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(54) Benevnelse **STIMULATION DEVICE**

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Description

Stimulation device

The present invention relates to a stimulation device for erogenous zones, namely for the clitoris, and a system with such a stimulation device.

The erogenous zones of the human body can be stimulated with a variety of aids.
For example, vibrators are used to stimulate a specific area of skin by direct contact. However, this form of stimulation can lead to irritation or skin irritation. Also, direct contact of the intimate area with such aids is not desired for individual reasons, for example hygiene or personal reservations.

The direct stimulation of the clitoris, for example with a vibrator, is particularly problematic. In women, the clitoris is usually the most sensitive erogenous zone. The entire clitoris is heavily equipped with nerve endings, making it particularly touch-sensitive and receptive to sexual stimuli. In this connection, emphasis is to be given to the glans clitoris in particular, in which the nerve cords of the two thighs meet. On the one hand, frequent use of a vibrator for direct stimulation results in habituation effects or conditioning of the stimulated erogenous zone, while on the other hand the first use of such a device requires a certain amount of practice or familiarisation.

Furthermore, medical studies carried out in 2006 have identified the female clitoris as the decisive starting point of the female climax and for the first time neurologically demonstrated the different sensory qualities of clitoral (and vaginal) orgasm. According to recent medical research, the stimulation of the clitoris, and not the vagina, is regarded as the starting point for women's sexual arousal and thus as the key to female "sexual pleasure".

Furthermore, the sensitivity of the human erogenous zones, for example the clitoris, the inner and outer labia or the nipples, is individually very different. The subject can be so sensitive that a direct stimulation can only be considered after prolonged foreplay, and

then only very delicately, or not at all. Furthermore, the sensitivity of the corresponding zone can change greatly from situation to situation or even during a sexual act.

For the above reasons, various indirect forms of stimulation are common practice as an alternative to direct stimulation.

For the indirect stimulation of erogenous zones and in particular the clitoris, conventional vacuum devices are used to stimulate the erogenous zones of the subject without direct contact with the main area to be stimulated. For example, vacuum pumps for the female primary or secondary sex organs are known, which usually have a suction cup for attachment and a hand pump. For example, the vacuum applied on the clitoris by this type of device creates a negative pressure in the clitoris itself, which is usually lower than the systolic blood pressure. This difference in pressure leads to an enlargement of the clitoris and/or stimulates blood flow in the affected area. This clitoral vascular congestion serves to promote pleasure by increasing sensitivity as well as optical and haptic manipulation. The improved blood circulation also leads to an increased secretion of vaginal lubrication, which renders the stimulation more pleasant. However, the manual operation of the hand pump is often cumbersome or annoying. In addition, the long-term or uninterrupted use of vacuum in this equipment category can also lead to habituation effects that limit the effectiveness of the device in the long term. In addition, a mere increase in the blood flow in the clitoris is often not sufficient to reach a climax; therefore vacuum pumps are often only used as foreplay to reach climax with a subsequent direct (pressure) massage of the erogenous zone.

Electrically powered vacuum pumps are increasingly being used instead of the manually operated vacuum pump. As an example, WO 2006 / 05 82 91 A2 discloses a device for sexual therapy, wherein the arrangement consists of a tubular suction chamber for the clitoris, an electrical vacuum source (vacuum pump) and several air flow openings. The operation of the vacuum pump creates a continuous air flow or air exchange in the clitoris area in the chamber. The increased vaginal secretions caused by the vacuum are disadvantageously suctioned off, which leads to a drying effect of the stimulated skin areas. The extracted moist air also leads to contamination of the downstream vacuum

arrangement, e.g. the vacuum pump. Such arrangements with vacuum pumps can be problematic in terms of hygiene, since vacuum pumps and the associated valves or ventilation components often have dead spaces or dead angles and/or are difficult to clean. The device is also used to treat the blood vessels of the clitoris and not to stimulate them to sexual climax.

US 6 099 463 A discloses a device for stimulating the clitoris with a tubular suction chamber, a vacuum source or vacuum pump and several valves with which the size of the vacuum is controlled. The vacuum can also be applied cyclically in order to achieve a stimulating effect, although a habituation effect can also be expected with this device due to the application of a continuous vacuum. Here, too, the above-mentioned disadvantages of hygiene and the drying out of the skin area to be stimulated exist. The pressure-technical arrangement with several valves, vacuum pump, etc. is also relatively complex.

US 6 464 653 B1 discloses therapeutic devices and procedures that produce a clitoral congestion using a vacuum generated by a vacuum pump to assist in the treatment of clitoral disorders such as incontinence. The vacuum level in the suction chamber can be manually adjusted or varied by means of a control valve or modulator, which can be covered with a finger. This requires the user's concentration and can be cumbersome or distracting in some circumstances. This relatively complex device with additional valves also has the above-mentioned disadvantages of hygiene and dehydration, and the device is also intended for long-term therapeutic purposes and not short-term sexual stimulation.

WO 2008 / 02 80 76 A2 discloses a therapeutic device for women, whose primary purpose is the treatment of sexual disorders. The device includes a combination of indirect stimulation using a vacuum chamber and direct stimulation using mechanical vibrators and oscillators.

The purpose of the vacuum in this therapeutic device is to increase the blood flow in the clitoris, while the actual stimulation or massage of the skin area occur through direct

mechanical vibrations/oscillations. For example, a suction cup for placement on the skin area to be stimulated is internally connected to a motor via a mechanical connection. The suction cup is extended by the motor after activation of the device, which increases its volume. The resulting volume of the suction cup and thus the strength of the vacuum can be adjusted by means of control elements on the device. The air displaced in the device by the intake process is discharged to the outside again via a pipe. The vacuum has only has a supporting function in this device, while the actual stimulation takes place directly, which also entails the above-mentioned disadvantages of direct stimulation.

US 2013 / 001 276 9 A1 discloses a device in which a pulsating overpressure is used for stimulation as an air pressure massage. A pump or compressor generates a pulsating overpressure, which is directed towards the erogenous zone to be stimulated by means of a nozzle. With this device, the affected skin area disadvantageously dries off or becomes dry. There is usually also a temperature difference between the temperature of the supplied air and the temperature of the skin area to be stimulated, which may be perceived as objectionable. This device also presents the above-mentioned hygiene problems, in which case any pathogens or germs or other contaminants in the device are also transported directly to the user's intimate area.

Thus, state-of-the-art devices have in common the disadvantage of the high complexity of the vacuum or overpressure-generating arrangements and this device's potential for having hygienic problems.

Furthermore, the state-of-the-art devices have the further common disadvantage that habituation effects occur in the case of prolonged or continuous or frequently recurring applications of vacuums.

Another disadvantage of some of the vacuum devices described above is that, firstly, the vacuum must be limited by a control valve or vacuum pump and, secondly, the vacuum should be reduced by manually opening a release valve before the suction cup is detached from the skin. If one of the valves has a technical defect and/or the user operates the device incorrectly, there is a risk of injury under certain circumstances.

Further relevant state of the art is disclosed in WO 2004/004610 A1, US 3,910,262 A, US 2 112 646 A, EP 0 365 230 A2, DE 20 2012 005 414 U1, WO 2013/178223 A2, US 2002/0120219 A1, CN 2 153 351 Y, US 1 730 535 A, DE 42 43 876 A1, DE 14 63 673 U, US 1 882 040 A and DE 17 03 184 U. A device for the treatment of incontinence and sexual dysfunction known from US 2002/120219 A1 comprises a pump/motor means connected to a chamber with an opening for attachment via the clitoris, wherein control means are provided to drive the drive unit and the device is a battery-powered hand tool.

