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(54) **Massaging device**

(57) A massaging element comprising a housing fitted with a pressure port and a massaging cushion made of a resilient material and being sealingly articulated to the housing and comprising a plurality of bulges projecting from an external surface of thereof and each extending along a longitudinal axis, whereby applying pressure via the pressure port the massaging cushion is inflated entailing displacement of the bulges in a direction having a first displacement component in a direction corresponding with the longitudinal axis and a second displacement component in a direction essentially normal to the first displacement component.

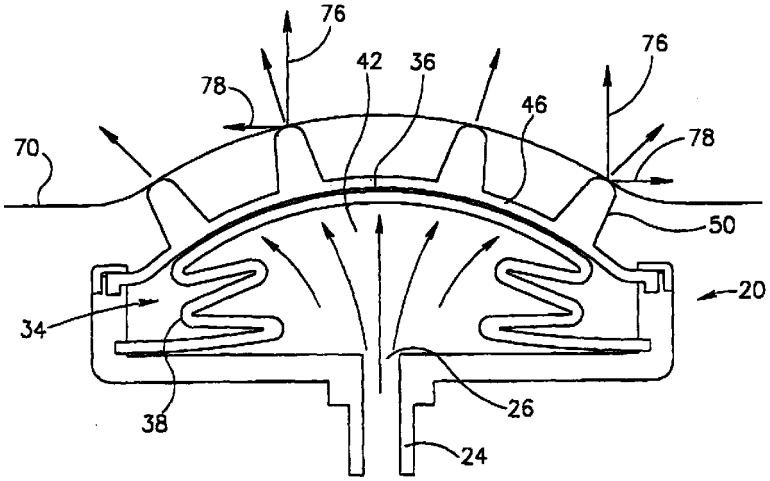

FIG.2B

EP 1 050 290 A2

Description

FIELD OF THE INVENTION

[0001] The present invention is generally in the field of massaging devices and more specifically it is concerned with massaging elements and massaging systems making use of such massaging elements and being pressure activated.

BACKGROUND OF THE INVENTION

[0002] Massaging is the technique of treating the body by either/or in combination of rubbing, vibrating or a kneading motion used for stimulating blood circulation and to relieve stress imposed onto the body and nerves. Massaging was initially done, and to date is very commonly so done by professional individuals using their hands.

[0003] However, during the years, mechanical massaging systems have been introduced whereby massaging became even more common, allowing individuals to be massaged independently of a professional masseuse.

[0004] A large variety of massaging systems is known, which are based on applying vibrations or rubbing motion to the body, by means of mechanical devices. Such devices are either hand held or used in combination with pads or furniture stoles, i.e. seats, beds etc.

[0005] U.S. Patent No. 3,403,862 discloses a spot pressure application apparatus applying an external stimulus pressure force to various predetermined treatment points on the body of an individual.

[0006] U.S. Patent No. 4,177,803 discloses an exercising device in the shape of a pedal) whereby the pressure exerted by the foot of the individual exerts the massage in a sideward movement.

[0007] U.S. Patent No. 4,197,837 discloses a device capable of generating a *wave-type* massaging motion. This invention describes an inflatable pressure control pad, which produces periodic inflations and deflations to a pad, giving rise to a wave-like motion applied to the skin of the individual.

[0008] U.S. Patent No. 5,607,749 discloses a massage system made of an alloy of flexible and collapsible nipples, which extend vertically from a platform where each nipple is movable from its normally extended position in response to an external force of the body in contact therewith. Return of each nipple to its normal position, due to its elasticity, exerts a massaging motion.

SUMMARY OF THE INVENTION

[0009] It is an object of the present invention to provide a massaging element and a massaging system making use of such massaging elements, in which massaging pressure is applied to an individual in both directions, perpendicular and parallel to the body's surface, resulting both in applying pressure to the body and to stretching and contracting of the skin being in contact with the device.

