume of liquid or ice, the support being located at an upper portion of the treatment device and configured for holding a volume of liquid or ice disposed on the support. The method comprises supplying a volume of liquid to the support at the upper portion of the treatment device, and freezing the treatment device, wherein the volume of liquid arranged on the support is transformed into a volume of ice.

Hence, the preparation of the treatment device comprises supplying a volume of liquid onto the support at the upper surface of the treatment device and freezing the treatment device together with the volume of liquid disposed thereon. Hence, the preparation can for example be carried out using a common freezer. The preparation may also be carried out under aseptic conditions, to meet the standards for a respective medical treatment or cosmetic treatment.

Moreover, according to the invention, a method for treating a person's skin with a treatment device is provided. The treatment device is a thimble-shaped treatment device comprising a receptable located at a lower portion of the treatment device, the receptable being configured for being put onto a finger. The method comprises freezing the treatment device and treating the person's skin with the treatment device.

The treatment device is put onto a finger, for example onto a finger of a doctor or a medical staff member. There, the treatment device is ready for use. When a local cooling is for example required during a cosmetic treatment or a medical treatment, the respective staff

member may for example press his or her finger with the treatment device attached to it onto the area of the person's skin where local cooling is desired.

Preferred Embodiments of the Invention

Preferred features of the invention which may be applied alone or in combination are discussed below and in the dependant claims.

Preferably, the treatment device is shaped in the form of a thimble adapted for being put onto a finger. The treatment device can have the shape and the size of a thimble. A doctor or a medical staff member may for example put the thimble onto the index finger and press the thimble against the person's skin, in order to provide for local cooling. A thimble is convenient to handle and does not disturb the doctor's or the medical staff member's work. When local cooling is required, the cooling effect can be quickly applied.

Preferably, the treatment device is implemented as a moulded part. Further preferably, the treatment device is implemented as an injection-moulded part. Preferably, the treatment device is produced by injection moulding. Injection moulding allows for a cost-efficient manufacturing of the treatment device. Preferably, the treatment device is made of silicone. Alternatively, it is preferred that the treatment device is made of a plastic material or of a gel, for example of silica gel. Further preferably, the treatment device is a disposable item. Accessories for medical treatments or cosmetic treatments are usually manufactured as disposable items that are aseptically packaged and handled.

Preferably, the treatment device is used for locally cooling a person's skin or for achieving a pain relief or for achieving a haemostatic effect or for local anaesthesia.

Preferably, the treatment device is adapted for locally cooling a puncture site before an injection is given to the person. Firstly, the treatment device is pressed against the person's skin, in order to provide a local cooling effect. Then, the skin is punctured by the injection needle. The local cooling reduces the pain when the skin is punctured and provides relief for the person.

Alternatively, the treatment device is adapted for locally cooling a puncture site after an injection has been given to the person. First, the person's skin is punctured by the injection needle and the injection is given to the person. Then, the treatment device is pressed against the puncturing site to relief the pain. Furthermore, the bleeding is reduced or even stopped.

Preferably, the treatment device is adapted for locally cooling a puncture site after a Botox injection has been given to the person. By locally cooling the puncture site after a Botox injection, blue bruises can be avoided. Furthermore, due to the local cooling, the leaking of of blood mixed with Botox can be reduced after a Botox injection. Thus, the dosage of Botox applied to the person can be controlled with improved accuracy.

Treatment device comprising a compartment

Preferably, the upper covering layer partly encompasses the volume of the chemical compound. Thus, the cold is conducted to the upper covering layer, which is effectively cooled.

Preferably, the upper covering layer is configured for being brought into contact with a person's skin. When the treatment device is pressed against the patient's skin, the upper covering layer gets in contact with the patient's skin and provides a local cooling.

Preferably, the volume of the chemical compound contained in the compartment is a liquid or a suspension or a gel or ice.

Preferably, the treatment device comprises a wall separating the receptable from the compartment, the wall comprising a closable opening for introducing the chemical compound into the compartment. Via the closable opening, the chemical compound can be introduced into the compartment from the receptable.

Treatment device comprising two compartments

Preferably, the upper covering layer partly encompasses the volume of the first chemical compound. The immediate contact between the volume of the first chemical compound and the upper covering layer ensures an effective cooling.

Preferably, the second compartment is disposed such that a volume of a second chemical compound contained in the second compartment is in immediate contact with the upper covering layer of the treatment device. Accordingly, both compartments are located immediately adjacent to the upper covering layer.

Preferably, the upper covering layer is configured for being brought into contact with a person's skin. When the treatment device is pressed against the patient's skin, the upper covering layer gets in contact with the patient's skin and provides a local cooling.

Preferably, the partition wall separating the first and the second compartment is configured for being destroyed when a predefined pressure is applied to at least one of the compartments. After the partition wall has been destroyed, the first and the second chemical compounds can mix.

Preferably, the treatment device further comprises a spike located at the upper covering layer or at the wall separating the receptable from the first and the second compartment. By pushing the spike against the partition wall, the partition wall can be destroyed.

Preferably, the treatment device comprises a wall separating the receptable from the compartment, the wall comprising a first closable opening for introducing the first chemical compound into the first compartment and a second closable opening for introducing the second chemical compound into the second compartment. Thus, the first and the second chemical compound can be introduced to the first and the second compartment from the receptable.

Treatment device comprising a second compartment located in a first compartment

Preferably, the second compartment's walls are configured for being destroyed when a predefined pressure is applied to the first compartment. When a sufficient pressure is

applied to the first compartment, the second compartment's envelope is destroyed, and the first and the second chemical compound mix.

Preferably, the treatment device comprises a wall separating the receptable from the first compartment, the wall comprising a closable opening for introducing the first chemical compound into the first compartment.

Treatment device comprising a support for a volume of liquid or ice

Preferably, the liquid is water or an aqueous solution or a suspension. The water or the aqueous solution or the suspension is supplied to the upper surface of the treatment device, and then, the treatment device is frozen, for example in a freezer.

Preferably, the liquid further comprises at least one of the following: a disinfectant, an antibiotic, an antimicrobial agent, an antifungal agent, an antibacterial agent, an antiviral agent, an anti-inflammatory agent, an active substance for haemostasis, an astringent, an anaesthetic, a cleaning agent. By adding one or more of these active substances to the liquid, the treatment device can fulfil additional functions in addition to cooling the person's skin. For example, in case a disinfectant is added to the liquid, the disinfectant will be supplied to the person's skin when the treatment device is pressed against the person's skin. In case the liquid contains an anti-inflammatory agent, an inflammation of the skin can be avoided. In case the liquid contains an active substance for haemostasis or an astringent, bleeding will be reduced or even stopped when the treatment device is pressed against the person's skin. This may be particularly useful after puncturing the skin, for example after an injection has been given to the person. As a further example, an anaesthetic may be added to the liquid. In this case, a local anaesthesia can be accomplished when the treatment device gets into contact with the person's skin. In a further example, the liquid may for example contain a cleaning agent, in order to accomplish an additional cleaning effect.

Preferably, the treatment device comprises a volume of ice arranged on the support, wherein the volume of ice is adapted for melting and releasing an active substance when being brought in contact with the person's skin. When the ice starts melting, an active substance contained in the liquid is slowly applied to the skin, whereby the amount of active substance in the liquid determines the dosage of the respective substance.

Preferably, the treatment device is configured for at least one of the following: disinfecting the person's skin, supplying at least one of an antibiotic, an antimicrobial agent, an antifungal agent, an antibacterial agent, an antiviral agent to the person's skin, supplying an anti-inflammatory agent to the person's skin, supplying a cleaning agent to the person's skin, supplying a haemostatic agent or an astringent to the person's skin, supplying an anaesthetic to the person's skin. Besides the effect of local cooling, the treatment device may serve for other purposes as well. This can for example be achieved by adding at least one of a disinfectant, an antibiotic, an antimicrobial agent, an antifungal agent, an antibacterial agent, an antiviral agent, an anti-inflammatory agent, a cleaning agent, a haemostatic agent, an astringent and an anaesthetic to the liquid before the liquid is frozen. When the ice starts melting, the respective active substance is released.

Preferably, the treatment device comprises a volume of ice arranged on the support, wherein the top surface of the volume of ice is exposed to the outside. Preferably, the treatment device comprises a volume of ice arranged on the support, wherein the top surface of the volume of ice is adapted for being brought in direct contact with the person's skin. Further preferably, the treatment device comprises a volume of ice arranged on the support, wherein the top surface of the volume of ice is adapted for being pressed onto the person's skin. When the treatment device with the volume of ice is pressed against the person's skin, the volume of ice gets in direct contact with the skin, and the skin is effectively cooled. In case the ice contains any active substances, the active substances are directly applied to the skin when the ice starts melting.

Preferably, the treatment device comprises a cooling unit arranged below the support for the volume of liquid or ice, the cooling unit being configured for cooling the support and the volume of liquid or ice arranged thereon. Preferably, the cooling unit comprises a first compartment with a first chemical compound and a second compartment with a second chemical compound, the first compartment and the second compartment being separated by a membrane. By puncturing the membrane or making the membrane burst, it can be accomplished that the two chemical compounds mix. In case the compounds are chosen such that an endothermic reaction occurs, the mixing of the compounds will cause a cooling effect. For example, mixing urea with water will give rise to a strong cooling effect. The cooling may be so strong that a volume of liquid disposed on the support is frozen.

Preferably, the cavity is the first compartment and comprises the first chemical compound. Thus, when a membrane between the cavity and the second compartment is disrupted, the first chemical compound and the second chemical compound mix, and a cooling effect occurs.

Preferably, the treatment device further comprises a protection cap adapted for being put onto an upper portion of the treatment device to protect the volume of liquid or ice disposed on the support. By putting a protection cap onto the volume of liquid or ice, it is prevented that the volume of liquid or ice is contaminated. The volume of liquid or ice may even be kept under aseptic conditions.

Preferably, the protection cap is configured for being detached before the treatment device is pressed against the person's skin. After the protection cap has been detached, the surface of the volume of ice can be brought in direct contact with the person's skin. By using a protection cap, it is made sure that the volume of ice is kept clean.

Alternatively, it is preferred that the protection cap remains attached to the treatment device when the treatment device is pressed against the person's skin. In this example, the volume of ice is not brought into direct contact with the person's skin. Cooling is effected indirectly, with the protection cap being cooled by the volume of ice contained therein. Thus, any direct contact between the volume of ice and the person's skin is avoided. This may for example be advantageous in situations where any contact of the skin with melt water should be avoided.

