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(54) **Title**: CONTAINER FOR A LIQUID MATERIAL TO BE SUPPLIED TO THE HUMAN OR ANIMAL BODY WHICH IS ADAPTED TO HEAT THE MATERIAL, DEVICE FOR POWERING AND METHOD FOR HEATING SUCH A CONTAINER

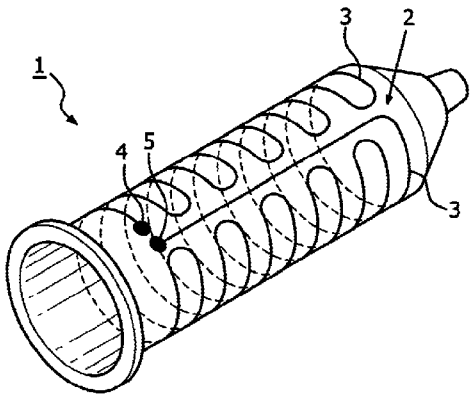

FIG. 1

(57) **Abstract**: The invention relates to a container for a liquid material to be supplied to a human or animal body, which container is provided with an outlet opening for the liquid material, and wherein the container is provided with at least one electrical conductor which extends over at least a part of the surface of the container and which is electrically insulated relative to the container and which can be connected to an external source of electrical energy for the purpose of causing flow through the electrical conductor of a current which heats the liquid material present in the container. As a result of these measures use need no longer be made of heat sources outside the container, so that the equipment required is greatly simplified. The invention also relates to such a method and a device for heating liquid mass held by such a container.

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CONTAINER FOR A LIQUID MATERIAL TO BE SUPPLIED TO THE HUMAN OR ANIMAL BODY WHICH IS ADAPTED TO HEAT THE MATERIAL, DEVICE FOR POWERING AND METHOD FOR HEATING SUCH A CONTAINER

The invention relates to a container for a liquid and/or viscous material to be supplied to a human or animal body, which container is provided with an outlet opening for the liquid and/or viscous material.

Such a container is known as a syringe, a capsule, compule, unidose, container or cartridge for a filler material for teeth and molars or as an infusion bag with a liquid to be introduced into the bloodstream.

In many cases it is attractive to heat the liquid materials present in such containers before or during their supply to the body. The pain of an injection can thus be reduced when the temperature of the injected liquid is equal to body temperature, and the effectiveness of cleaning liquids applied in dentistry, such as are applied in root canal treatments, increases when the temperature of such a liquid is higher than the ambient temperature, usually of 20°C, while such a cleaning treatment is perceived as less painful when the temperature of the liquid is close to body temperature. During administering of composite materials such as are used in dentistry for filling cavities in teeth and molars it is also attractive to heat the materials so that they become more fluid and can thus be mixed and moved into the cavity more easily. Such composite materials usually also adhere better to the walls of the cavity so that a more durable restoration is achieved. A similar situation occurs with infusion liquids, administering of which is considered less unpleasant when the temperature thereof corresponds to body temperature, and the effectiveness of these liquids likewise increases greatly at increased temperature.

The invention has for its object to provide such a container which makes it possible in simple manner to heat a liquid and/or viscous material present therein.

This object is achieved in that the container is provided with at least one electrical conductor which is thermally coupled to the liquid material present in the container and which can be connected to an external source of electrical energy for the purpose of

causing flow through the electrical conductor of a current which heats liquid material present in the container. External is understood to mean outside the container; this means that the external source can be formed by a battery received in an apparatus in which the container is placed, such as a dispensing gun.

As a result of these measures use need no longer be made of heat sources outside the container, so that the equipment required is greatly simplified. The heating further takes place in a more effective manner because the heating element is placed closer to the liquid.

The invention also relates to a method for heating a liquid mass received in a container, wherein the liquid mass is heated by causing flow of a current through an electrical conductor which forms part of the container and which is thermally coupled to the material present in the container.

According to a first embodiment, the container has a rigid, substantially cylindrical form and is provided with a piston for urging the liquid material through the outlet opening. This embodiment relates in the first instance to a syringe, not only such as is used for injecting a liquid into the human or animal body, but also for supplying a flushing liquid to a cavity during dental treatments, such as a root canal treatment in which sodium hypochlorite is used to clean the cavity of the root canal. This embodiment also relates to a container, cartridge or ampule for composite for dental applications. The liquid mass is formed here by the composite. It is also pointed out that in this situation the external source is usually formed by a battery received in the dispensing gun in which the cartridge is placed.

According to another preferred embodiment, the container is a plastically deformable cartridge for the purpose of urging the liquid material through the outlet opening by plastic deformation of the cartridge, or the container is adapted to carry the liquid material through the outlet opening as a result of gravitational force, wherein the at least one electrical conductor extends on the outside of the container. This conductor extending on the outside can be, though need not be, covered with a layer of electrically insulating material. This relates particularly, though not exclusively, to an infusion bag. Such a bag is generally preheated in an oven before it is connected to a patient. The

optimum operating temperature is hereby obtained. The device also provides a simple solution for such containers.