Thus, in view of the problems described above, the underlying task of the invention is to specify a stimulation device which has a simple structure and is simple and safe to use.

A further task of the present invention is to specify a stimulation device with an effective stimulation-triggering effect suitable for the stimulation of an erogenous zone, in particular the female clitoris.

In addition, some of the invention's tasks are to provide a device that prevents the erogenous zones to be stimulated from drying out, is hygienic and avoids habituation effects.

The task underlying the invention is solved by the stimulation device according to claim 1. Advantageous further developments and embodiments are the subject of the dependent claims.

According to the invention, a pressure field-generating device of the stimulation device comprises at least one first chamber and at least one second chamber with at least one opening for placement on a body part or on the erogenous zone, respectively, and at least one connecting element connecting the first chamber to the second chamber.

By means of this formation of chambers communicating fluidically via at least one connecting element according to the invention, a pressure field can easily be generated

in the second chamber by changing the volume of the first chamber, which is temporarily directed towards the skin area to be stimulated.

A pressure field within the meaning of the invention is a time-varying field of media pressures which has temporary overpressures and temporary under-pressures, wherein an under-pressure is a media pressure which is below the reference pressure and an overpressure is a medium pressure which is above the reference pressure.

The medium is usually gaseous, preferably air, but can be a liquid medium, such as water or commercial lubricant, as an alternative or additive. For example, the lubricant can be filled into the invention chambers before using the stimulation device. In this way, the corresponding skin area can be stimulated with a suitable skin-friendly liquid instead of air, which can be desired according to the individual preference of the user. As a further example, the stimulation device can also be used under water with water as a medium (for example in the bathtub).

The reference pressure is usually the ambient pressure relative to the stimulation device at the beginning of the application (i.e. before the stimulation device is placed on the skin area to be stimulated). If the stimulation device is preferably used with air, the reference pressure is the current air pressure or the normal pressure.

The pressure field according to the invention stimulates the circulation of the skin area to be stimulated on the one hand, while on the other hand it is indirectly massaged. Thus two advantageous effects are combined. Due to the increased blood circulation, the erogenous zone of the subject is more sensitive, while a massage effect is also produced, which serves to stimulate the erogenous zone, for example for sexual arousal up to orgasm. The massage effect is produced by the kinetic energy of the medium flowing from the first chamber through the connecting element against the surface of the skin area to be stimulated. In this way, the massage effect is produced indirectly, i.e. without direct contact of the skin area to be stimulated with a solid body, e.g. a vibrator, which means that the disadvantages of direct stimulation explained at the beginning are avoided.

Through the exemplifying application of the pressure field to the clitoris, which changes over time according to the invention, the pressure field imitates a stimulation which usually occurs during sexual intercourse. The copulation movement also produces an alternating stimulus at the clitoris. Thus it is a realistic imitation of the natural act of copulation, and medical statements confirm that the application of the pressure field according to the invention leads neither to habituation effects nor to the causation of addiction. This is due in particular to the alternating application of under- and over-pressures (or also to the non-continuous application of only one type of pressure).

Furthermore, the maximum applicable pressure is regularly limited by the maximum load capacity of the skin area to be stimulated. For example, an excessively high negative pressure, especially in erogenous zones, carries the risk of painful injuries. Stimulation devices working exclusively with vacuums are usually limited to this maximum in their mode of operation. In contrast to this, according to the invention, an extended working range of the stimulation-triggering pressure field or effect is created by the combination of over- and under-pressures since the working range of the pressure can now be exploited to the maximum both in the positive and in the negative range.

The pressure field can act directly by aligning the at least one connecting element with the skin region to be stimulated, wherein the pressure field is significantly influenced by the configuration of the at least one connecting element and the at least one opening from the connecting element into the second chamber, and thus being adjustable according to the application of the stimulation device. Thus, at least one opening of the connecting element can be directly opposite the body part to be stimulated. For example, in a stimulation device intended for the clitoris, the connecting element may have a single through opening with a jet effect on the glans clitoris between the first and second chambers. Alternatively, the at least one connecting element may consist of several, for example four, through openings between the chambers if a larger area of skin is to be stimulated.

Furthermore, after the half-sided or partially opened second chamber has been placed on the skin area to be stimulated, a self-contained system of media or air flow is created in the pressure field generation device. Thus the medium or air is moved back and forth between the chambers, while an exchange with media or air from outside the system is at least largely avoided. Thus, the first chamber is connected exclusively to the second chamber via or through the connecting element.

For example, there is no direct connection between the first chamber and the surroundings of the device via a pressure valve or via an air discharge duct. For example, the temperature of the air in the invention's flow system will quickly adapt to the skin temperature, while the disturbing supply of new (e.g. cold) air from outside the system will be avoided, as may be the case with state-of-the-art technology, e.g. the use of vacuum pumps. In addition, drying effects are avoided, since in a closed system there is no or hardly any removal of stimulation-promoting fluid, such as body fluid.

Furthermore, the pressure field generation device according to the invention has the advantage of increased hygiene and improved cleanability due to its simple design. This invention avoids valves or pumps/compressors with potential dead spaces and areas that cannot be cleaned. The pressure field generation device according to the invention is therefore easy to clean. For example, the stimulation device can be cleaned easily by filling the first chamber with a cleaning fluid and activating the pressure field. Alternatively, the second chamber can be arranged exchangeably, which also facilitates the cleaning of both chambers. Furthermore, the chambers according to the invention and the connecting element of the pressure field generation device can be manufactured in one piece, whereby these consist of a single plastic moulded part (e.g. rubber).

In addition, the design according to the invention leads to the avoidance of complex fluidic elements, such as valves, which simplifies production.

Furthermore, the stimulation device according to the invention has a drive unit which changes the volume of the first chamber in such a way that a pressure field is generated

via the connecting element in the second chamber, which serves to stimulate the erogenous zone, and a control device which controls the drive unit.

The volume of the medium transported between the chambers is limited in principle to the maximum volume of the first chamber. In addition, the transported volume can be further limited by the maximum possible volume change caused by the drive unit.

As a result, the maximum positive or negative pressure that the stimulation device can build up in the second chamber is limited due to the dimensioning of the components of the pressure-field generating device and the drive. In particular, the maximum positive or negative pressure can be limited to a level that minimises or eliminates the risk of injury to the skin areas to be stimulated. For example, there is no need for a state-of-the-art safety valve or manual intervention by the user in the stimulation process, such as opening a release valve.

Furthermore, the temporal change of the pressure field or the modulation of the pressure field is largely automatically controlled by the control device. Thus the modulation of the pressure field, for example intensity, temporal course or sequence, is pre-stored in the control device.

Preferably, the temporal change of the pressure field can show regular or recurring (stimulation) patterns, for example impulses with a given cycle or regularly alternating pulse sequences. In this way, the user's interaction with the stimulation device can, according to the invention, be limited to switching on and off and selecting the stimulation pattern, while the stimulation device automatically performs the preferred stimulation pattern. Thus, according to the invention, the application complexity of the stimulation device is low compared to conventional (medical) vacuum stimulation devices. Alternatively or additionally, the user can individually configure the stimulation pattern of the stimulation device during or before operation.