Preferably, the treatment device further comprises a flap cover adapted for covering the volume of liquid or ice. By using a flap cover, it is prevented that the volume of liquid or ice is contaminated before being applied to the person.

Preferably, the flap cover is a detachable flap cover configured for being detached before the treatment device is pressed against the person's skin. Before use, the flap cover is detached. Thus, it is made sure that the surface of the volume of ice applied to the person's skin under clean or even aseptic conditions.

Alternatively, it is preferred that the flap cover remains attached to the treatment device when the treatment device is pressed against the person's skin. The volume of ice is not

brought into direct contact with the person's skin. Instead, cooling is effected indirectly, with the flap cover being cooled by the volume of ice.

Preferably, the treatment device comprises a liquid-absorbing medium disposed on the upper surface of the treatment device. A volume of liquid supplied to the liquid-absorbing medium is absorbed by the liquid-absorbing medium. Then, the treatment device is frozen, whereby the liquid in the liquid-absorbing medium is frozen as well. As a result, a volume of ice attached to the top surface of the treatment device is obtained.

Preferably, the liquid-absorbing medium is one of a sponge, a mesh, a tissue, a gauze, a web. These materials are suited for absorbing and retaining a volume of liquid.

Preferably, the liquid-absorbing medium is configured for being soaked with the liquid. Further preferably, the liquid-absorbing medium is configured for being frozen together with the liquid contained therein. As a result of the freezing process, a volume of ice is obtained, which is fixed to the top surface of the treatment device.

Preferably, the cavity's diameter at the narrow section is smaller than the cavity's diameter immediately below the narrow section.

Preferably, the cavity comprises an upper reservoir and a lower reservoir located below the upper reservoir, the upper reservoir and the lower reservoir being fluidically connected via the narrow section.

Preferably, the treatment device comprises a volume of ice, the volume of ice being fixed in the cavity by the narrow section. Due to the narrow section, the volume of ice is fixed on the treatment device, whereby a mechanical connection between the treatment device and the volume of ice is established. Thus, it is made sure that the volume of ice cannot detach from the treatment device.

Preferably, a chemical compound is disposed in the cavity, with the chemical compound being adapted for providing a cooling effect when mixed with water or with an aqueous solution. When the chemical compound gets in contact with water or an aqueous solution, an endothermic reaction will occur, which causes a cooling effect. The cooling effect may be so pronounced that the volume of liquid is frozen when it gets in contact with the chemical

compound. For example, when mixing urea in powdered form with water, a strong cooling effect is obtained. Thus, a volume of liquid disposed on the support can be transformed into a volume of ice.

Preferably, the method for treating a person's skin is used for locally cooling a person's skin or for achieving a pain relief or for achieving a haemostatic effect or for local anaesthesia.

Preferably, in the method for treating a person's skin, the treatment device further comprises a support for a volume of liquid or ice, the support being located at an upper surface of the treatment device and configured for holding a volume of liquid or ice, wherein during the freezing step, a volume of liquid disposed on the support is turned into a volume of ice.

Brief Description of the Drawing

The invention is illustrated in greater detail with the aid of schematic drawings.

It shows schematically:

Figure 1a: Figure 1a shows a treatment device with a compartment encompassing a volume of a chemical compound.

Figure 1b: Figure 1b shows the treatment device of Figure 1a from below.

Figure 2: Figure 2 shows a treatment device comprising two compartments separated by a partition wall.

Figure 3: Figure 3 shows another example of a treatment device with two compartments located in its upper portion.

Figure 4: Figure 4 shows a treatment device with a second compartment floating in a first compartment.

Figure 5a: Figure 5a shows a treatment device with a support for a volume of liquid at its upper surface and with a receptable for the user's finger at its lower portion.

Figure 5b: Figure 5b shows the treatment device of figure 1a together with a volume of liquid disposed on the upper surface.

Figure 5c: Figure 5c shows the treatment device with a volume of ice attached to the upper surface.

Figure 6: Figure 6 shows a treatment device comprising a liquid-absorbing medium that is fixed to the upper surface of the treatment device.

Figure 7: Figure 7 shows a treatment device comprising a cooling unit with two compartments.

Figure 8: Figure 8 shows a treatment device with a cooling unit comprising a bladder filled with liquid.

Figure 9: Figure 9 shows a treatment device with a volume of liquid or ice that is protected by a flap cover.

Figure 10: Figure 10 shows a treatment device comprising a detachable protection cap, the protection cap being configured for protecting the volume of liquid or ice arranged on the treatment device's upper surface.

Detailed Description of Embodiments of the Invention

In the following description of preferred embodiments of the present invention, identical reference numerals denote identical or comparable components.

Figure 1a shows a treatment device 1 a person's skin. The treatment device 1 comprises a receptable 2, wherein the receptable 2 is adapted for being put onto a person's finger 3, for example onto a finger of a doctor or a medical staff member. The treatment device 1 further comprises a compartment 4 configured for encompassing a volume of chemical compound, with the compartment 4 being located in the upper portion of the treatment device 1. The treatment device 1 further comprises an upper covering layer 5 that encloses the upper

portion of the compartment 4, with the volume of the chemical compound contained in the compartment 4 being in immediate contact with the upper covering layer 5. The compartment 4 is separated from the receptable 2 by a wall 6, with the wall 6 comprising a closable opening 7. Via the closable opening 7, the chemical compound can be introduced into the compartment 4. For example, a liquid or a hydrogel may be filled into the compartment 4 from the receptable 2. After the respective chemical compound has been filled into the compartment 4, the closable opening 7 may be tightly sealed, for example by inserting a plug of suitable size into the closable opening 7. The treatment device 1 may for example be realized as a moulded part that is manufactured by means of injection moulding. Preferably, the treatment device is made is made of silicone, but it may as well be made of any other plastic material, of gel, etc.

In figure 1b, the treatment device 1 is shown from below. It can be seen that the treatment device 1 comprises the receptable 2 and the closable opening 7 for introducing the respective chemical compound into the compartment 4.

The treatment device 1 is adapted for locally cooling a person's skin. For this purpose, a liquid or a gel is inserted into the compartment 4, and then, the closable opening 7 is tightly sealed, for example with a plug. Filling the compartment 4 with a suitable chemical compound may already be done at the manufacturer's site. Next, the entire treatment device 1 is frozen. As a result of this freezing process, the volume of liquid or gel contained in the compartment 4 is frozen as well. For example, the volume of liquid may be converted into a volume of ice. As soon as the respective chemical compound contained in the compartment 4 is frozen, the treatment device 1 is ready for use. The receptable 2 is put onto a finger 3 of a person, for example of a doctor or medical staff member. During a treatment, when local cooling of a patient's skin is required, the doctor or medical staff member may press the upper part of the treatment device 1 against the patient's skin, in order to effect a local cooling. From figure 1a, it can be seen that the upper covering layer 5 is much thinner at the top than at the side portions of the treatment device 1. Thus, it is made sure that the upper surface of the treatment device 1 is effectively cooled by the volume of ice or frozen hydrogel contained in the compartment 4.

The treatment device 1 may for example be used for locally cooling a patient's skin before an injection is given to the patient. Thus, the patient's pain sensitivity is reduced, and even a certain anaesthetic effect may be accomplished. Alternatively or additionally, the treatment

device 1 may be used for locally cooling a patient's skin after an injection has been given to the patient. The local cooling provides for a pain relief, and furthermore, the local cooling reduces or stops the bleeding. For example, in case local cooling is provided after a botox injection has been given to a patient, the treatment device 1 may be useful for reducing or avoiding bruises.

The treatment device 1 may be manufactured under sterile conditions and may for example be delivered in a blister package. Also the freezing process may be effected under sterile conditions. When the upper covering layer 5 is pressed onto the patient's skin, it is made sure that the upper surface of the treatment device 1 is sterile. Preferably, a disinfecting strip 8 may be fixed onto the upper surface of the treatment device 1, the disinfecting strip 8 containing a disinfecting agent. Further preferably, the disinfecting film 8 may be covered by a protecting film that is pulled off before use.

Figure 2 shows another example of a treatment device 9 configured for locally cooling a patient's skin. The treatment device 9 also comprises a receptable 2 configured for being put onto a person's finger. In the upper portion of the treatment device 9, two separate compartments 10, 11 are located. The first compartment 10 is configured for encompassing a first volume of a first chemical compound, with the volume of the first chemical compound being in direct contact with the upper covering layer 5. Below the first compartment 10, a second compartment 11 is located, the second compartment 11 being configured for encompassing a volume of a second chemical compound. A partition wall 12 separates the first compartment 10 from the second compartment 11. Furthermore, a wall 6 is disposed between the second compartment 11 and the receptable 2. The first chemical compound and the second chemical compound are chosen such that when the two compounds mix, an endothermic reaction takes place, whereby a cooling effect is provided. For example, the mixing of water and urea gives rise to a significant cooling effect. The partition wall 12 is configured for being disrupted or destroyed as soon as a pressure of a certain magnitude is applied to the second compartment 11. The partition wall 12 may for example comprise a predetermined breaking point. As soon as the partition wall 12 is disrupted, the first chemical compound contained in the first compartment 10 mixes with the second chemical compound contained in the second compartment 11, and the mixture is cooled significantly. As the upper covering layer 5 is quite thin at the top of the treatment device 9, the cold produced in the upper portion of the treatment device 9 is conducted to the upper surface of treatment device 9.

For initiating the cooling effect, the user has to press his or her finger against the wall 6, thus exerting a pressure onto the second compartment 11. If the pressure is sufficiently strong, the partition wall 12 will burst, and the first chemical compound will mix with the second chemical compound, whereby a cooling effect is produced. For example, when mixing water and urea, the cooling effect may be so strong that the aqueous solution is frozen.

In order to simplify the bursting of the partition wall 12, the treatment device 9 may optionally comprise a spike 13, which is drawn by dotted lines in figure 2. The spike 13 may for example be located at the upper covering layer 5 or at the wall 6. By pushing the spike 13 against the partition wall 12, the partition wall 12 can be destroyed.

In figure 3, another example of a treatment device 14 is depicted, with the treatment device 14 comprising a receptable 2 for a person's finger and two compartments disposed above the receptable 2. The first compartment 15 is configured for encompassing a volume of a first chemical compound and the second compartment 16 is configured for encompassing a volume of a second chemical compound. In figure 3, the first compartment 15 and the second compartment 16 are disposed such that both the volume of the first chemical compound and the volume of the second chemical compound are in immediate contact with the upper covering layer 5. As in the previous example, the partition wall 17 separating the first compartment 15 and the second compartment 16 can be easily disrupted or destroyed by applying a sufficient pressure to at least one of the two compartments. Between the two compartments 15, 16 and the receptable 2, a wall 6 is located. The wall 6 comprises a first closable opening 18 for introducing the first chemical compound into the first compartment 15 and a second closable opening 19 for introducing the second chemical compound into the second compartment 16. Thus, both compartments 15, 16 can be filled from the receptable 2.