Although other forms of connection are not precluded, it is recommended that the electrical conductor comprises two connecting points for galvanic contact with the source of electrical energy. This is after all the simplest form of connection. It is otherwise possible to transfer the electrical energy to conductors arranged on the container by means of induction in the manner of an electric toothbrush; here a changing magnetic field is generated which induces voltage in the conductors arranged on the container, this resulting in current flowing in the conductors. The conductors must however then form a closed circuit.

Another option in principle comprises the measure that the at least one conductor is arranged on a carrier placed in the container and manufactured from electrically insulating material. This greatly simplifies manufacture; the carrier can easily be provided with one or more conductors, for instance by forming the carrier from a piece of plastic provided with a metal, for instance copper, layer and etching away this layer such that a suitable conductor pattern remains, optionally of 'medical grade' material, i.e. material which can be placed without problem into contact with mucous membranes of the body.

The carrier is preferably hollow and the at least one conductor is arranged on the outside of the carrier. The interior of the carrier, which more preferably takes a cylindrical form, can hereby function as a cylinder through which a piston can be moved for the purpose of driving out the content of the piston.

Even more interesting is when the carrier is substantially cylindrical on its inner side and the outer side of the carrier is provided with a recess which extends all around and in which the at least one conductor is arranged. In the interior of the container the conductor can hereby be placed only in contact with the carrier but not in contact with the container, so that the heat transfer takes place for the major part only to the carrier.

In order to facilitate the fixation of the carrier in the container it is recommended that the non-recessed part of the carrier fits into the container.

When the electrical conductor is placed on a rigid carrier, such as on the container itself or on a carrier placed in the container, it is attractive that the at least one electrical conductor extends helically over at least part of the container. Other configurations of conductors, such as zigzag, are otherwise not precluded. In a helical configuration of the conductor a great distance will generally result between the two contact points. It is however structurally more attractive when the contact points are located close together so that they can be placed on the same carrier so as to enable simultaneous closing of the contacts. To make this possible in a helical configuration of the conductor it is recommended that the at least one electrical conductor is wound in bifilar manner round at least part of the container.

In order to make the production of the containers as easy as possible it is recommended that the at least one electrical conductor extends on the outer side of the container, since it can then be arranged on the container after production of the container.

In order to prevent short-circuit of the conductors, which sometimes lie close together, due to liquids, it is recommended that an electrically insulating layer is arranged on the outer side of the conductor. This embodiment also provides the option of applying non–biocompatible materials for the conductors.

According to a simple embodiment, the conductor is arranged on a foil and the foil is arranged on the outer side of the container.

An embodiment which is particularly easy to produce is however obtained when the at least one electrical conductor is formed from electrically conductive ink.

It is otherwise in no way precluded that the electrical conductor is embedded in the container and is enclosed by the container; for this purpose a conductor can for instance be placed in a mould for use in injection moulding. It is likewise possible to wind a conductor round a core and to mould the thus wound core. This approximates the situation with the separate carrier placed in the container, provided the core is hollow. In the embodiment with a separate carrier the conductor is preferably placed on the outer side of the carrier and there is a distance between the inner side of the container

and the conductor. This winding can also take a bifilar form. It is otherwise also possible to make use of a foil of insulating material on which a conductor is arranged. This conductor can be formed by etching or laser. The foil is then placed with its insulating side or with its conductive side on the carrier, and the thus formed carrier is placed into the container.

It is known from the prior art that from a dosing viewpoint it is attractive to dose the content of a container according to the invention with vibration. A preferred embodiment provides the measure that the container is adapted for placing in a dosing device adapted to generate vibrating movements. It is noted here that appropriate structural measures are required to adapt the fragile construction according to the invention to withstand such vibrations.

The invention also relates to a device for heating liquid mass held by a container of the above stated type, comprising a housing, provided with a cavity for receiving the container, connecting means for connecting the connecting points of the container to a source of electrical energy, and a switch for interrupting the electrically conductive connection between the source of electrical energy and the connecting means. It is possible to envisage the switch being switched on automatically when the container is placed in the cavity. It is however also possible for a manually operated switch to be arranged between the energy source and the winding. The dentist can hereby heat the composite shortly before administering thereof. The power of the winding and of the energy source must be dimensioned for this purpose.

In most cases it is the intention to heat the mass present in the container to body temperature. It is therefore attractive that the device be provided with a device for determining the temperature of a part thermally coupled to the content of the container for the purpose of operating the switch subject to the measured temperature, so that the function of a thermostat is obtained. The temperature sensor of this thermostat can here be situated on the container, although it is preferably placed in the heating device.