[0010] By a first aspect of the present invention, there is provided a massaging element comprising a housing fitted with a pressure port and a massaging cushion made of a resilient material and being sealingly articulated to the housing and comprising a plurality of bulges projecting from an external surface of thereof and each extending along a longitudinal axis, whereby applying pressure via the pressure port the massaging cushion is inflated entailing displacement of the bulges in a direction having a first displacement component in a direction corresponding with the longitudinal axis and a second displacement component in a direction essentially normal to said first displacement component.

[0011] Preferably, the massaging cushion is fitted over a support member having an inflated and a deflated position and being biased to assume its deflated position. Still preferably, the support member has an essentially flat support portion bearing against the massaging cushion, and an expandable bellows portion fixed at an end thereof within the housing.

[0012] In accordance with one design of the invention, the massaging elements are pneumatically controlled. In accordance with one design, each housing comprises a vent port for pressure release. Such a port may be connected to a release vent controllable by a pneumatic controller. Alternatively, the venting port may be an aperture of restricted dimensions wherein inflation flow rate is higher than deflation through that aperture.

[0013] However, when the massaging elements are hydraulically operated, thus there must be provided suitable pressure release mechanisms, e.g. pressure release valves which may be spontaneously operated at a certain pressure threshold or controlled by a suitable controller When the massaging element is hydraulically operated, then each massaging element or several adjacent massaging elements of a massaging system are connected to a valving system for controlling inlet and outlet of the pressurizing liquid.

[0014] Typically, there is formed a pressure chamber between the support member and a portion of the housing being in flow communication with the pressure port.

[0015] In accordance with one specific embodiment, the longitudinal axis of each of the plurality of bulges extends essentially perpendicular to the surface of the massaging cushion. In accordance with another embodiment, the longitudinal axis of each of the plurality of bulges is inclined with respect to the surface such that all axes intersect at an imaginary point above the surface of the massaging cushion.

[0016] Preferably, the bulges have a tapering cross-section, each formed with a rounded tip. In accordance with one specific embodiment, the tips of the bulges are

replaceable. Such replaceable tips may be made of an essentially hard material, e.g. plastic.

[0017] It is preferable that the tips of the bulges are made of a material with essentially low friction coefficient and machined accordingly, i.e. to reduce to a minimum friction of the bulges or replaceable tips with skin tissue or an intermediate layer of material. This can be carried out for example, by polishing the replaceable tips.

[0018] For smoother massaging operation, it is preferable that intermediate the skin tissue and the massaging bulges there be provided a layer of material which at least on its side facing the massaging bulges be of reduced friction, such as, for example, plastic material, synthetic fabric, etc.

[0019] By a preferred embodiment, the structure of the housing is essentially circular and the massaging cushion is designed to assume the shape of a spheric portion in its inflated position.

[0020] However, by a different embodiment, the massaging element has a different shape which might be adapted for use over specific body portions, e.g. a person's back, shoulders, neck, knees, etc.

[0021] Still preferably, the bulges are distributed over the massaging cushion at an essentially circular pattern.

[0022] In accordance with a specific embodiment, the support member is fixed to the housing by a retainer ring and the massaging cushion is fixed to the housing by a retaining member,

[0023] In accordance with another aspect of the present invention, there is provided a massaging system comprising one or more massaging elements each having housing fitted with a pressure port being in flow communication with a pressure chamber within the housing, a massaging cushion made of a resilient material and comprising a plurality of bulges projecting from an external surface of thereof and each extending along a longitudinal axis; and a pressure unit for pressurizing the pressure chamber; whereby pressurizing the pressure chamber entails inflation of the massaging cushion such the bulges are displaced in a direction having a first displacement component in a direction corresponding with the longitudinal axis and a second displacement component in a direction essentially normal to said first displacement component.

[0024] In accordance with the second aspect of the present invention, the system comprises at least two massaging elements wherein pressurizing two juxtaposing massaging elements applied to the skin of an individual, the second displacement components yield contraction of the individual's skin between said juxtaposing pressure elements.

[0025] Preferably, the massaging system further comprises a controller for controlling sequence of inflation and deflation of each of the pressure chambers, pressure level and flow rate, so as to obtain a massaging course fitted for the individual's requirements. Typically, the controller is programmable or preprogrammed to provide various operational parameters.