In accordance with a further aspect of the invention, claim 11 proposes a system with the stimulation device according to the invention comprising a remote control device

separate from the stimulation device, the control device of the stimulation device being remotely controlled by the remote control device. A standard wireless (e.g. wireless) or wired remote control can be used to remotely control the modulation of the stimulation device or its activation by another user.

Furthermore, it discloses a procedure for stimulating body parts, especially the clitoris. The associated beneficial effects and impacts are explained in more detail above in relation to the pressure field.

The use of the stimulation device according to the invention as a sex toy to stimulate the female clitoris is also disclosed. As explained at the beginning, the female clitoris is a particularly sensitive erogenous zone in women, which is why the use according to the invention of an indirect massage - in combination with a negative pressure stimulation for this part of the body to stimulate up to orgasm appears particularly advantageous.

The features and functions of the present invention described above, as well as other aspects and features, are further described below by means of a detailed description of preferred embodiments with reference to the attached drawings.

Brief description of the drawings

Wherein:

Fig. 1 shows a front view of a first embodiment of the stimulation device according to the invention;

Fig. 2 shows a perspective side view of the first embodiment of the stimulation device according to the invention;

Fig. 3 shows a cross-section through the stimulation device according to the invention of the first embodiment;

Fig. 4 shows a cross-section through a pressure field generating device of a first aspect of the present invention in the first state.

Fig. 5 shows a cross-section through a pressure field generating device of a first aspect of the present invention in the second state.

Fig. 6 shows a cross-sectional view of a pressure field generating device of a first aspect of the present invention in the third state;

Fig. 7 shows a cross-sectional view of a pressure field generating device of a second aspect of the present invention;

Fig. 8 shows a cross-sectional view of a pressure field generating device of a third aspect of the present invention;

Fig. 9 shows a cross-sectional view of a pressure field generating device of a fourth aspect not covered by the claims;

Fig. 10 a), b) and c) show cross-sections through a pressure field generating device of a fifth aspect of the present invention;

Fig. 11 shows a partial cross-section through a second embodiment of the stimulation device according to the invention;

Fig. 12 a) to f) show various bottom and side views of further aspects of a second chamber of the present invention;

Fig. 13 shows a block diagram of an embodiment of the present invention;

Fig. 14 a) to d) show diagrams of various patterns of the pressure modulations of the present invention

Description of preferred embodiments

With reference to Fig. 1, a front view of a first embodiment of the stimulation device 1 according to the invention is explained, wherein a perspective view is shown in Fig. 2 and a cross-section of the first embodiment of the stimulation device 1 according to the invention is shown in Fig. 3.

The first embodiment of the stimulation device 1 is a portable or small electrical appliance comprising a housing 8, a pressure field generating device 2, operating elements 71, a display 72, an on/off switch 74, a socket 75, a battery 76 and optional lighting 9.

The housing 8 is preferably designed ergonomically so that it may be held comfortably with one hand and has no sharp or pointed edges. Furthermore, the housing 8 may be made of a plastic, for example polycarbonate (PC) or acrylonitrile-butadiene-styrene

(ABS). In addition, the gripping areas or even the entire housing may be supplemented or configured with a haptically advantageous silicone. The housing 8 is preferably configured to be at least water-repellent or splash-proof, for example, protection class IP 24.

The operating elements 71 serve to adjust the operating mode of the device, i.e. the setting of the modulation pattern of the pressure field. The operating elements 71 may be embodied, for example, as at least one pushbutton, as at least one rotary switch, or as at least one touch-sensitive switch. Furthermore, the operating elements 71 may emit an optical feedback for the operation, for example by means of light-emitting diodes (LED) integrated in the switch.

An optional display 72 is provided to inform the user of the device status and/or setting condition. The display 72 may be configured, for example, from a plurality of light-emitting diodes or as an LCD display. The information displayed may be, for example, the state of charge of a battery or the current setting of the modulation pattern.

The on/off switch 74 is used to activate and deactivate the stimulation device 1. This on/off switch 74 may be, for example, a push button, which switches the stimulation device 1 on and off through prolonged pressing, or a snap-in slide switch.

A socket 75 serves for the external power supply of the stimulation device 1 via an external plug 73, which is connected, for example, to an external power adapter. In order to ensure the splash-water resistance of the stimulation device 1, a magneto-inductive transmitter may preferably be provided instead of the socket in order to allow power transmission in the stimulation device 1 through an electrical conductive contact. In addition, the stimulation device 1 has a battery, for example a nickel-metal hydride (NiMH) rechargeable battery, for cordless operation.

The pressure field generating device 2 of a first embodiment comprises a first chamber 3 in the interior of the stimulation device 1, a second chamber 4 for placement on a body

part 11 to be stimulated, and a connecting element 5 which connects the first chamber 3 to the second chamber 4.

A drive unit 6, for example an electric motor, drives the first chamber 3 via a shaft 61 and by means of an eccentric 62 (or alternatively by means of a connecting rod) in such a way that the volume of the first chamber 3 is changed in accordance with the rotation of the shaft 61 of the drive unit 6. For this purpose, it should be noted that basically all types of drives may be used in the stimulation device 1 to cause a deflection of the wall 31 of the first chamber 3 in order to change the volume. For example, this may be done hydraulically, pneumatically, piezoelectrically, mechanically or electromagnetically. Examples of this will be explained later.

A control device 7 controls the drive unit 6, the operating elements 71 and the display 72. For this purpose, the controller 7 and the drive unit 6 are powered by the internal battery 76 and/or the external power supply 73.

An optional lighting 9 is provided on or in the housing 8. The lighting 9 is preferably used to light the interior of the second chamber 4. The lighting 9 may either be switched by the user or automatically activated when the stimulation device 1 is activated. Furthermore, the lighting 9 may be formed of energy-saving LEDs. For example, the lighting may serve as an orientation aid in the dark for the user of the stimulation device 1, or as additional optical stimulation.

Referring to Fig. 4, 5 and 6, the construction and the function of a first aspect of the pressure field generating device 2 of the stimulation device 1 will be explained in more detail below.

Fig. 4 shows the pressure field generating device 2 in a first state, wherein the second chamber 4 is placed on the skin area or body part 11 to be stimulated. The first state of the pressure field generating device 2 is characterized by a neutral displacement of the first chamber 3, i.e. no external force, for example from the drive unit, acts on the first

chamber 3. The volume V1 of the first chamber is the standard volume of this chamber 3.

The body part 11 to be stimulated is a skin area of the body, with a particularly sensitive erogenous zone, wherein the clitoris 12 is shown here by way of example. Thus, the application of the present invention is not limited to the female clitoris 11, but the stimulation device 1 may be applied to all parts of the body or erogenous zones (for example, the inner thighs, loins, neck, nipples, etc.) and may be stimulated by media or air pressure massage and/or negative pressure.

By placing the second chamber 4 on the body part to be stimulated 11, it forms a substantially or completely closed chamber with respect to the outside of pressure field generating device 2, and which only communicates with the second chamber via the connecting element 5, wherein, in the ideal case, the edges of the chamber 4 fit tightly on the surface of the body part 11. This results in two communicating chambers 3 and 4, wherein a volume change of one of the chambers 3 or 4 results in a corresponding pressure equalization between the chambers 3 and 4 via the connecting element 5.