Another preferred embodiment provides the measure that the device is adapted to measure the electrical resistance of the conductor arranged on the container and to derive the temperature of the conductor from the measured resistance value by

determining the resistance of the electrical conductor on the basis of the current strength through the electrical conductor and the voltage difference over the electrical conductor.

In order to enable the most accurate possible measurement it is further recommended that the device is adapted to alternately cause current to flow through the conductor arranged on the container and to measure the electrical resistance value of the conductor.

This embodiment also relates to such a method wherein the heating of the content of the container takes place by causing an electrical current heating the content of the container to flow through the conductor arranged on the container, this being alternated with determining the temperature of the electrical conductor by means of measuring the magnitude of the current through the electrical conductor and the voltage over the electrical conductor.

In order to enable power supply to the conductors arranged on the container by means of induction, the device preferably comprises a coil for generating a varying magnetic field whereby a voltage resulting in a current flowing in the conductor is generated in the conductor arranged on the container.

The present invention will be elucidated hereinbelow with reference to the accompanying drawings, in which:
Figure 1 is a schematic perspective view of a first embodiment of the invention;
Figure 2 is a schematic perspective view of a second embodiment of the invention;
Figure 3 is a schematic perspective view of a third embodiment of the invention;
Figure 4 is a schematic cross-sectional view of a heating device for use with a container according to the invention;
Figure 5 is a schematic cross-sectional view of an alternative heating device for use with a container according to the invention;
Figure 6 is an electrical circuit diagram of the heating device shown in figure 4; and
Figure 7 is a cross-sectional view of an alternative embodiment.

Figure 1 shows a container in the form of a syringe 1. This is a substantially cylindrical container, of which the piston for pressing the liquid in container 1 out of the container

is not shown for the sake of clarity. Not shown either is the normally used needle usually arranged on the syringe. For the purpose of heating the - likewise not shown - content of syringe 1, the casing surface 2 of the syringe 1 manufactured from electrically insulating material such as plastic or glass is provided with a printed electrical conductor 3. This conductor 3 is formed from electrically conductive ink printed on cylindrical casing 2 of the syringe by means of a suitable printing technique. Conductor 3 extends between two contact points 4, 5 which are both also formed by electrically conductive ink. These contact points 4, 5 serve to supply electrical energy to conductor 3. Contact points 4, 5 are here placed in the vicinity of each other, i.e. placed at the same axial position of the cylinder, so that they can both come into contact easily with a movable contact of a power supply device. Conductor 3 is here arranged in a winding loop in order to prevent the conductor crossing over itself when the contact points are positioned in the vicinity of each other.

Figure 2 shows an infusion bag designated in its entirety with 11, which serves as container for the liquid to be supplied to a human or animal. Infusion bag 11 is provided on its top side with an eye 12 so that it can be hung. On its underside the infusion bag is provided with an outlet nozzle 13 to which an infusion tube 14 is connected. The actual infusion bag 11 is assembled from two panels of flexible plastic, only one of which, 15, is drawn, and these panels are both provided with a conductor 17 arranged by means of foil 16 on each of the panels. Conductor 17 is here arranged in the form of a conductive foil on insulating foil 16. It is for that matter also possible for the conductor to be printed onto insulating foil 16. Conductor 17 extends in a bifilar pattern between two connecting points 18, 19 which are placed in the vicinity of each other in order to facilitate the connection. The contact points are preferably adapted to connect a power supply circuit (not shown in the drawing) using a single plug.

In this embodiment the heating of the container, i.e. the infusion bag, can take place during the administering of the relevant liquid. This is partly related to the fact that administering of an infusion generally extends over a longer period of time, usually several hours. Use can be made for this purpose of an external power supply circuit.

The container 21 shown in figure 3 is adapted to administer a composite to a dosing device, which is adapted to feed the composite into a cavity of an element of a set of

teeth, this composite then being cured by means of for instance UV light. This is a container with a substantially cylindrical part 22 which transposes at one of its ends into a slightly curved part 23, which also has a diameter decreasing toward the end. It hereby becomes possible to place the container such that the content can easily reach the cavity in the tooth or molar for filling. The interior of container 21 is thus also substantially cylindrical, with a curved part having a decreasing diameter at an end. A piston 24 of somewhat resilient material is situated at the end remote from the curved part. The other part of the cavity is filled with composite material 25. A conductor 26 wound in bifilar manner is here arranged all around the outer wall of container 21, and serves to heat the composite material present in the container which must be urged by the piston out of the interior of the container through curved part 23 and outside the container. Use is made for connection of conductor 26 of two connecting points 27a, 27b, both arranged on an edge 28 arranged on the container, which connecting points can easily be brought into contact with relevant connection contacts for power supply to the conductor. As a result of its flexibility the piston can here adjust to the arc to pass through and to the decrease in the diameter This also applies for the composite mass. In order to reduce the resistance of the composite mass, it is heated by conductor 26 through which a current flows.