[0026] The pressure applied to the pressure chambers may be either hydraulic or pneumatic and a suitable pressure source is associated, e.g. air compressor, hydraulic compressed chamber etc.

[0027] The massaging system in accordance with the present invention may be in the form of a plurality of massaging elements arranged on a pliable carrying mat. Such an element is suitable for use particularly with any furniture, e.g. bed, chair, car seat etc. In accordance with another specific embodiment, the plurality of massaging elements are arranged on an essentially rigid carrying member, e.g. a hardened seat suitable for use in conjunction with a vehicle's seat, etc. Alternatively, the massaging elements are integrally arranged on a surface of a piece of furniture, e.g. bed or chair.

[0028] By still another embodiment, the device may be hand-held. According to one other example, the messaging elements are implemented into a foot messaging device, the device sized to rest one or two feet over a corresponding surface. Such a device may incorporate also hydro-jets facilitated by the pressurized air for activating the messaging elemnets.

BRIEF DESCRIPTION OF THE DRAWINGS

[0029] In order to understand the invention and to see how it may be carried out in practice, some preferred embodiments will now be described, by way of non-limiting examples only, with reference to the accompanying drawings, in which:

Fig. 1 is an isometric, exploded view of a massaging element, in accordance with an embodiment of the present invention;

Fig. 2 illustrates the massaging element of Fig. 1 in two operative positions, wherein:

Fig. 2A illustrates the massaging element in its deflated position; and

Fig. 2B illustrates the massaging element in its inflated, massaging position;

Fig. 3 is an isometric view of another embodiment of a massaging cushion for use in conjunction with the massaging element seen in Fig. 1;

Fig. 4A illustrates a massaging cushion in accordance with the present invention suitable for receiving replaceable massaging tips;

Fig. 4B illustrates a replaceable massaging tip for use with a massaging cushion of Fig. 4A;

Fig. 5 illustrates two operative positions of a massaging system comprising massaging elements in accordance with the present invention when applied to an individual's skin, wherein:

Fig. 5A illustrates the massaging elements in the deflated position; and

Fig. 5B illustrates the massaging elements in the

inflated position

Fig. 6 illustrates a massaging system according to the present invention;

Fig. 7 is a top elevation of a massaging cushion having a non-circular pattern; and

Fig. 8 is an isometric view of a foot messaging device comprising massaging elements in accordance with the present invention.

DETAILED DESCRIPTION OF SPECIFIC EMBODIMENTS

[0030] Attention is first directed to Fig. 1 presenting the principal components of a massaging element in accordance with the present invention generally designated **20**. The massaging element comprises a cylindrical housing **22** fitted with an inlet tube **24** terminating at inlet port **26** within housing **22**. Housing **22** is further formed wit a laterally extending recess **28** and an annular shoulder **30**, the purpose of which will become apparent hereinafter.

[0031] A support diaphragm **34** comprises an essentially flat support portion **36**, a bellows-type portion **38** and a skirt portion **40**, the edges of which being adapted for sealingly and fixedly receiving within annular recess **28** of housing **22**. In the assembled position (best seen in Figs. 2), there is formed a pressure chamber **42**.

[0032] A massaging cushion **46** is essentially circular and comprises, on a top surface thereof **48**, a plurality of bulges **50**, each having a tapering cross-section with a longitudinal axis extending essentially normal to surface **48**. Each of the bulges **50** comprises a rounded massaging tip **52** and as can be seen in Fig. 1, the bulges are disposed on the surface **48** at an essentially circular pattern.

[0033] A retaining ring **60** is provided for securing massaging cushion **48** to the housing. Retaining ring **60** is adapted for snap engagement with the housing, as can be seen in Figs. 2.

[0034] As can be seen in Figs. 2a and 2b, pressure port **26** extends into chamber **42**. The arrangement is such that upon applying pressure of fluid, typically pneumatic pressure, as seen in Fig. 2b, the .....'s portion **38** of support member **34** expands, entailing the formation of support portion **36** into a spherical shape, consequencing in corresponding the formation of massaging cushion **46**.