A wall 31 of the first chamber 3 is fixed by means of a bracket 32. The bracket 32 is in turn secured to the housing 8. The wall 41 of the second chamber is further attached to the bracket 32. Two aligned openings in the wall 41 of the second chamber and the bracket 32 together form the connecting element 5, which connects the first chamber 3 and the second chamber 5. In this case, the wall 31, the bracket 32 and the wall 41 are preferably adhesively bonded to one another media or air-tight. Alternatively, they may also be press-fitted or screwed together (for example with the aid of sealing areas between the housing 8 and the respective part). The bracket 32 may be glued or screwed to the housing 8, for example.

The wall 31 of the first chamber 3 is preferably made of a flexible, media or air-tight material, such as rubber. The bracket 32 is preferably made of a rigid plastic, which is also media and air-tight. The wall 41 of the second chamber is preferably made of a flexible, skin-friendly material, such as silicone or rubber.

Fig. 5 shows the pressure field generating device 2 of Fig. 4 in a second state, wherein the second chamber 4 is again placed on the body part 11 to be stimulated. The second state is characterized in that a force A acting on the first chamber 3 causes an expansion of the chamber 3. In detail, in this embodiment, the force A draws the wall 31 of the first chamber 3 in a direction away from the second chamber 4.

This increases the volume V2 of the chamber 3, i.e. V2 > VI. In order to compensate for the resulting pressure difference between the chambers 3 and 4, the medium or the air now flows from the second chamber 4 into the first chamber 3.

Assuming that in the first state, the pressure present in the chambers 3 and 4 corresponds to the currently prevailing external reference pressure (for example the air pressure), the total pressure present in the second state will now be lower than the external reference pressure. This negative pressure is arranged to be preferably lower than the usual systolic blood pressure in the blood vessels of the body part 11. This increases the blood flow in this area and the clitoris 12 is better supplied with blood in the second state.

Fig. 6 shows the pressure field generating device 2 in a third state, wherein the second chamber 4 is again placed on the body part 11 to be stimulated. The third state is characterized in that a force acting on the first chamber 3 causes volume reduction or compression of the chamber 3. In detail, the direction of the force B is opposite to the direction of the force A and so deforms the wall 31 of the first chamber that the resulting volume V3 of the chamber is smaller than the volume V1. The compression of the chamber 3 causes an overpressure in the chamber 3, which is compensated by a media or air flow through the connecting element 5 in the direction of the second chamber 4.

This media flow is now preferably directed by the orientation of the opening 51 and/or the connecting element 5 onto the body part 11 to be stimulated, in particular on the glans of the clitoris 12. The indirect (pressure) massage according to the invention takes

place via the medium flowing onto the body part 11. The size of the opening 51 is so dimensioned that it is small enough in relation to the volume displaced in the first chamber 3 in order to sufficiently accelerate the medium to give a noticeable massage effect.

Furthermore, the type of flow may be favorably influenced not only by the size and orientation of the opening 51, but also by the internal configuration of the connecting element. For example, helical grooves in the connecting element 5 can cause a swirl of the flow according to the invention, wherein the flow profile of the flow produces a "softer" or more turbulent effect on the body part to be stimulated. Alternatively, the pressure field resulting in the second chamber 4 may be adjusted by means of a plurality of openings 51 according to the application.

In the arrangement shown in Fig. 4 to 6, it is advantageous that this is hygienically unproblematic (for example due to the avoidance of dead spaces) and is easy to manufacture. For example, no valves or other openings in or on the first chamber 3 are required.

Fig. 7 shows a second aspect of the present invention with an alternative construction of the pressure field generating device 2. Thus, the walls 31 and 41 of the first and second chambers 3 and 4 engage with each other in order to form two communicating chambers with a connection element 5, also in the first aspect of the construction of the pressure generating device 2. This eliminates the need for a separate bracket while the second chamber 4 is exchangeable. In addition, the connecting element 5 may be configured integrally or in one piece with the wall 41 of the second chamber 4. An exchangeable chamber 4 has the advantage that different shapes of the chamber 4 adapted to the respective body part may be used in this way (a more detailed explanation on this may be found later), without having to exchange the entire stimulation device 1. Alternatively, the second chamber 4 may also be plugged into the housing 8 (not shown in detail). The wall 31 of the first chamber 3 may, for example, be glued or screwed to the housing 8.

Also, as shown in more detail in Fig. 7 by the dashed line and the double arrow C, the expansion and the compression of the first chamber 3 may be affected by a force effect that is perpendicular to the axial direction of the connecting element 5. In principle, the force exerted indirectly or directly on the first chamber 3 by the drive unit 5 may be applied from any desired direction. The decisive factor here is only that the volume of the first chamber 3 is increased and decreased by the drive unit 6.

Fig. 8 shows a third aspect of the invention with an integral or one-piece construction of the pressure field generating device 2. An elastic material, such as silicone or rubber may be used as the material of the chambers 3 and 4. The advantage here is that possibly hygienically questionable gaps may be avoided, while the production cost will be lower. Also in this case, the pressure field generating device 2 may be glued or screwed to the housing 8. A change in the volume of the first chamber 3 takes place in an analogous manner to that described in connection with Fig. 7.

Fig. 9 shows a fourth aspect with an alternative construction of the pressure field generating device 2. In this case, the second chamber 4, a plurality of connecting elements 5, as well as portions of the wall 31 of the first chamber 3 are formed integrally. Alternatively, the pressure field generating device 2, while maintaining the geometric pattern of Fig. 9 in a similar manner to that shown in Fig. 4 or 7, may also be constructed in two or more pieces of individual parts.

The volume change of the first chamber 3 takes place here in a manner not covered by the claims, similar to the piston pump, but without any existing valves. Thus, a piston 63 is reciprocated in the directions of the double arrow D by the drive unit, for example, an electric motor or an electromagnet. This type of drive has the advantage that the volume of the first chamber 3 may be reduced in a simple manner to zero, or approximately zero, and thus the first chamber 3 may be almost completely emptied.

The design of the connecting element 5 with a plurality of channels 52 and openings 51 leads to a distribution of the pressure field to a plurality of concentration points. While the embodiment of the connecting element 5 with only one channel, as described in

connection with Fig. 6, leads to the formation of a highly concentrated media or air flow towards one target area, in the embodiment of the connecting element 5 shown in Fig. 9 the media or air flow may be distributed to several target areas. For example, the clitoris 11 may be blown not only onto its glans, but evenly from several sides. Depending on the application, this distribution of the airflow concentration across multiple areas may help to prevent overstimulation and/or help to increase the stimulation area.

Fig. 10a to 10c show a fifth aspect of the invention with (partial) cross-sections of a construction of the pressure field generating device 2 with a bending element 64 as a drive for the volume change of the first chamber 3. The bending element 64 may be, for example, a conventional piezoelectric bending element, which deforms or bends after applying a tension. In this aspect of the invention, the wall 31 of the first chamber 3 is rigidly constructed, while the bending element 64 is fitted in a suitable manner on the sides of the first chamber 3. The transition points between the bending element 64 and the wall 31 are sealed (for example, elastically bonded). In this structure, the drive for the pressure field generating device 2 is already integrated and thus eliminates the need for an external drive. For example, an electric motor with an eccentric is eliminated. As a result, possibly disturbing natural oscillations due to the eccentric movement of the stimulation device may be reduced.