By applying these measures heated composite will also polymerize and cure more rapidly under the influence of a polymerization lamp (LED). A reduction in the polymerization time of up to more than 50% (from 60 s to 20 s) can hereby be achieved. This also results in a better-quality restoration, since owing to its greater fluidity the composite penetrates better into the cavity so that cavities are avoided and the polymerization takes place deeper in the cavity, whereby the quality of the polymer is improved and the lifespan of the restoration is increased. The flow of the composite will be increased by up to as much as 80% by the present invention. In addition, the monomer conversion will be enhanced by the heating.

Figure 4 shows a device 30 adapted to heat a container according to the embodiment shown in figure 1. For this purpose device 30 comprises a cavity 31 adapted to receive container 1 and to determine the position of container 1 in cavity 31, this being particularly important for making contact for the purpose of power supply to conductors 3 on container 1. The position of the container is determined by a fitting piece 32. To

make contact use is made of two movable contacts 34, 35, each of which are movable inside a hollow cylinder 36 and which are each urged toward the interior of cavity 31 by means of a spring 37, wherein means are present to prevent the contacts falling into the cavity. At a good rotation position of container 1 the contacts 34, 25 will come into contact with contact points 4 and 5 on the container when container 1 is placed in cavity 31, after which the heating process can begin. After completion hereof the container can be removed in simple manner.

The embodiment of device 41 shown in figure 5 is particularly intended for supplying power to the embodiment of container 21 shown in figure 1. The shape of a mould part 42 is adapted in this embodiment. Because contactless power supply is applied in this embodiment, this embodiment does not comprises any contacts but is provided with a coil 43 which extends all around the cavity 44 arranged in device 41. When powered by an alternating current the coil generates an alternating magnetic field which extends into cavity 44 and other parts. When a container 1 is situated in cavity 44 as shown in the drawing, an alternating current will be generated in closed conductors 3 of container 1 which results in a current in the conductors which heats container 1, and thereby the content of the container.

Figure 6 shows a circuit which forms part of the device shown in figure 4. The circuit comprises a power supply part 51 which reduces the mains voltage to a voltage better suited to these applications, for instance of about 10 V. Power supply part 51 is connected to both contacts 33, 34, wherein a two-way switch 52 is incorporated in one of the connections. When this two-way switch is closed as shown in figure 6, the conductor of a container connected to the contacts is powered, whereby it heats the content of the container. In order to measure the progress of the heating process, or the temperature of the content of the container, the circuit provides the option of measuring the resistance of the conductor. For this purpose the circuit is provided with a control circuit 53 which places switch 52 into the other position at set times so that contact 33 is connected to power supply part 51 via a resistor 54. The control circuit is connected to both connections of resistor 54 so that it can measure the voltage drop over resistor 54, and thereby the current strength of the current flowing through the conductor. The control circuit is also connected to contact 34 so that the voltage over the conductor can be measured. Control circuit 53 is further adapted to calculate the resistance value of the

conductor from the measured current and voltage. Because the electrical resistance of a conductor depends in known manner on the temperature, the temperature of the conductor can hereby be measured. Because the conductor is placed in the immediate vicinity of the content of the container, a good impression can hereby be obtained of the temperature of the content of the container. Depending on the measured temperature, two-way switch 52 can then be moved back to the other position. The resistance of resistor 54 is otherwise so great here that the measuring current flowing through this resistor hardly affects the temperature. This circuit is otherwise also suitable for power supply to the embodiment shown in figure 2.

Figure 7 shows a container designated in its entirety with 50, which comprises a container 51 in narrower sense which in terms of shape is comparable to the embodiment shown in figure 3. The container can be manufactured from a suitable material such as plastic or a metal. The cavity 52 arranged in container 51 is substantially cylindrical but is provided on one side with an obliquely extending nozzle, whereby the container is suitable for administering composite material to elements of a set of teeth for filling. For this purpose such a container is placed according to the prior art in an administering apparatus/composite gun provided with a piston/plunger to enable dosing of the composite material.