Figure 4 shows yet another example of a treatment device 20, with the treatment device 20 comprising a first compartment 21 located above the receptable 2. The first compartment 21 contains a volume of a first chemical compound, with the volume of the first chemical compound being in immediate contact with the upper covering layer 5. The first compartment 21 further contains a second compartment 22, with the second compartment 22 containing a volume of a second chemical compound, the second compartment 22 being encompassed by a flexible envelope 23. The second compartment 22 is configured for floating within the

first compartment 21. The wall 6 separates the first compartment 21 from the receptable 2. When the user presses against the wall 6 with a sufficient strength, the flexible envelope 23 will burst, and the second chemical compound contained therein will mix with the first chemical compound, whereby a cooling effect is produced.

Figure 5a shows a treatment device 24 for locally cooling a person's skin. The treatment device 24 comprises a receptable 2 located at the lower portion of the treatment device 24. With the receptable 2, the treatment device 24 can be put onto a finger, preferably onto an index finger. The treatment device further comprises a support 25 located at the upper surface of the treatment device 24, wherein the support 25 comprises a cavity 26. The support 25 with the cavity 26 is adapted for holding a volume of liquid disposed thereon. The liquid may for example be water or an aqueous solution. In addition, the aqueous solution may for example contain further active substances.

In figure 5b, the treatment device 24 is shown together with a volume of liquid 27 that has been disposed on the support 25. After the volume of liquid 27 has been disposed on the support 25 of the treatment device 24, the treatment device 24 together with the volume of liquid 27 is frozen. For this purpose, the treatment device 24 and the volume of liquid 27 may for example be put into a freezer for a certain period of time. Thus, the volume of liquid 27 is frozen and transformed into a corresponding volume of ice.

The shape of the support 25 is chosen such that the volume of ice is held in place by the support 25. For example, as shown in figure 5a and figure 5b, the support 25 may comprise the cavity 26 with a narrow section 28, with the cavity's diameter at the narrow section 28 being smaller than the cavity's diameter immediately below the narrow section 28. The volume of ice is fixed and held in place by the narrow section 28, whereby a detachment of the volume of ice from the upper part of the treatment device 24 is avoided. The cavity 26 is shaped such that a lower reservoir 29 of liquid and an upper reservoir 30 of liquid are formed, with the lower reservoir 29 and the upper reservoir 30 being fluidically connected, and with the narrow section 28 separating the lower reservoir 29 from the upper reservoir 30.

After the volume of liquid 27 has been frozen, the treatment device 24 is ready for being used. As shown in figure 5c, the receptable 2 of the treatment device 24 is put onto a finger 3, preferably onto an index finger. Now, the treatment device 24 together with the volume of ice 31 disposed on the support 25 can be pressed against an area of the person's skin that

is to be cooled. By bringing the volume of ice 31 into contact with the person's skin, a local cooling of the person's skin is effected. In the example shown in figure 5c, the upper surface of the volume of ice 31 is exposed to the outside. Thus, a direct contact between the ice and the person's skin is accomplished.

The treatment device 24 can for example be used to provide a local cooling of the person's skin before or after an injection is given. For example, a doctor or a medical staff member may put the treatment device 24 onto his or her index finger and press it onto the respective area of the person's skin where the skin will be punctured by the injection needle. Additionally or alternatively, the treatment device 24 may be pressed against the puncture site after an injection has been given, in order to relief the pain. For example, after a Botox injection has been given to a person, the respective puncture site may be cooled with the treatment device.

In addition to locally cooling the person's skin, the treatment device may also serve for other purposes. For example, the liquid may additionally contain one or more active substances, like for example a disinfectant, an active substance for haemostasis, an astringent, an anaesthetic, a cleaning agent, etc. These active ingredients are added to the aqueous solution. Then, the volume of liquid is frozen, and a volume of ice is obtained. When the volume of ice is brought in contact with the person's skin, the ice starts melting, and the active substances are slowly released. Thus, a certain dosage of the respective active substance is supplied to the person's skin. For example, the liquid may contain a disinfectant. In this case, when the liquid device is pressed against the person's skin, the skin is disinfected. Furthermore, the liquid may contain a cleaning agent for cleaning the person's skin. As a further example, the liquid may contain a haemostatic agent or an astringent. When the treatment device is pressed against a puncture site, bleeding is reduced or even stopped. As a further example, the liquid may contain an anaesthetic for locally anaesthetising a certain area of the person's skin, for example before puncturing the skin with an injection needle.

The treatment device 24 may for example be manufactured as a moulded part, preferably as an injection-moulded part. Preferably, the treatment device is a disposable item made of plastic. For disposable items, the use of plastic is preferred because it is cheap. Furthermore, items made of plastic can be aseptically packaged and distributed. Alternatively, the treatment device may be made of silicone rubber or silica gel.

In figure 6, another example of a treatment device 32 is shown. The treatment device 32 of figure 6 also comprises a receptable 2 that can be put onto a user's finger 3. The treatment device 32 further comprises a liquid-absorbing medium 33 that is fixed to the upper surface of the treatment device 32. The liquid-absorbing medium 33 is soaked with liquid, and then, it is frozen together with the liquid contained therein. Thus, a volume of ice is obtained that is fixed to the upper surface of the treatment device 32. The liquid-absorbing medium 33 may for example be a sponge, a mesh, a tissue, a web or any other material that is capable of absorbing and holding a volume of liquid.

Figure 7 shows yet another example of a treatment device 34. The treatment device 34 comprises a receptable 2 configured for being put onto a user's finger, and a support 25 located at the upper surface of the treatment device 34, the support 25 being adapted for holding a volume of liquid 27 disposed thereon. The support 25 may for example be shaped such that a lower reservoir 29 and an upper reservoir 30 are formed, the lower reservoir 29 and the upper reservoir 30 being separated by a narrow section 28. In the example shown in Fig. 7, a cooling unit 35 is located immediately below the support 25. The cooling unit 35 comprises a first compartment 36 containing a first chemical compound and a second compartment 37 containing a second chemical compound. The first compartment 36 and the second compartment 37 are separated from each other by a first flexible membrane 38. Furthermore, both the first compartment 36 and the second compartment 37 are separated from the receptable 2 by a second flexible membrane 39.

When the user presses the index finger against the second flexible membrane 39, the second chemical compound is pressed against the first flexible membrane 38, which bulges in the outwards direction. As soon as a certain pressure is applied to the first flexible membrane 38, the first flexible membrane 38 will burst, and the first chemical compound will mix with the second chemical compound. For example, in case the first chemical compound is a liquid, the liquid may pour from the first compartment 36 into the second compartment 37 as soon as the first flexible membrane 38 bursts. The first chemical compound and the second chemical compound are chosen such that when they mix, an endothermic reaction takes place, with the total enthalpy of the products being larger than the total enthalpy of the reactants. As a result, the mixture is cooled significantly. For certain reactants like for example water and urea, even a freezing effect is observed. Hence, by mixing the first chemical compound in the first compartment 36 and the second chemical compound in the

second compartment 37, the volume of liquid 27 disposed on the support 25 may be turned into a volume of ice 31.

In the example that has been discussed so far, the volume of liquid 27 has been disposed on the support 25 before the first flexible membrane 38 has been destroyed. However, it is also possible to initiate the freezing effect first and then supply a volume of liquid 27 to the support 25 in a subsequent step. As a result, the volume of liquid 27 will also be turned into a volume of ice 31.

Figure 8 shows another example of a treatment device 40 comprising a receptable 2 that can be put onto a user's finger. The receptable 2 further comprises a support 25 configured for holding a volume of liquid, the support 25 comprising a cavity 26. In the example shown in figure 8, a small flexible membrane 41 is disposed at the bottom of the cavity 26. The small flexible membrane 41 separates the interior of the cavity 26 from a bladder 42 located below the cavity 26, said bladder 42 containing a liquid. The bladder 42 is made of a flexible skin 43 and comprises a spike 44 located at the inside of the flexible skin 43.

When the user presses the index finger against the bladder 42, the spike 44 will be moved in the direction of the small flexible membrane 41 (drawn by dotted lines in Fig. 8). In case a force of sufficient strength is applied, the small flexible membrane 41 will be destroyed, and the liquid contained in the bladder 42 will pour into the cavity 26. Inside the cavity 26, a further chemical compound 45 is disposed, for example a chemical compound in powdered form, like for example urea. As soon as the liquid gets in contact with the further chemical compound 45, an endothermic reaction will take place, and a cooling effect will occur. For example, when mixing water and urea, the cooling effect may be so strong that the volume of water that pours into the cavity will freeze instantaneously. Thus, by compressing the bladder 42, a volume of ice can be generated on the support 25.

In figure 9, another example of a treatment device 46 is shown. As in the previous examples, the treatment device 46 comprises a receptable 2 adapted for being put onto a finger 3. The treatment device 46 further comprises a support 25 for holding a volume of liquid 27. In the example of figure 3, the volume of liquid 27 is covered by a flap cover 47. The flap cover 47 remains on the volume of liquid 27 during the freezing process. Before using the treatment device 46, the flap cover 47 may be detached from the volume of ice 31, as indicated by the arrow 48. In this way, it is made sure that the volume of ice 31 is kept sterile. Alternatively,

the flap cover 47 may remain on the volume of ice 31 when the treatment device 46 is pressed against the person's skin. Thus, a direct contact between the volume of ice 31 and the skin is avoided. This may for example be advantageous in cases where any contact between the melt water and the skin should be avoided.

In figure 10, yet another example of a treatment device 49 is shown. Again, the treatment device 49 comprises a receptable 2 adapted for being put onto a finger 3. A volume of liquid 27 is disposed on the support 25. In the example shown in figure 10, a protection cap 50 is attached to the upper portion of the treatment device 49, the protection cap 50 being configured for protecting the volume of liquid 27 from any contaminants and for maintaining aseptic conditions. During the freezing process, the protection cap 50 remains attached to the upper portion of the treatment device 49. Before the treatment device 49 is pressed against the person's skin, the protection cap 50 may be removed. Alternatively, the protection cap 50 may remain on the volume of ice, in order to prevent any direct contact between the volume of ice (and the melt water) and the person's skin.