In detail, Fig. 10a shows the pressure field generating device 2 with the bending element 64 in the neutral position. Thus, the volume of the first chamber 3 with the bending element 64 in the neutral position, is the standard volume. Fig. 10b further shows the first chamber 3 with an energized and subsequently outwardly-bent bending element, for which reason the volume of the first chamber 3 is increased; and consequently, a negative pressure prevails in the pressure field generating device 2. Fig. 10c shows a bending element of the first chamber 3, which is excited in the opposite direction to Fig. 10b, and therefore the volume of the first chamber 3 is reduced; and, as a result, there is an overpressure in the pressure field generating device 2.

Fig. 11 shows a second embodiment of the invention with a spatially separate arrangement of the chambers 3 and 4 of the pressure field generating device 2. The chambers 3 and 4 are connected via an expanded connecting element 5, which may be a longer flexible tube or a rigid tube. For example, the length of the connecting element 5 may be 0.5m. Thus, it is possible to hold the housing 8 in one hand while the other hand holds the second chamber 4 on the body part 11 to be stimulated; or the housing 8 may be simply set aside while the user holds only the second chamber 4 in their hands. In this embodiment, the stimulation device may also be designed as a tabletop device.

Fig. 12 a) to 12 f) show various bottom and side views of further aspects of the second chamber 4 of the present invention. In detail, Fig. 12 a) shows a bottom view of a circular second chamber 4 with a centrally located opening 51; Fig. 12 b) shows a bottom view of a triangular second chamber 4 with a centrally located opening 51; Fig. 12 c) shows a bottom view of an oval second chamber 4 with a centrally located opening 51; while Fig. 12d) shows a bottom view of an approximately eight-shaped second chamber 4 with two openings 51 arranged offset in the middle. Fig. 12 e) furthermore shows a lateral cross-section of a second chamber 4 according to the invention, wherein the second chamber 4 additionally has an extended contact surface 43 with the skin, or a support part 43 has to improve the sealing function of the second chamber 4 with the skin. The extended contact surface 43 may have grooves or projections which further enhance the sealing function. Fig. 12 f) shows a side cross-section of a second chamber 4 with a plurality of separate connecting elements 5 and an extended contact surface due to the support part 43.

Thus, the shape of the second chamber 4 may basically be adapted to the anatomy of the erogenous zone to be stimulated. The shape of the chamber 4 of Fig. 12 a) is adapted, for example, to the round shape of the breast, while the shape of the chamber 4 of Fig. 12 c) is better adapted to the shape of the female vulva. Furthermore, the shape of the second chamber 4 also determines the shape of the pressure field according to the invention. Thus, the size of the second chamber 4 relative to the volume displaced by the first chamber 3 determines the height of the achievable negative or positive pressure. Next to be determined by the proximity of the opening 51

of the connecting element 5 to the skin area to be stimulated, is the intensity of the massage effect according to the invention on this area. With a plurality of openings 51, cf. Fig. 12d), the massage effect may also be distributed over several areas. Thus, for example, the clitoris may be less stimulated directly on the very sensitive clitoris (see Fig. 12 e)), but reinforced on the areas surrounding the clitoris to avoid over-stimulation of the clitoris.

Fig. 13 shows a block diagram showing an example of the functional structure of an embodiment of the present invention including a control device 7, a drive unit 6, a lighting 9, an on/off switch 74, operating elements 71, a battery 76, and an external power supply 73.

The control device 7, which has, for example, a microcontroller or is hardwired, first controls the power supply of all consumers of the stimulation device 1, and optionally a charging and discharging process of the battery 76 and/or battery management. In particular, the control device 7 controls the excitation of the drive unit 6, for example the size of the deflection, the frequency, the modulation, etc.

Furthermore, the control device 7 has a memory in which at least one modulation or stimulation pattern (these are explained in more detail in connection with Fig. 14 a) to d), is stored. The drive unit 6 may now be driven according to this pre-stored stimulation pattern in its excitation at the option of the user of the stimulation device 1 via the operating element 71. The stimulation patterns of the pressure field may also be optionally and individually created and stored by the user via the control elements.

Fig. 14 a) shows the time course of a total pressure p in the pressure field generating device (2) when using this for stimulation. The dashed line indicates the reference pressure, for example the currently prevailing atmospheric pressure, which is present outside the pressure field generating device (2). If the second chamber 4 is now placed on the body part 11 to be stimulated, the initially prevailing ambient pressure in the pressure field generating device (2) is approximately maintained. It is now assumed that the second chamber 4 is placed substantially tightly on the body part to be stimulated.

After activation of the stimulation device, the drive unit 6 is actuated or excited by the control device 7 in accordance with a pre-stored stimulation pattern. Accordingly, the volume of the first chamber 3 and thus the total pressure in the pressure field generating device 2 will change, wherein the pressure changes is modulated to the reference pressure. The pressure or stimulation pattern shown by way of example in Fig. 14 a) develops a pulsed, regular pressure field. In phases of increasing the pressure, the erogenous zone to be stimulated is blown or massaged, while in the periods in which there is a negative pressure, circulation in the body part 11, such as the clitoris, is promoted. Thus, according to the invention, there are periods of time (marked I) in Fig. 14 a) during which a negative pressure prevails, while the clitoris is simultaneously massaged indirectly.

Fig. 14b) shows three examples of alternative stimulation patterns. Thus, in the area marked II), a pulsed stimulation pattern with high amplitude is shown. In the area marked III), a pulsed stimulation pattern with low amplitude is shown. Furthermore, an irregular or asymmetrical stimulation pattern in the time sequence and in the amplitude is depicted in the area marked with IV. The patterns may be varied according to physical effect/application and according to individual wishes.

Fig. 14c) shows another example of an alternative stimulation pattern. Thus, the amount of pressure may increase over time to accommodate the user's state of excitement.

The invention allows, in addition to the illustrated embodiments, further design principles. Thus, various arrangements or structures of the first chamber 3 may be arbitrarily combined with various embodiments of the second chamber 5 or the connecting element 5. For example, the first chamber 3 with the drive of Fig. 10 may be combined with the second chamber of Fig. 12 f).

Although only a first chamber 3 is shown in all embodiments, two or more first chambers 3 may be present, which are then driven simultaneously or with a time delay, in such a way that they change their volume to build up a pressure field according to the invention.

A stimulation device 1 may have a plurality of pressure field generating device 2. For example, two pressure field generating devices may be present to simultaneously stimulate two erogenous zones.

The stimulation patterns according to the invention may deviate from the patterns shown in Fig. 14 a), b) and c) as long as they have a chronological sequence of underpressures and overpressures. For example, at the beginning or after activation of the device, a relatively long-lasting negative pressure may be built up initially (for example 3 minutes) in order to effectively increase the blood circulation in the zone to be stimulated, whereupon pulses of slowly increasing lower amplitude follow pulses of increasing underpressure and overpressure.