For the purpose of heating the composite material or other materials which could be administered, use is made of a carrier 53 which is placed in cavity 52 in container 51 and preferably manufactured from plastic. This carrier has a cylindrical cavity in which the piston of a dosing device in which the container is placed can move. The outside of the container is provided with a part 53a with a large diameter which fits precisely into the interior of container 51, and a part 53b with a small diameter, so that a space is created between container 51 and the narrow part 53b of the carrier. This narrow part 53b is provided on its outside with an electrical conductor 54 which serves to heat the content of the container. Conductor 4 is connected to the contacts 56 arranged on the end wall of container 51 by means of conductors 55 extending through the wide part 53a of the carrier. These conductors preferably each extend through a groove (not shown in the drawing) extending in axial direction over the wide part of the container so that they can be placed easily. The actual heating conductor 54 can be embodied as a printed wiring, but can also be formed simply by metal wire, optionally of medical

grade material. This latter embodiment has the advantage that this wire can also be used to form connecting wire 55.

The necessary modifications can also be made to the shape and the proportions of the shown embodiment. It is thus possible to adjust the ratio of the length of the narrow and the wide part of the carrier. It is further possible to enclose the narrow part between two wide parts.

In the finished container filled with composite the filled cavity is closed with a piston or plunger 57. This plunger, which usually consists of a type of rubber, is pressed in by the plunger of the composite gun so that the cap is pushed forward and the composite flows out of the 'mouth' of the container.

It will be apparent that numerous changes can be made to the above elucidated exemplary embodiments; measures of the various embodiments are in particular interchangeable.

Claims

1. Container for a liquid material to be supplied to a human or animal body, which container is provided with an outlet opening for the liquid material, **characterized in that** the container is provided with at least one electrical conductor which is thermally coupled to the liquid material present in the container and which can be connected to an external source of electrical energy for the purpose of causing flow through the electrical conductor of a current which heats liquid material present in the container.

2. Container as claimed in claim 1, **characterized in that** the container has a rigid, substantially cylindrical form and is provided with a controllable piston for urging the liquid material through the outlet opening.

3. Container as claimed in claim 1, **characterized in that** the container is a plastically deformable cartridge for the purpose of urging the liquid material through the outlet opening by plastic deformation of the cartridge, or that the container is adapted to carry the liquid material through the outlet opening as a result of gravitational force, and that the at least one electrical conductor extends on the wall of the container.

4. Container as claimed in claim 2, **characterized in that** the at least one electrical conductor extends over at least a part of the wall of the container.

5. Container as claimed in claim 2, **characterized in that** the at least one electrical conductor is placed on a carrier placed in the container.

6. Container as claimed in claim 5, **characterized in that** the carrier is hollow and the at least one conductor is arranged on the outside of the carrier.

7. Container as claimed in claim 6, **characterized in that** the carrier is substantially cylindrical on its inner side and that the outer side of the carrier is provided with a recess which extends all around and in which the at least one conductor is arranged.

8. Container as claimed in claim 7, **characterized in that** the non-recessed part of the carrier fits into the container.

9. Container as claimed in any of the foregoing claims, **characterized in that** the conductor extends helically on the carrier or the container.

10. Container as claimed in claim 9, **characterized in that** the at least one electrical conductor is wound in bifilar manner.

11. Container as claimed in any of the foregoing claims, **characterized in that** the at least one electrical conductor extends on the outer side of the container.

12. Container as claimed in claim 11, **characterized in that** the conductor is manufactured from a medically compatible (medical grade) material.

13. Container as claimed in claim 11, **characterized in that** an electrically insulating layer is arranged on the outer side of the conductor.

14. Container as claimed in any of the foregoing claims, **characterized in that** the conductor is arranged on a foil and that the foil is arranged on the carrier or the container.

15. Container as claimed in any of the foregoing claims, **characterized in that** the at least one electrical conductor is formed from electrically conductive ink.

16. Container as claimed in any of the foregoing claims, **characterized in that** the container is adapted for placing in a dosing device.

17. Container as claimed in claim 16, **characterized in that** the container is adapted for placing in a dosing device adapted to generate vibrating movements.

18. Device for heating liquid material held by a container as claimed in any of the claims 1-17, comprising:

- a housing provided with a cavity for receiving the container;

- connecting means for connecting the conductor arranged in the container to a source of electrical energy; and
- a switch for interrupting the electrical connection between the source of electrical energy and the connecting means.

19. Device as claimed in claim 18, **characterized in that** the device comprises a device for determining the temperature of a part thermally coupled to the material present in the container for the purpose of operating the switch subject to the measured temperature.

20. Device as claimed in claim 19, **characterized in that** the device is adapted to measure the electrical resistance of the conductor arranged on the container and to derive the temperature of the conductor from the measured resistance value by determining the resistance of the electrical conductor on the basis of the current strength through the electrical conductor and the voltage difference over the electrical conductor.

21. Device as claimed in claim 20, **characterized in that** the device is adapted to alternately cause current to flow through the conductor arranged on the container and to measure the electrical resistance value of the conductor.

22. Device as claimed in any of the claims 18-21, **characterized in that** the device comprises a coil for generating a varying magnetic field and for thus generating a voltage and a current in the conductor arranged on the container.