The features described in the above description, claims and figures can be relevant to the invention in any combination. Their reference numerals in the claims have merely been introduced to facilitate reading of the claims. They are by no means meant to be limiting.

List of reference numerals

1 treatment device
2 receptable
3 finger
4 compartment
5 upper covering layer
6 wall
7 closable opening
8 disinfecting strip
9 treatment device
10 first compartment
11 second compartment
12 partition wall

13 spike
14 treatment device
15 first compartment
16 second compartment
17 partition wall
18 first closable opening
19 second closable opening
20 treatment device
21 first compartment
22 second compartment
23 flexible envelope
24 treatment device
25 support
26 cavity
27 volume of liquid
28 narrow section
29 lower reservoir of liquid
30 upper reservoir of liquid
31 volume of ice
32 treatment device
33 liquid-absorbing medium
34 treatment device
35 cooling unit
36 first compartment
37 second compartment
38 first flexible membrane
39 second flexible membrane
40 treatment device
41 small flexible membrane
42 bladder
43 flexible skin
44 spike
45 further chemical compound
46 treatment device
47 flap cover

48 arrow

49 treatment device

50 protection cap

Claims

1. A treatment device (1), the treatment device (1) comprising
a receptable (2) located at a lower portion of the treatment device (1), the receptable (2) being configured for being put onto a finger (3),
a compartment (4) configured for encompassing a volume of a chemical compound, with the compartment (4) located in an upper portion of the treatment device (1) above the receptable (2), and
an upper covering layer (5),
characterized in that
the compartment (4) is disposed such that a volume of a chemical compound contained in the compartment (4) is in immediate contact with the upper covering layer (5) of the treatment device (1),
with the compartment (4) not containing any intact or destroyed partition walls or membranes.

2. The treatment device according to claim 1, wherein the upper covering layer (5) partly encompasses the volume of the chemical compound.

3. The treatment device according to claim 1 or claim 2, wherein the upper covering layer (5) is configured for being brought into contact with a person's skin.

4. The treatment device according to any one of claims 1 to 3, wherein the volume of the chemical compound contained in the compartment (4) is a liquid or a suspension or a gel or ice.

5. A treatment device (9, 14), the treatment device (9, 14) comprising
a receptable (2) located at a lower portion of the treatment device (9, 14), the receptable (2) being configured for being put onto a finger (3),
a first compartment (10, 15) configured for encompassing a volume of a first chemical compound and a second compartment (11, 16) configured for encompassing a volume of a second chemical compound, with the first and the second compartment (10, 11, 15, 16) located in an upper portion of the treatment device (9, 14) above the receptable (2), with a first partition wall (12, 17) separating the first compartment (10, 15) from the second compartment (11, 16), and

an upper covering layer (5),
characterized in that
the first compartment (10, 15) is disposed such that a volume of a first chemical compound contained in the first compartment (10, 15) is in immediate contact with the upper covering layer (5) of the treatment device (9, 14),
with the first compartment (10, 15) not containing any intact or destroyed partition walls or membranes apart from the first partition wall.

6. The treatment device according to claim 5, wherein the upper covering layer (5) partly encompasses the volume of the first chemical compound.

7. The treatment device according to claim 5 or claim 6, wherein the second compartment (11, 16) is disposed such that a volume of a second chemical compound contained in the second compartment (11, 16) is in immediate contact with the upper covering layer (5) of the treatment device (9, 14).

8. The treatment device according to any one of claims 5 to 7, wherein the upper covering layer (5) is configured for being brought into contact with a person's skin.

9. The treatment device according to any one of claims 5 to 8, wherein the partition wall (12, 17) separating the first and the second compartment (10, 11, 15, 16) is configured for being destroyed when a predefined pressure is applied to at least one of the compartments (10, 11, 15, 16).

10. A treatment device (20), the treatment device (20) comprising
a receptable (2) located at a lower portion of the treatment device (20), the receptable (2) being configured for being put onto a finger (3),
a first compartment (21) configured for encompassing a volume of a first chemical compound, with the first compartment (21) located in an upper portion of the treatment device (20) above the receptable (2),
characterized in that
the first compartment (21) contains a second compartment (22) that is located in the interior of the first compartment (21), the second compartment (22) being configured for encompassing a volume of a second chemical compound and for floating in the first compartment (21).

11. The treatment device according to claim 10, wherein the second compartment's walls (23) are configured for being destroyed when a predefined pressure is applied to the first compartment (21).

12. A treatment device (24, 34, 40, 46, 49), the treatment device (24, 34, 40, 46, 49) comprising
a receptable (2) located at a lower portion of the treatment device (24, 34, 40, 46, 49), the receptable (2) being configured for being put onto a finger (3),
characterized in that
the treatment device (24, 34, 40, 46, 49) comprises a support (25) for a volume of liquid (27) or ice (31), the support (25) being located at an upper portion of the treatment device (24, 34, 40, 46, 49) and configured for holding a volume of liquid (27) or ice (31) disposed on the support (25), and
the support (25) comprises a cavity configured for accommodating at least a part of the volume of liquid (27) or ice (31) disposed on the support (25), wherein the cavity has a narrow section (28), with the cavity widening up below the narrow section (28).

13. Treatment device (24, 34, 40, 46, 49) according to claim 12, characterized in that the liquid is water or an aqueous solution or a suspension.

14. Treatment device (24, 34, 40, 46, 49) according to any one of claims 12 or claim 13, characterized in that the liquid further comprises at least one of the following: a disinfectant, an antibiotic, an antimicrobial agent, an antifungal agent, an antibacterial agent, an antiviral agent, an anti-inflammatory agent, an active substance for haemostasis, an astringent, an anaesthetic, a cleaning agent.

15. Treatment device (24, 34, 40, 46, 49) according to any one of claims 12 to 14, characterized in that the treatment device (24, 34, 40, 46, 49) comprises a volume of ice (31) arranged on the support (25), wherein the volume of ice (31) is adapted for melting and releasing an active substance when being brought in contact with the person's skin.

16. Treatment device (24, 34, 40, 46, 49) according to any one of claims 12 to 15, characterized in that the treatment device (24, 34, 40, 46, 49) is configured for at least one of the following:

disinfecting the person's skin;
supplying at least one of an antibiotic, an antimicrobial agent, an antifungal agent, an antibacterial agent, an antiviral agent to the person's skin;
supplying an anti-inflammatory agent to the person's skin;
supplying a cleaning agent to the person's skin;
supplying a haemostatic agent or an astringent to the person's skin;
supplying an anaesthetic to the person's skin.

17. Treatment device (24, 34, 40, 46, 49) according to any one of claims 12 to 16, characterized in that the treatment device (24, 34, 40, 46, 49) comprises a volume of ice (31) arranged on the support (25), wherein the top surface of the volume of ice (31) is adapted for being brought in direct contact with the person's skin.

18. Treatment device (24, 34, 40, 46, 49) according to any one of claims 12 to 17, further comprising a liquid-absorbing medium (33) disposed on the upper surface (4) of the treatment device (24, 34, 40, 46, 49).

19. Treatment device (24, 34, 40, 46, 49) according to any one of claims 12 to 18, characterized in that the cavity's diameter at the narrow section is smaller than the cavity's diameter immediately below the narrow section.

20. Treatment device (24, 34, 40, 46, 49) according to claim 19, characterized in that the treatment device (24, 34, 40, 46, 49) comprises a volume of ice (31), the volume of ice (31) being fixed in the cavity by the narrow section (28).

21. A treatment device (24, 34, 40, 46, 49), the treatment device (24, 34, 40, 46, 49) comprising
a receptable (2) located at a lower portion of the treatment device (24, 34, 40, 46, 49), the receptable (2) being configured for being put onto a finger (3),
characterized in that
the treatment device (24, 34, 40, 46, 49) comprises a support (25) for a volume of liquid (27) or ice (31), the support (25) being located at an upper portion of the treatment device (24, 34, 40, 46, 49) and configured for holding a volume of liquid (27) or ice (31) disposed on the support (25), and
a volume of ice (31) arranged on the support (25).

22. A method for preparing a treatment device (1), the treatment device (1) comprising:
a receptable (2) located at a lower portion of the treatment device (1), the receptable (2) being configured for being put onto a finger (3), and
a compartment (4) encompassing a volume of a chemical compound, with the compartment (4) located in an upper portion of the treatment device (1) above the receptable (2),
the method comprising:
freezing the treatment device (1) together with the volume of the chemical compound.

23. The method of claim 22, wherein the treatment device (1) comprises an upper covering layer (5), wherein the compartment (4) is disposed such that a volume of a chemical compound contained in the compartment (4) is in immediate contact with the upper covering layer (5) of the treatment device (1), with the compartment (4) not containing any intact or destroyed partition walls or membranes.

24. A method for preparing a treatment device (24, 34, 40, 46, 49), the treatment device (24, 34, 40, 46, 49) comprising:
a receptable (2) located at a lower portion of the treatment device (24, 34, 40, 46, 49), the receptable (2) being configured for being put onto a finger (3), and
a support (25) for a volume of liquid (27) or ice (31), the support (25) being located at an upper portion of the treatment device (24, 34, 40, 46, 49) and configured for holding a volume of liquid (27) or ice (31) disposed on the support (25),
the method comprising:
supplying a volume of liquid (27) to the support (25) at the upper portion of the treatment device (24, 34, 40, 46, 49),
freezing the treatment device (24, 34, 40, 46, 49), wherein the volume of liquid (27) arranged on the support (25) is transformed into a volume of ice (31).

25. A method for treating a person's skin with a treatment device (24, 34, 40, 46, 49), the treatment device (24, 34, 40, 46, 49) being a thimble-shaped treatment device (24, 34, 40, 46, 49) comprising a receptable (2) located at a lower portion of the treatment device (24, 34, 40, 46, 49), the receptable (2) being configured for being put onto a finger (3), the method comprising:
freezing the treatment device (24, 34, 40, 46, 49);
treating the person's skin with the treatment device (24, 34, 40, 46, 49).