List of reference numbers

1	stimulation device
2	pressure field generating device
3	first chamber
4	second chamber
5	connecting element
6	drive unit
7	control device
8	housing
9	lighting
11	body part
12	clitoris
31	wall of the first chamber
32	bracket
41	wall of the second chamber
42	opening of the first chamber
43	contact area
51	opening of the connecting element to the second chamber
61	drive shaft
62	eccentric
63	piston
64	bending element
71	operating element
72	display
73	power supply
74	on/off switch
75	socket
76	battery
77	control board

Patentkrav

1. Stimuleringsanordning (1) for klitoris (12) for seksuell opphisselse som fører til klimaks, omfattende:
en trykkfeltgenereringsinnretning (2) med:
et første kammer (3) med en enkelt åpning; og
et andre kammer (4) med en åpning (42) for plassering over klitoris (12); og
et forbindelseselement (5) som forbinder det første kammeret (3) med det andre kammeret (4); og
en drivenhet (6) som forandrer volumet av det første kammeret (3) gjennom skiftende ekspansjon og kompresjon av det første kammeret (3) gjennom kraftvirkning på det første kammeret (3) slik at et stimulerende trykkfelt genereres i det andre kammeret (4) via forbindelseselementet (5); og
en styreinnretning (7) som gir signal til drivenheten (6), hvor
trykkfeltet generert i det andre kammeret (4) består av et mønster av under- og overtrykk modulert med hensyn til et referansetrykk; og hvor
modulasjonen av trykkfeltet er forhåndslagret i styreinnretningen, og
det første kammeret (3) med sin eneste åpning utelukkende er forbundet med det andre kammeret (4) via forbindelseselementet (5), og
stimuleringsanordningen (1) er en batteridrevet bærbar håndholdt anordning og har minst ett betjeningselement (71), hvor den respektive modulasjonen av trykkfeltet kan forandres ved hjelp av betjeningselementet (71).

2. Stimuleringsanordning (1) ifølge krav 1, hvor
det minst ene forbindelseselementet (5) har minst én åpning (51), som er motliggende kroppsdelen (11) som skal stimuleres og er rettet mot kroppsdelen (11) som skal stimuleres.

3. Stimuleringsanordning (1) ifølge hvilket som helst av kravene 1 eller 2, hvor
det andre kammeret (4) er laget av et fleksibelt materiale, fortrinnsvis silikon eller gummi, og/eller er laget av et i det minste delvis gjennomsiktig materiale og/eller er tilpasset formen av vaginale labia minora slik at disse dekkes fullstendig av det andre kammerets (4) åpning.

4. Stimuleringsanordning (1) ifølge hvilket som helst av kravene 1 til 3, hvor
det andre kammeret (4) er utformet i ett stykke med forbindelseselementet (5) og det

første kammeret (3).

5. Stimuleringsanordning (1) ifølge hvilket som helst av kravene 1 til 3, hvor det andre kammeret (4) er anordnet for å være utskiftbart.

6. Stimuleringsanordning (1) ifølge hvilket som helst av kravene 1 til 5, hvor det andre kammeret (4) har en tettende støttedel (43) for forstørrelse av kontaktflaten av det andre kammeret (4) mot huden.

7. Stimuleringsanordning (1) ifølge hvilket som helst av kravene 1 til 6, hvor stimuleringsanordningen (1) har lys (9), fortrinnsvis LED-lys, for belysning av det andre kammeret (4).

8. Stimuleringsanordning (1) ifølge hvilket som helst av kravene 1 til 7, hvor forbindelseselementet (5) har en indre form og en åpning til det andre kammeret (4) som er utformet slik at trykkfeltet moduleres med hensyn til retning og type.

9. Stimuleringsanordningen (1) ifølge hvilket som helst av kravene 1 til 8, hvor stimuleringsanordningen (1) er innrettet slik at trykkfeltets medium kan være vann.

10. Stimuleringsanordning (1) ifølge hvilket som helst av kravene 1 til 9, hvor stimuleringsanordningen (1) omfatter et hus (8) som det andre kammeret (4) kan festes pluggbart på.

11. System med en stimuleringsanordning (1) ifølge hvilket som helst av kravene 1 til 10, omfattende:
en fjernstyringsanordning anordnet separat fra stimuleringsanordningen (1),
hvor styringsinnretningen (7) til stimuleringsanordningen (1) kan fjernstyres av fjernstyringsanordningen.