23. Method for heating a liquid mass received in a container, **characterized in that** the liquid mass is heated by causing flow of a current through an electrical conductor which extends over at least a part of the surface of the container and which is electrically insulated relative to the container.

24. Method as claimed in claim 23, **characterized in that** the liquid mass is heated to between 25 and 65°C, preferably to between 34 and 57°C, more preferably to between 35 and 39°C, and most preferably to between 36 and 38°C.

25. Method as claimed in claim 24 or 25, **characterized in that** heating of the content of the container takes place by causing an electrical current heating the content of the container to flow through the conductor arranged on the container, this being alternated with determining the temperature of the electrical conductor by means of measuring the magnitude of the current through the electrical conductor and the voltage over the electrical conductor.

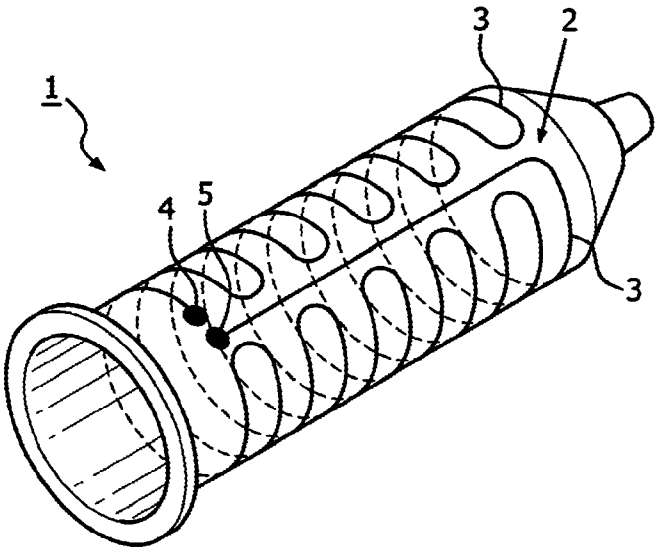

FIG. 1

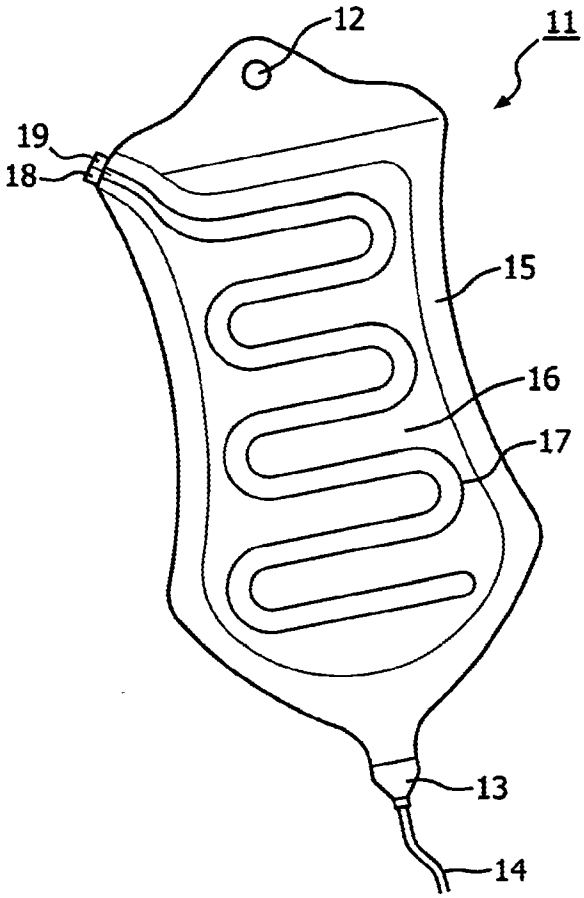

FIG. 2

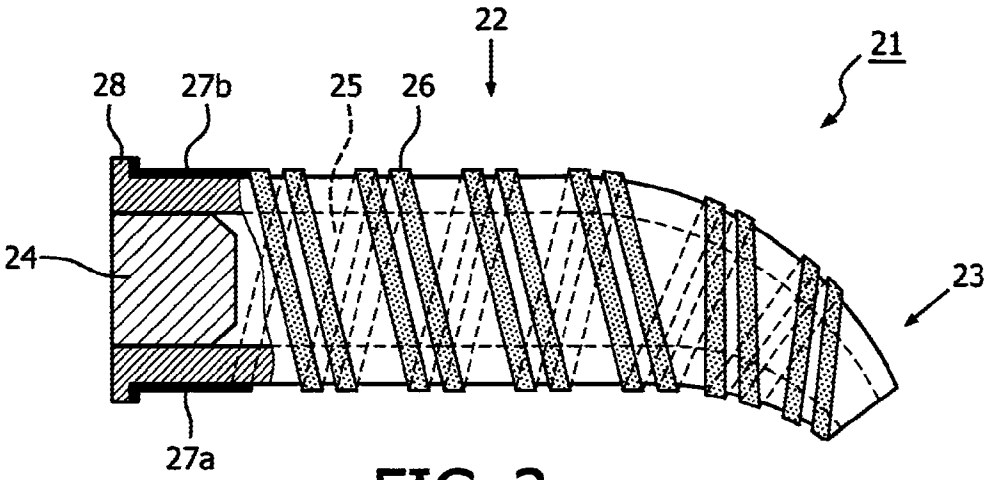

FIG. 3

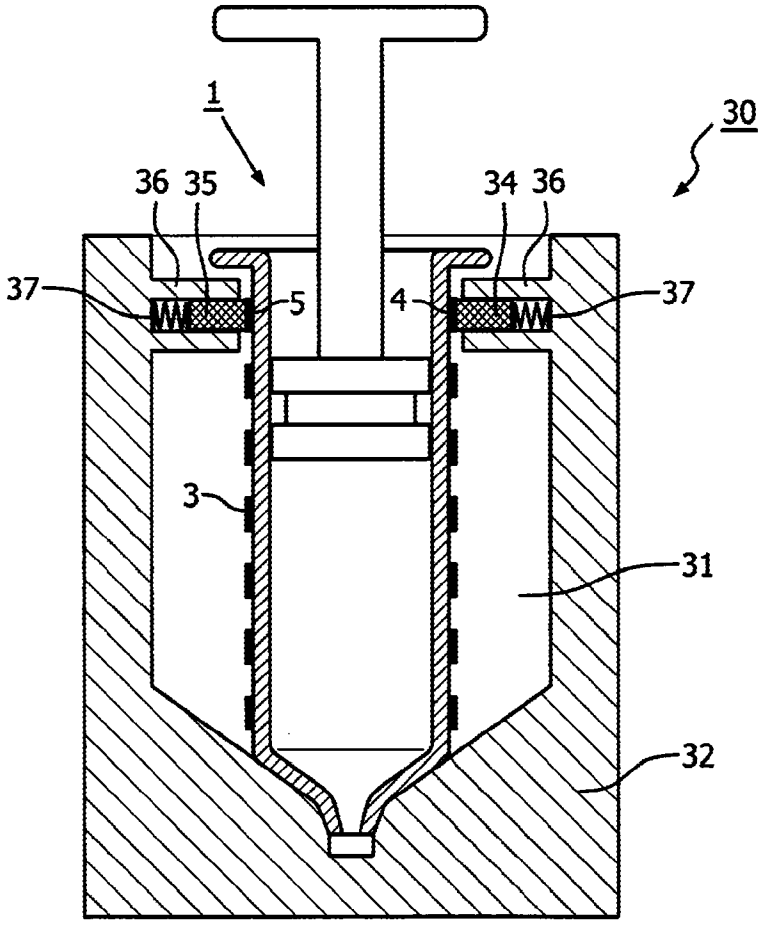

FIG. 4

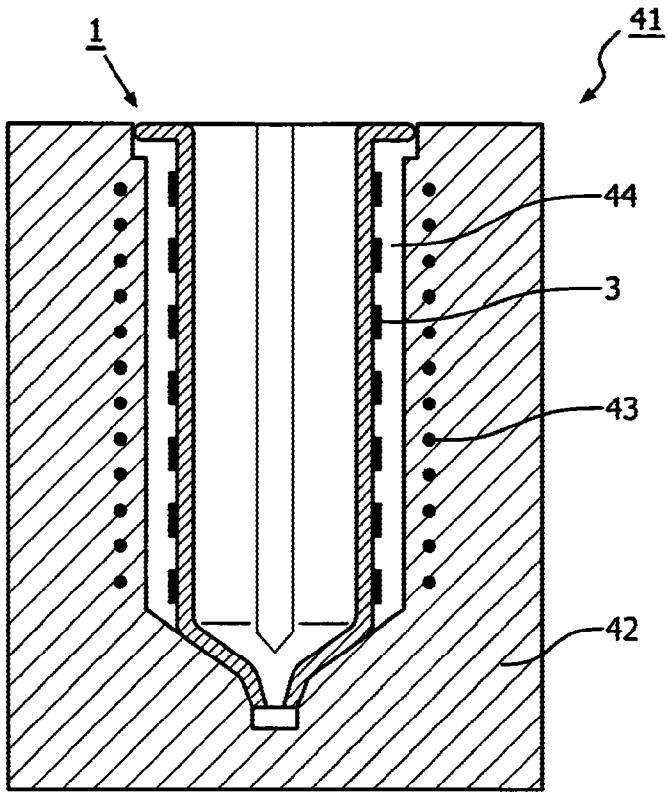

FIG. 5

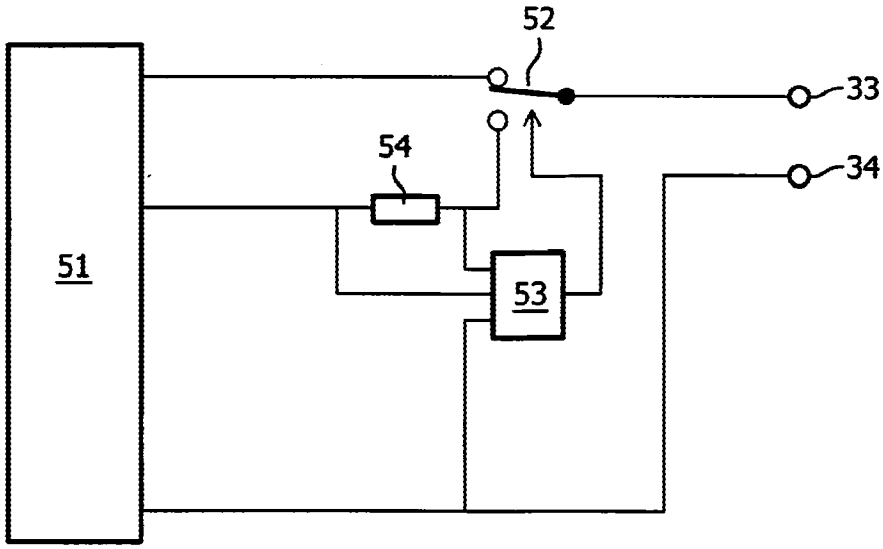

FIG. 6

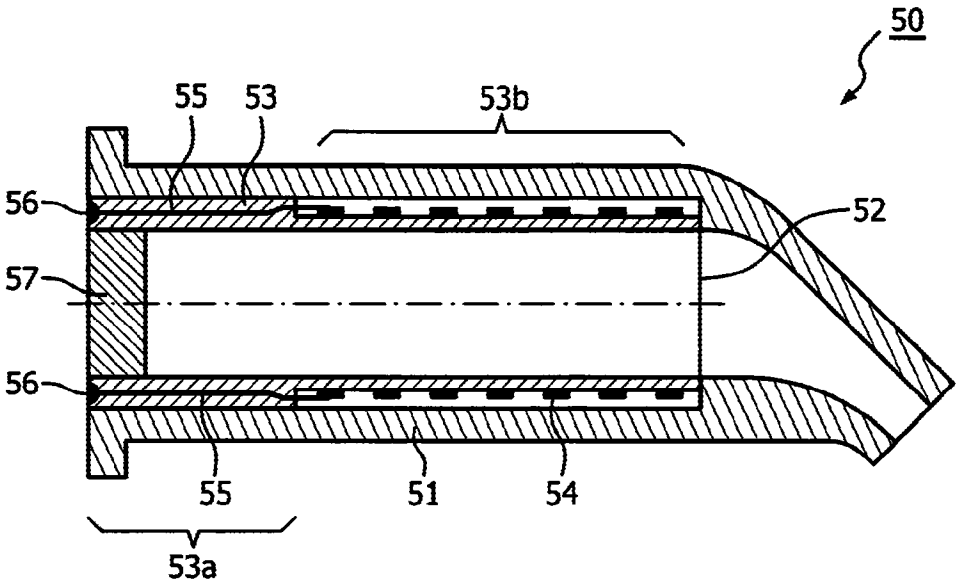

FIG. 7

INTERNATIONAL SEARCH REPORT

International application No
PCT/NL2010/050023

A. CLASSIFICATION OF SUBJECT MATTER
INV. A61M5/44
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)
A61M

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 practical, search terms used)
EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X Y	DE 157 260 C (LOUIS & H. LOEWENSTEIN [GE]) 24 December 1904 (1904-12-24) page 1, line 64 - page 2, line 5	1,2,4-9, 11,14, 18,22,23 3,10,12, 13,16,17
X	US 2006/150792 A1 (CAZZINI KARL H [US] ET AL) 13 July 2006 (2006-07-13) paragraphs [0018], [0024], [0027], [0032], [0033], [0036]; figures 1,2	1,15, 18-21, 23-25
Y	DE 201 04 970 U1 (BARKEY VOLKER [DE]) 28 June 2001 (2001-06-28) page 2, line 24 - line 25 page 3, line 1 - line 3 figure 1	3

-/--

[X] Further documents are listed in the continuation of Box C.

[X] See patent family annex.

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"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
18 May 2010	25/05/2010

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	Sedy, Radim

INTERNATIONAL SEARCH REPORT

International application No
PCT/NL2010/050023

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

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INTERNATIONAL SEARCH REPORT

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