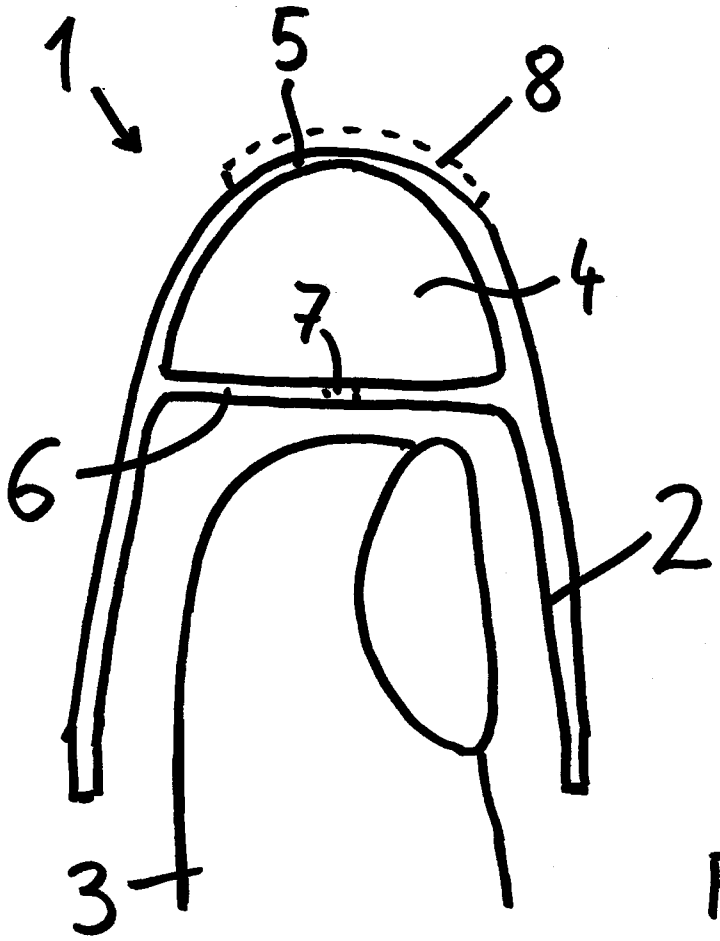

Fig. 1a

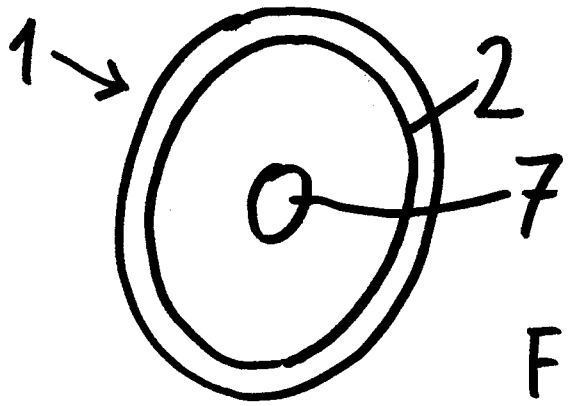

Fig. 1b

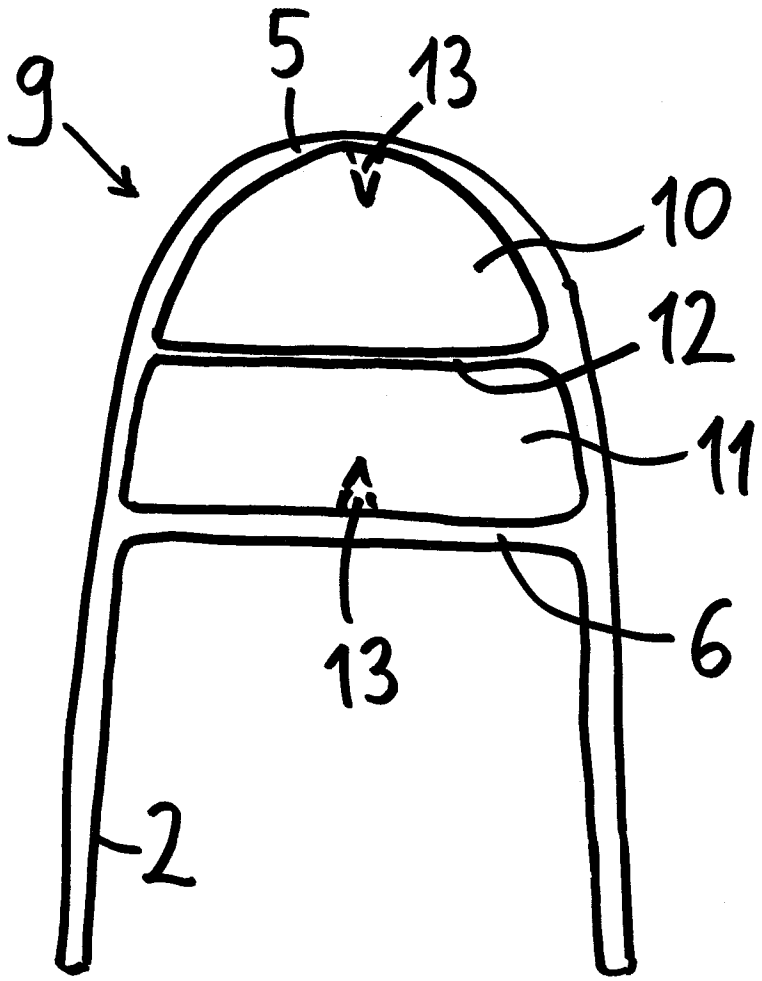

Fig. 2

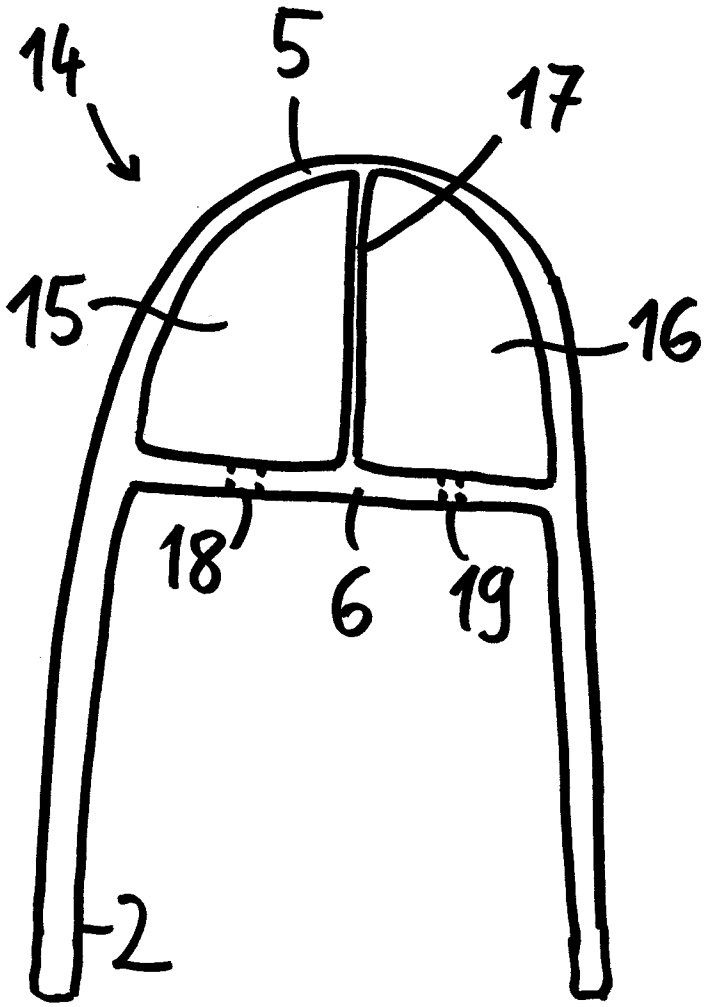

Fig. 3

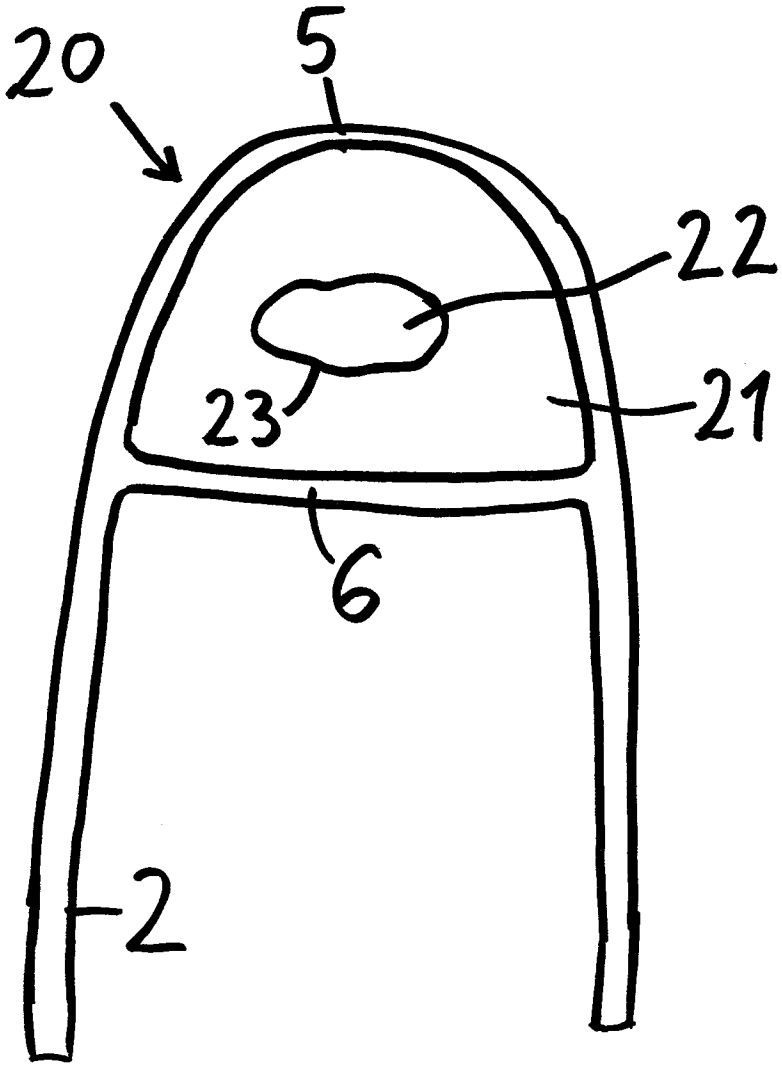

Fig.4

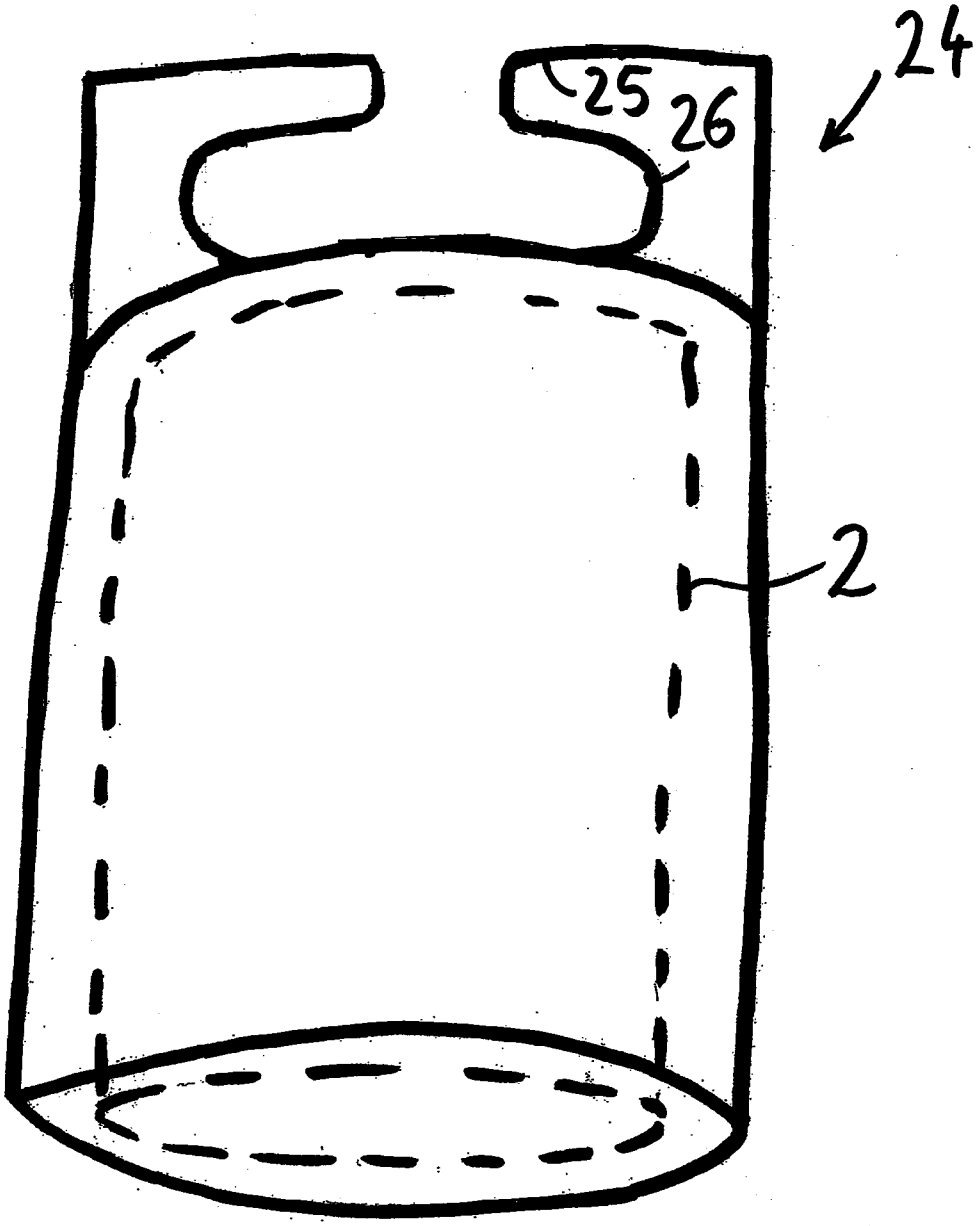

Fig. 5a

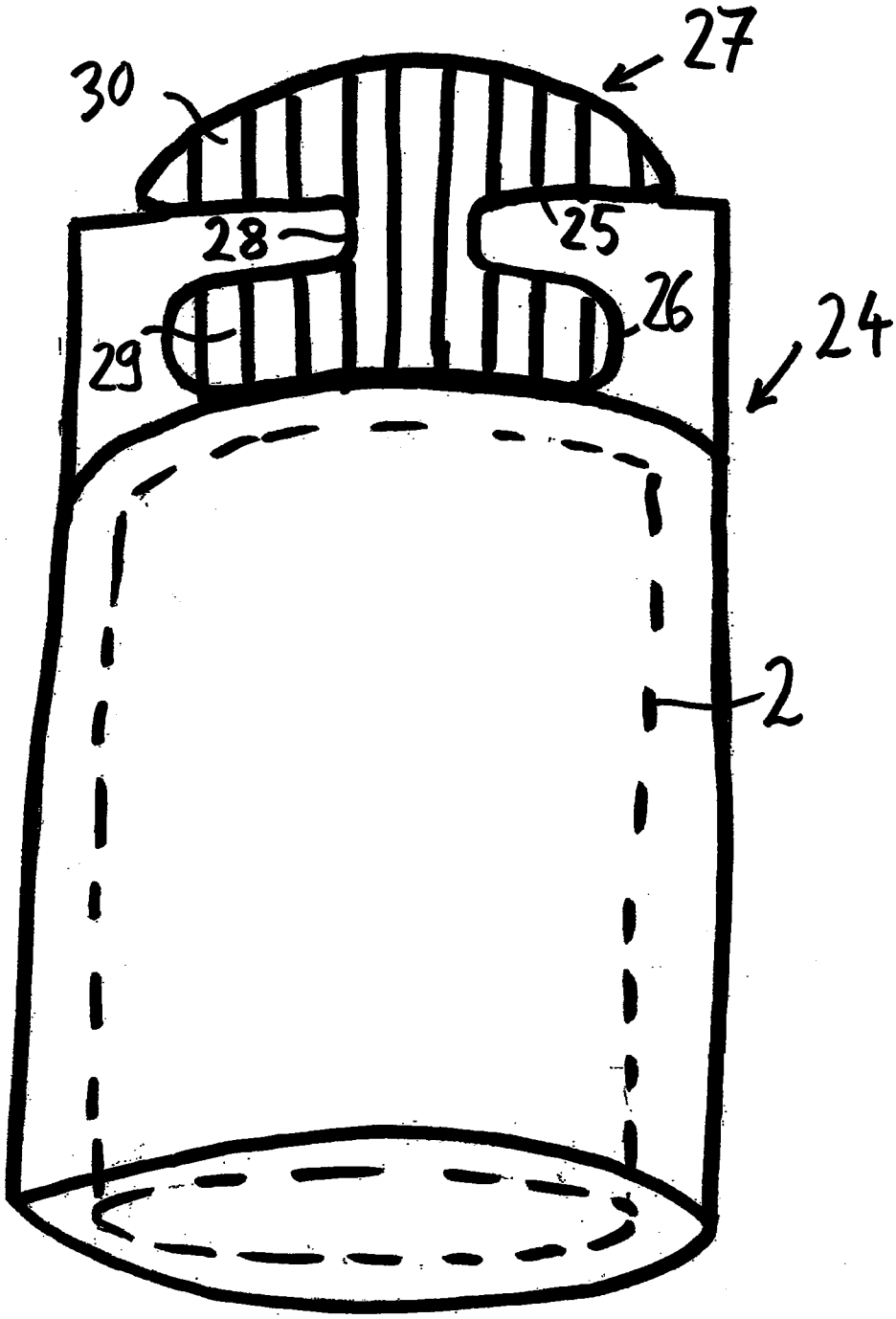

Fig. 5b

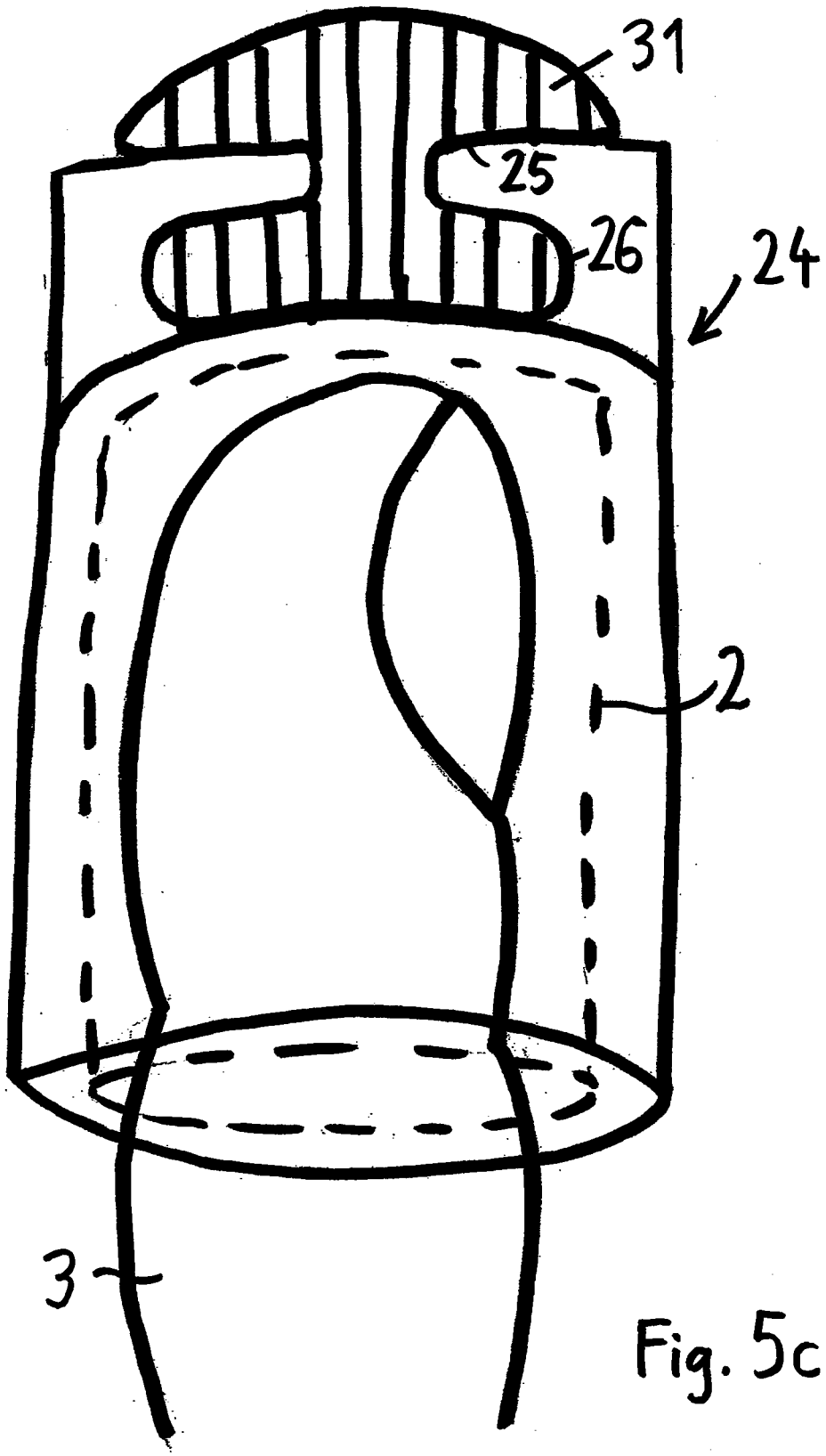

Fig. 5c

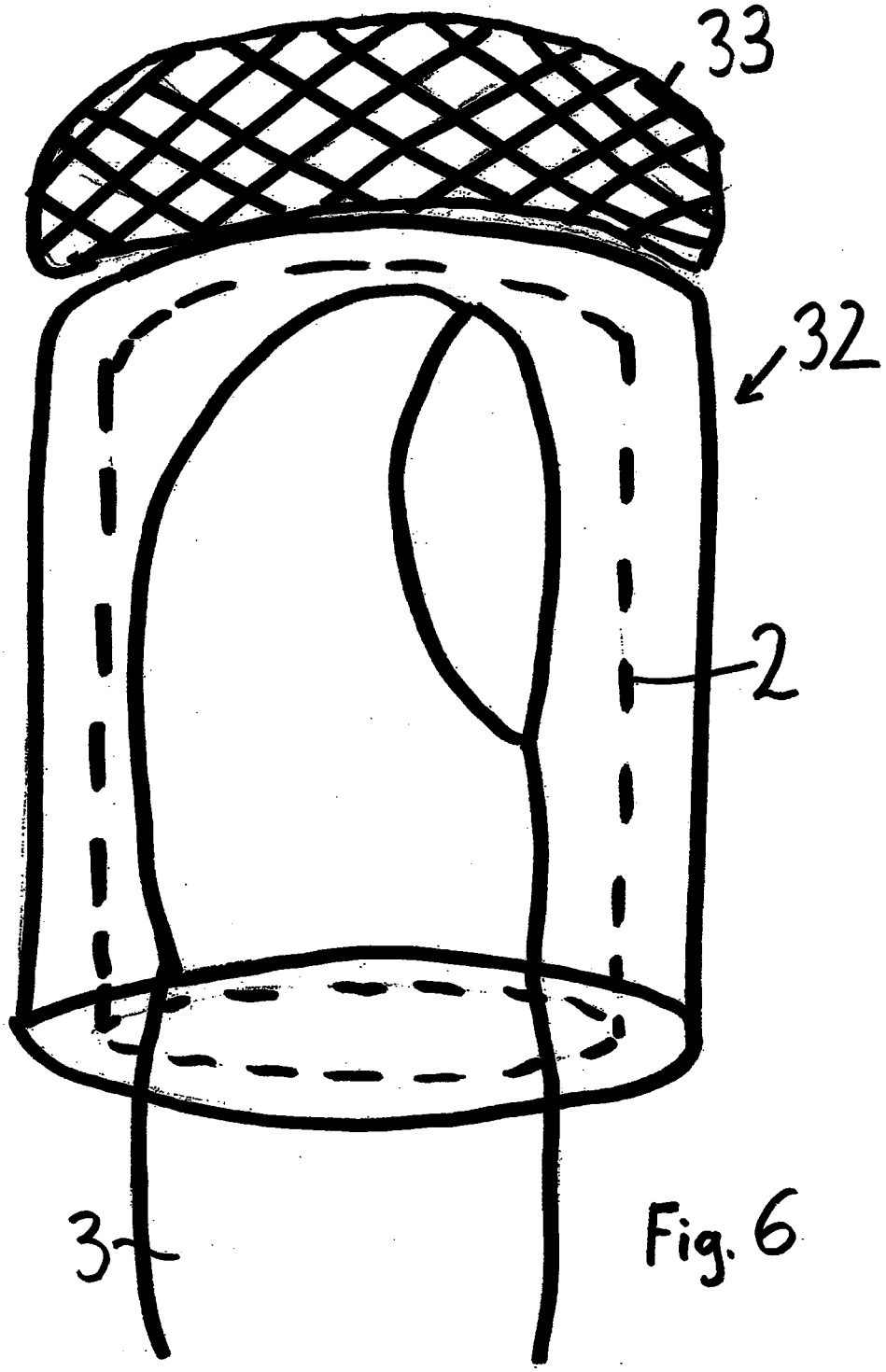

Fig. 6

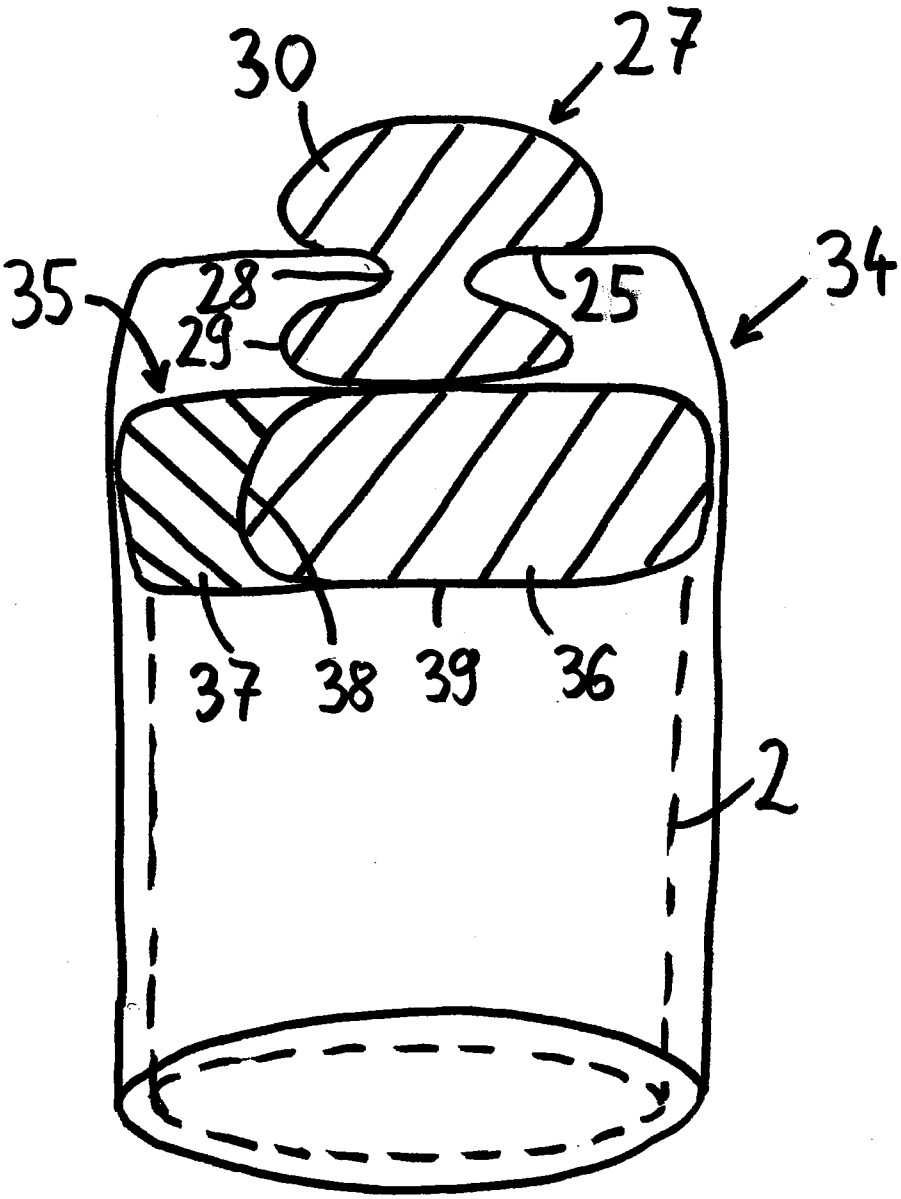

Fig. 7

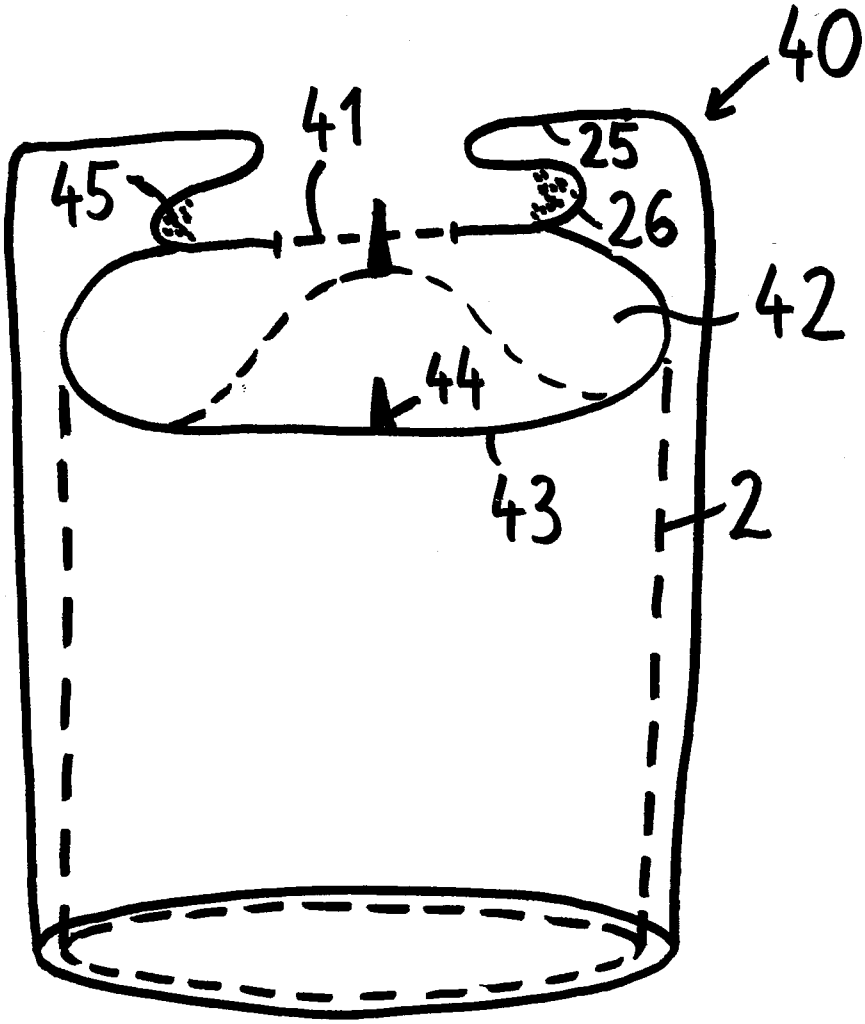

Fig. 8

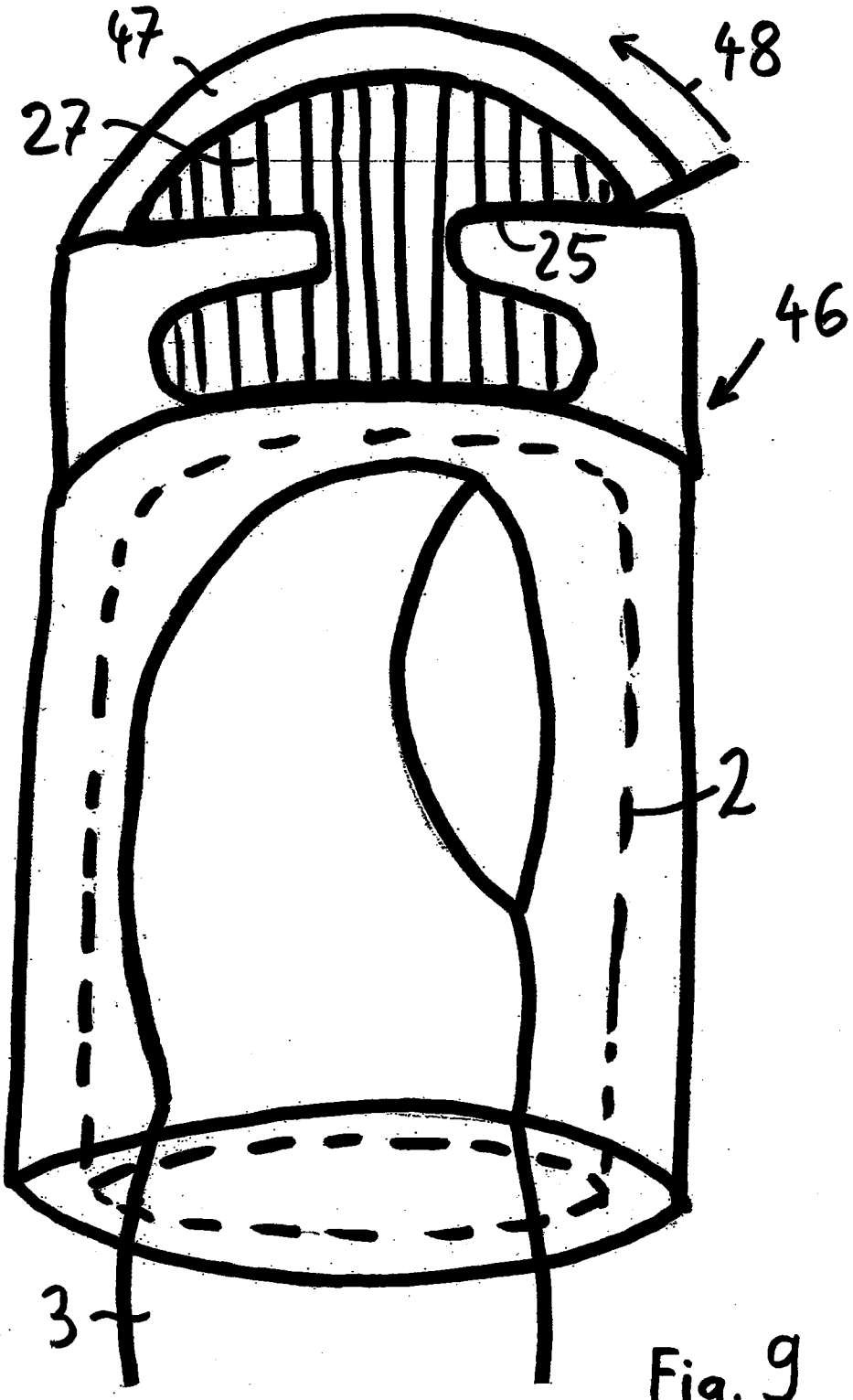

Fig. 9

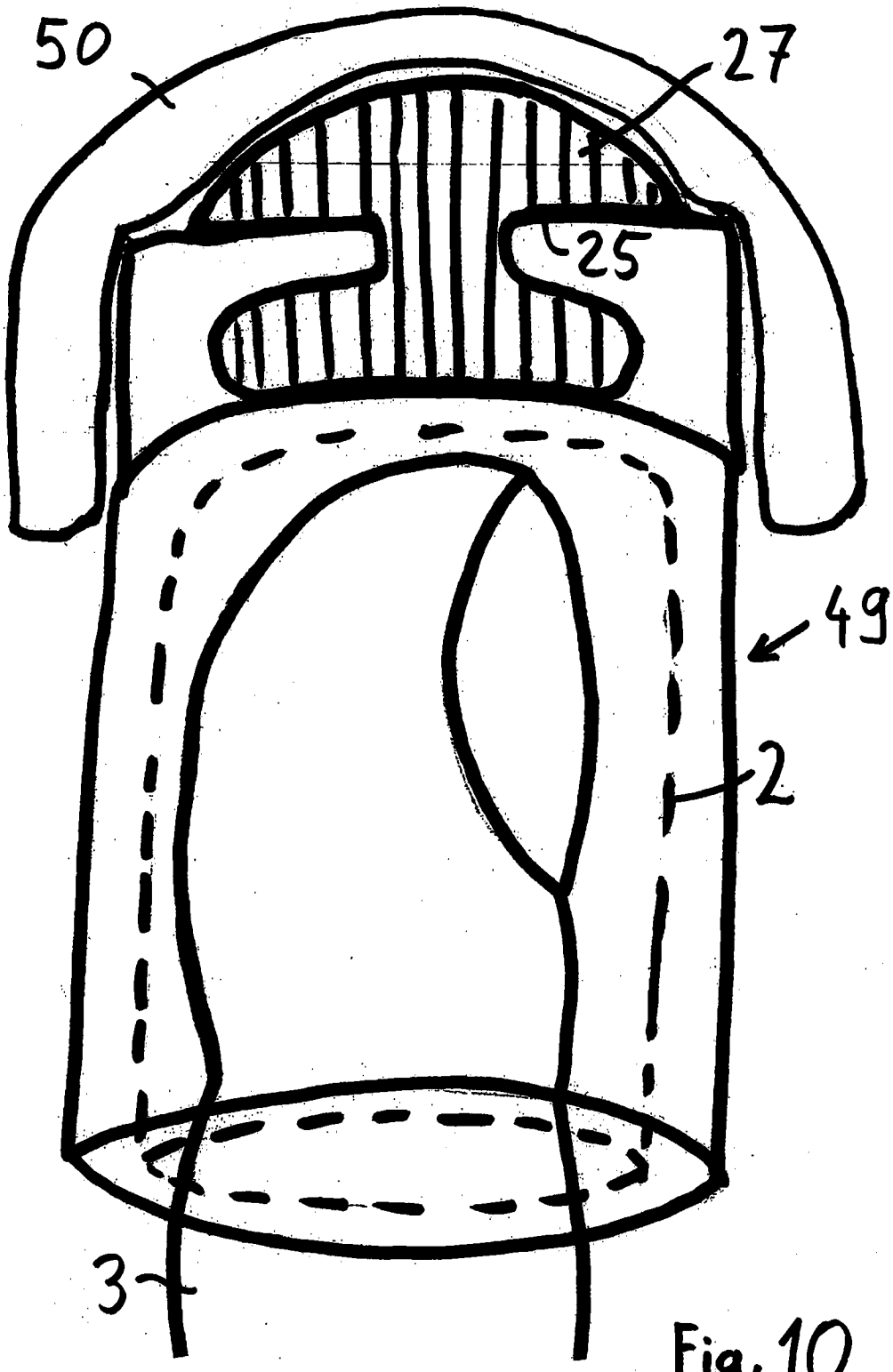

Fig. 10

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2016/053505

A. CLASSIFICATION OF SUBJECT MATTER
INV. A61F7/10 A61F7/00 A61F7/02
ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
A61F D05B A41D A61H