[0035] In the position seen in Fig. 2a, the massaging element **20** is in the deflated position and when applied to skin **70** of an individual, pressure is applied only in a normal direction represented by arrow **72** extending parallel to longitudinal axis of the bulges **50**.

[0036] Upon pressurizing pressure chamber **42**, support member **34** deforms such that the support surface **36** and the massaging cushion **46** assume a spherical shape. When applied to skin **70**, bulges **50** are displaced in a direction having a first displacement component **76** in any direction corresponding with the longitudinal axis of the bulges and which is essentially normal to the skin surface, and a second displacement component represented by arrows **78**, being in a direction essentially normal to said first displacement component **76**, i.e. essentially parallel to the surface of the skin.

[0037] The outcome of the above arrangement is that the massaging element **20** applies simultaneous pressure in first direction normal to the surface of the skin, and in a second direction essentially perpendicular thereto. This arrangement provides on the one hand pressure and on the other hand yields retracting and contracting force onto the skin of the individual.

[0038] Where the massaging element is adapted only for pneumatic operation, there may be formed in the housing a pressure bleed aperture (not shown) wherein the massaging cushion is inflated as explained above, via the inlet port and deflation of the massaging element is spontaneously facilitated through the bleeding aperture. The arrangement is such that the inflation flow rate is higher than the deflation (bleeding) flow rate, whereby the duration of inflated state of the massaging element depends on the dimensions of the bleeding aperture.

[0039] However, it will be appreciated that the above arrangement is not suitable for use in massaging elements which are hydraulically operated where a valving system is required as explained herein in the specification.

[0040] Further attention is now directed to Fig. 3 illustrating a preferred embodiment of a massaging cushion generally designated **80**. It is noted that the surface **82** comprises several bay-like cut-outs **84** for imparting the massaging cushion **82** improved flexibility, in order to assume its spherical shape in the inflated state.

[0041] Massaging cushion **80** further differs from the massaging cushion **46** in Figs. 1 and 2 in that the bulges **86** are inwardly inclined, having their longitudinal axes intersecting at an imaginary point above the surface **82**.

[0042] In Fig. 4A there is illustrated a massaging cushion generally designated **90**, in which the massaging bulges **92** are frastoconical and extend at an inclination, as in Fig. 3. However, instead of the rounded tips seen in Fig. 3, the bulges are provided at their end with a receptacle **94** for snappingly receiving a replaceable tip **98** seen in Fig. 4B. Tip **98** comprises a rounded surface **100**, which in an assembled position coincides with the contour of the bulges **92**. Member **98** is fitted with a stem **102** and an engagement bulge **104** for snappingly engagement within a receptacle **94** of bulge **92**. However, other arrangements for attaching the tips are also possible, e.g. screw fitting, etc.

[0043] Whilst in the previous embodiments illustrated in Figs. 1-3, the massaging cushion is integrally formed with the bulges and the rounded tips and is typ-

ically made of a rubber or a silicone rubber material, in the embodiment of Fig. 4 the massaging cushion **90** and bulges **92** are made of a resilient material, whereas the tips **98** are made of an essentially rigid material such as plastic.

[0044] In order to reduce the frictional engagement of the massaging tips and the skin tissue, it is desired that the massaging tips be machined to reduce the friction coefficient, e.g. by polishing.

[0045] By one specific embodiment, the massaging tips **98** may be replaced by a suitable member provided with micro-capsules comprising moisturizing agents, lubricants, odor agents etc.

[0046] Attention is now directed to Figs. 5A and 5B illustrating the massaging effect of two enabling massaging elements in accordance with the present invention, constituting a section of a massaging system. As seen in Fig. 5A, there are provided two massaging elements **120** and **122**, being of any one of the massaging elements illustrated in the previous embodiments. In Fig. 5A massaging elements **120** and **122** are in a deflated position and when applied to skin **124** they apply only a pressure in direction of arrows **126**, which is essentially normal to skin **124**.

[0047] Upon inflating massaging elements **120** and **122** as seen in Fig. 5B, the juxtaposing bulges **130** and **132** of the neighboring massaging elements **120** and **122**, respectively, cause contraction of skin **124** as seen in the intermediate skin portion **140**, whilst skin portions **142** are tensioned or refracted as seen above the massaging elements **120** and **122**.