Fig. 1

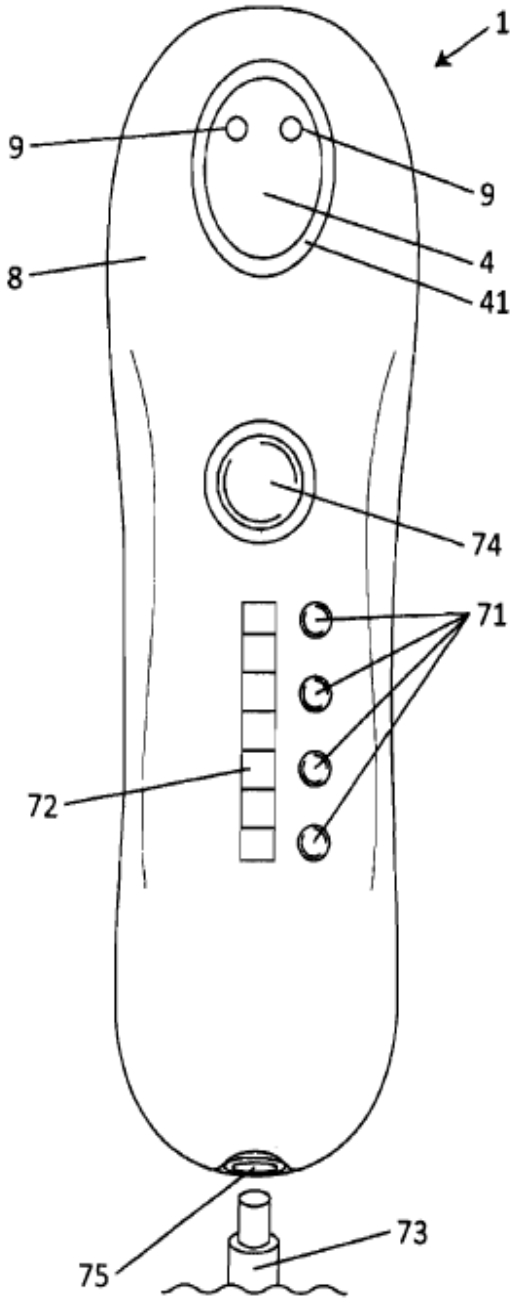

Fig. 2

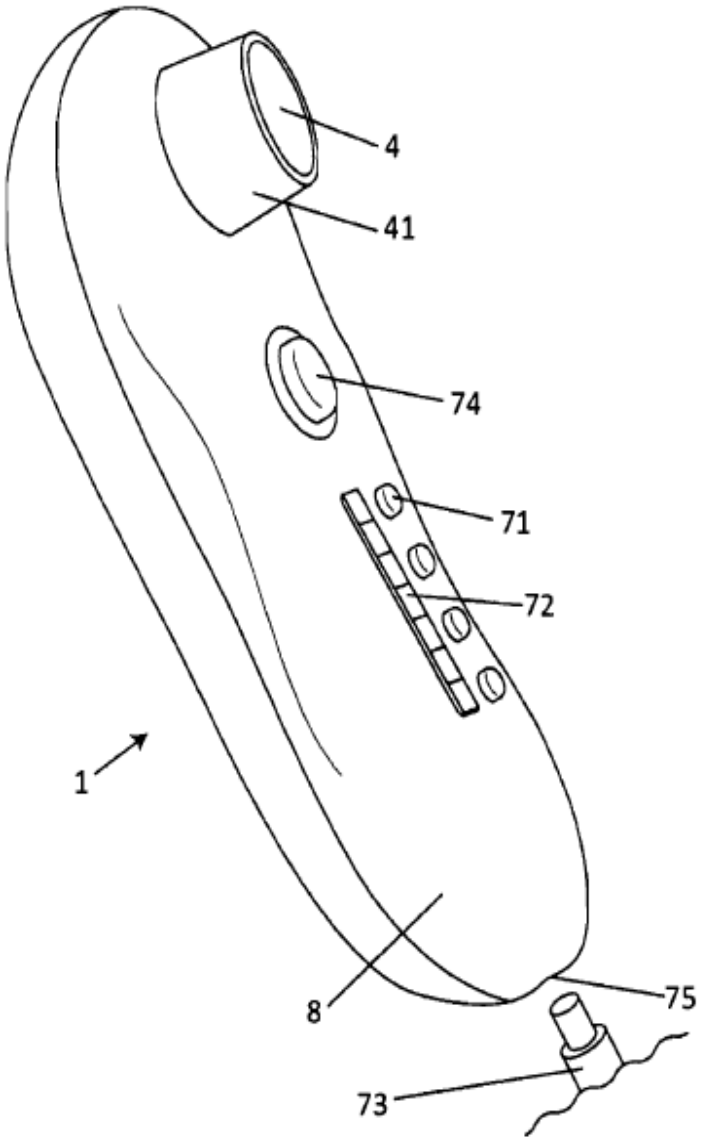

Fig. 3

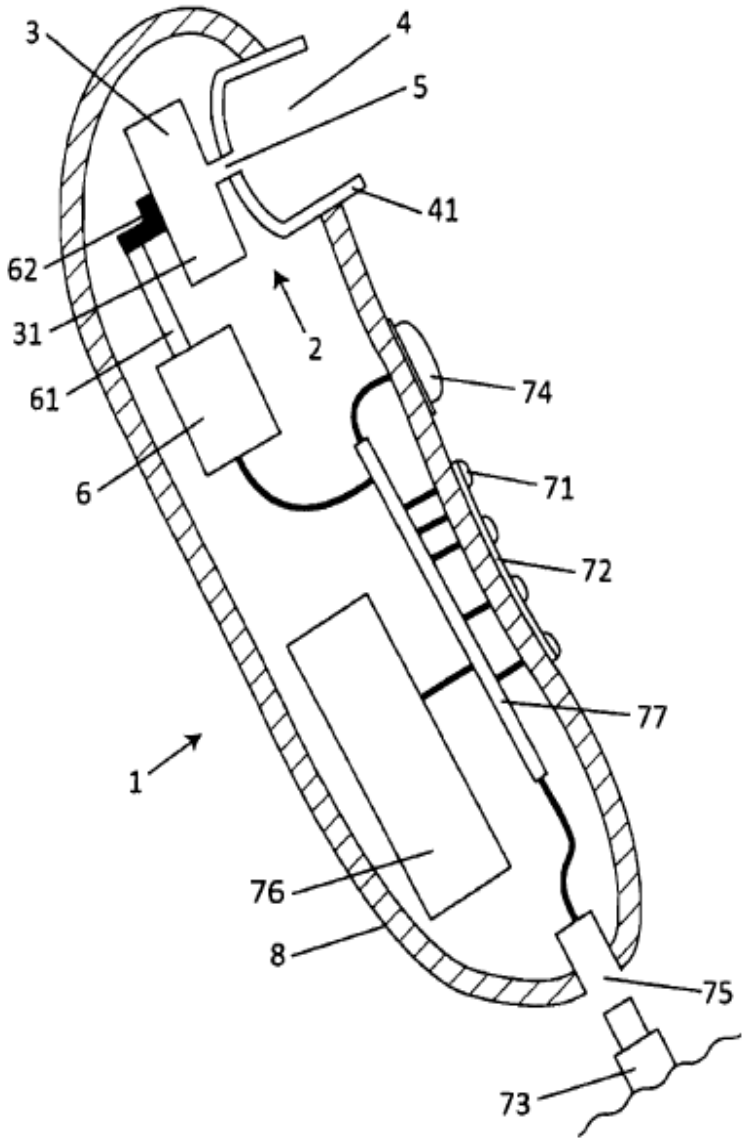

Fig. 4

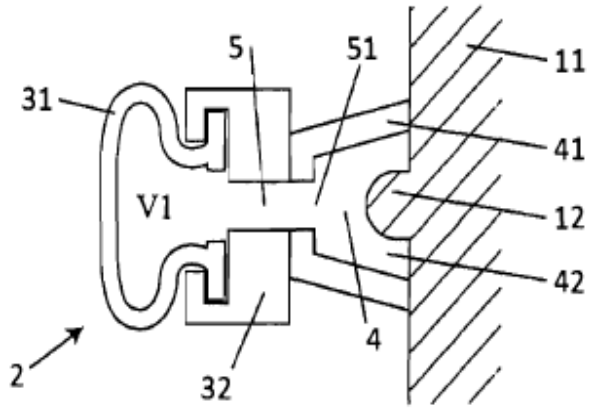

Fig. 5

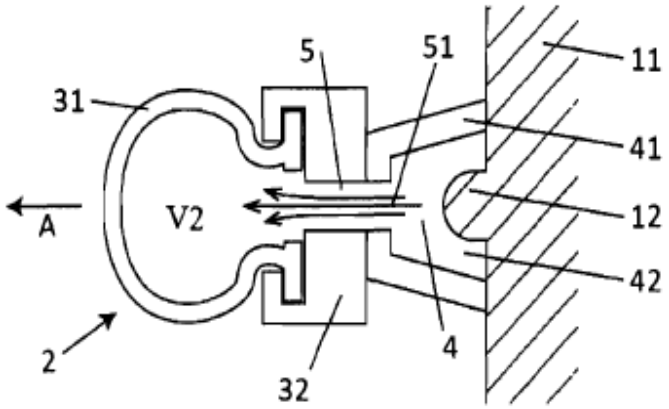

Fig. 6

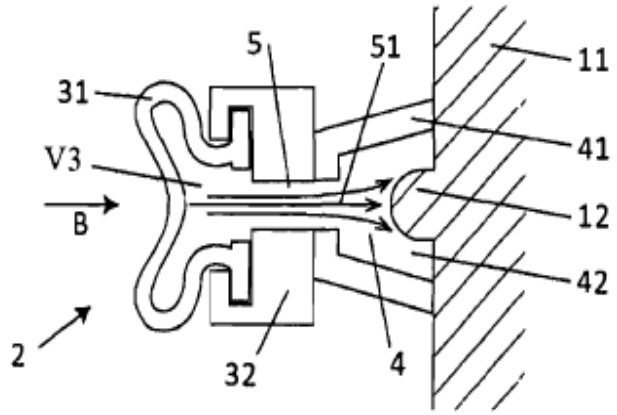

Fig. 7

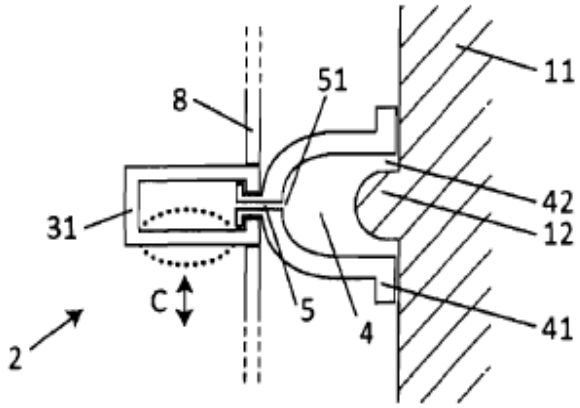

Fig. 8

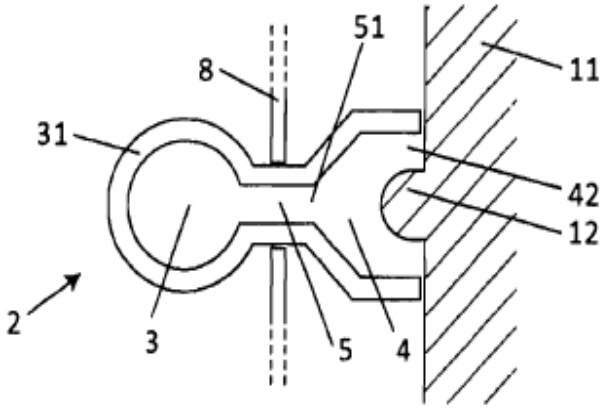

Fig. 9

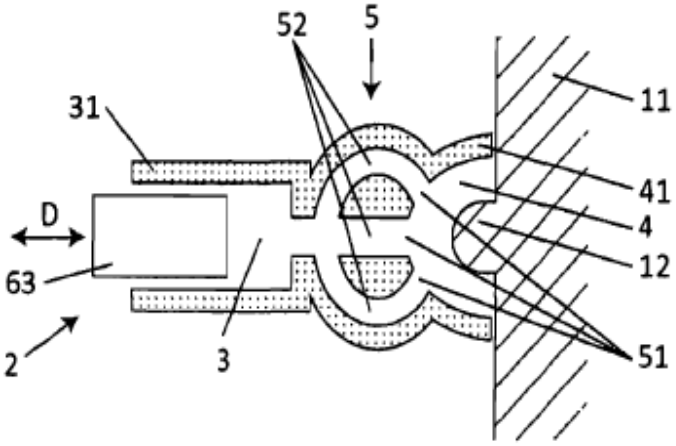

Fig. 10a

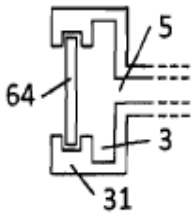

Fig. 10b

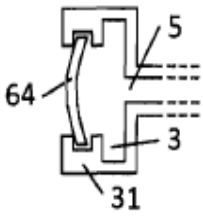

Fig. 10c