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

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

EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2 502 182 A (STRAUCH ELLA M) 28 March 1950 (1950-03-28) figures 1-4	1-4
X	WO 2005/063163 A2 (KNEADS MUST LTD [GB]; UNA TUCKER [GB]) 14 July 2005 (2005-07-14) claims 1-6; figure 1	1-4
X	US 5 879 315 A (MOSLEY KEITH A [US]) 9 March 1999 (1999-03-09) figure 1	1-4,22, 23
X	US 2009/264971 A1 (WICKSTEAD JAMES C [US]) 22 October 2009 (2009-10-22) claims 14,21; figures 9a,9b paragraph [0065] paragraph [0058]	1-3

☐ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
20 December 2016	02/01/2017

Name and mailing address of the ISA/	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Cornelissen, P

INTERNATIONAL SEARCH REPORT

International application No.
PCT/EP2016/053505

Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. [X] Claims Nos.: 25
because they relate to subject matter not required to be searched by this Authority, namely:

Rule 39.1(iv) PCT - Method for treatment of the human or animal body by therapy

2. [ ] Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

3. [ ] Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. [ ] As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.

2. [ ] As all searchable claims could be searched without effort justifying an additional fees, this Authority did not invite payment of additional fees.

3. [ ] As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:

4. [X] No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

1-4, 22, 23

Remark on Protest

[ ] The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.

[ ] The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.

[ ] No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-4, 22, 23

   A treatment device with a finger receptacle and a single compartment

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2. claims: 5-11

   A treatment device with a finger receptacle and 2 compartment seperarted by a partitiion wall

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3. claims: 12-21, 24

   A treatment device with a finger receptacle and a support for a volume of ice

   ---

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/EP2016/053505

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2502182 A	28-03-1950	NONE	
WO 2005063163 A2	14-07-2005	AU 2004308114 A1	14-07-2005
		CA 2551608 A1	14-07-2005
		EP 1708666 A2	11-10-2006
		JP 2007537774 A	27-12-2007
		US 2007191745 A1	16-08-2007
		WO 2005063163 A2	14-07-2005
US 5879315 A	09-03-1999	NONE	
US 2009264971 A1	22-10-2009	CA 2662940 A1	16-10-2009
		US 2009264971 A1	22-10-2009