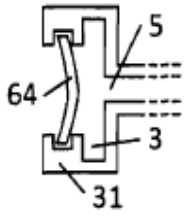

Fig. 11

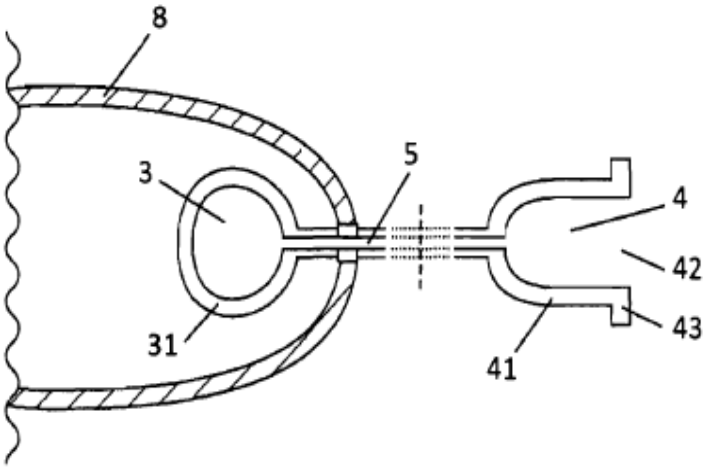

Fig. 12a

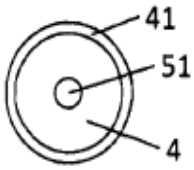

Fig. 12b

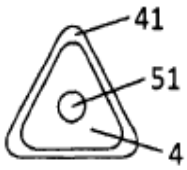

Fig. 12c

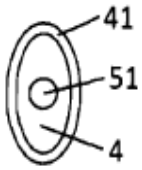

Fig. 12d

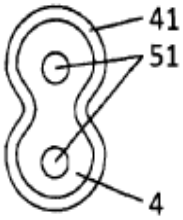

Fig. 12e

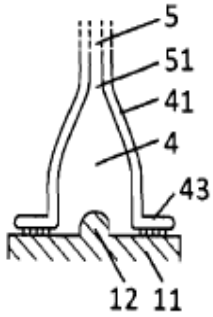

Fig. 12f

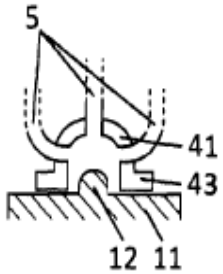

Fig. 13

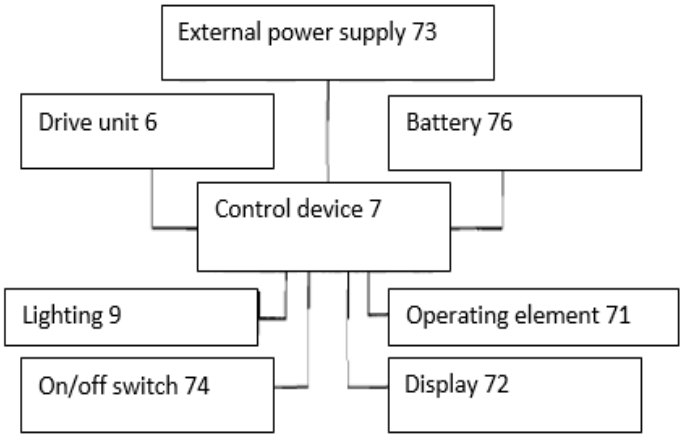

Fig. 14a

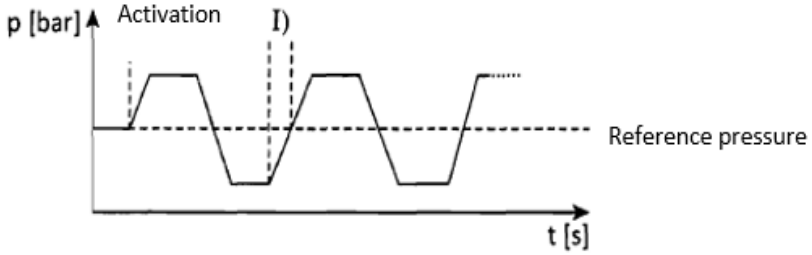

Fig. 14b

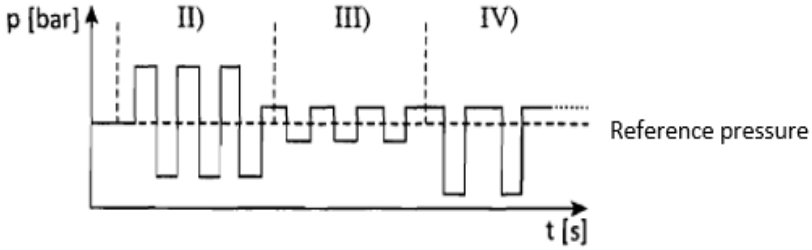

Fig. 14c