[0048] Referring now to Fig. 6 of the drawings, there is fitted a massaging system in accordance with the present invention. Such a system is useful, for example, in medical institutes and it comprises an electrically operated pressure source generally designated **150** connected via suitable typing and wiring **152** and **154** to a massaging chair **156** and a massaging bed **158**, respectively. Each of the massaging chairs **156** and massaging bed **158** is fitted with a programmable controller **160** which independently controls different pressure parameters, e.g. pressure rate, pressure intervalves, flow rate and also control of different regions as may be required, i.e. portions corresponding with the back of the individual.

[0049] It will be noted that by one specific embodiment, there may be provided a mat fitted with a plurality of massaging elements, which may be applied by a user on any surface.

[0050] In the embodiment seen in Fig. 7, there is illustrated a massaging cushion **180** having a boomerang-like shape and fitted with a plurality of bulges **182**. The massaging cushion in accordance with this embodiment is suitable in particular for massaging a person's back. It will be noted that a variety of designs for massaging cushions may be provided, each adapted for a different body part.

[0051] Reference is now made to Fig. 8 illustrating a foot massaging device generally designated **190** and comprising a water tight housing **192** with a base mat **194** shaped for supporting two feet. The mat **192** fitted with a plurality of massaging elements **194** as disclosed hereinabove. The device further comprises a plurality of under-jet nozzles **196** and side-jet nozzles **198**. A control **200** selects a plan which controls water temperature, water jet pressure messaging parameters (e.g. speed, one or both feet, etc). It is appreciated that the air pressure used for operating the massaging elements may be used for generating the water jets.

[0052] In accordance with any of the above embodiments, it is preferably desired that over the massaging elements there be provided a friction reducing material such as a fabric having at least an inner surface made of or coated with a friction reducing material such as silk or other synthetic cloth, nylon, etc. Preferably, the one or more massaging elements of a massaging system are all received within a suitable enveloping friction reducing member, as can readily be understood. Alternatively, there is provided such a friction reducing layer between the massaged surface and the massaging elements.

[0053] Whilst the above description refers to some specific embodiments, as illustrated in the annexed Figures, it is to be understood that the invention is not restricted thereto, and may include a variety of embodiments and applications, *mutatis mutandis*. One such example may be providing a manually held massaging device comprising massaging elements as described, and comprising a source of compressed air, e.g. a portable balloon.

Claims

1. A massaging element **20** comprising a housing **22** fitted with a pressure port **26** and a massaging cushion **46** made of a resilient material and being sealingly articulated to the housing **22** and comprising a plurality of bulges **50** projecting from an external surface **48** thereof and each extending along a longitudinal axis, whereby applying pressure via the pressure port **26** the massaging cushion **46** is inflated entailing displacement of the bulges **50** in a direction having a first displacement component in a direction **76** corresponding with the longitudinal axis and a second displacement component in a direction **78** essentially normal to said first displacement component.

2. A massaging element **20** according to claim 1, wherein the massaging cushion **46** is fitted over a support member **34** having an inflated position and a deflated position and being biased to assume it's deflated position.

3. A massaging element **20** according to claim 2, wherein the support member **34** has an essentially

flat support portion **36** bearing against the massaging cushion **46**, and an expandable bellows portion **38** fixed at an end thereof within the housing **22**.

4. A massaging element **20** according to claim 2, wherein the support member **34** defines a pressure chamber **42** being in flow communication with the pressure port **26**.

5. A massaging element **20** according to claim 1, wherein the longitudinal axis of each of the plurality of bulges **50** extends essentially perpendicular to the surface **48**.

6. A massaging element **20** according to claim 1, wherein the longitudinal axis of each of the plurality of bulges **86** are inclined with respect to the surface **82** such that the axes intersect at an imaginary point above the surface **82**.

7. A massaging element **20** according to claim 1, wherein the bulges **50** have a tapering cross-section, each formed with a rounded tip **52**.

8. A massaging element **20** according to claim 1, wherein upon inflation the massaging cushion **46** assumes the shape of a spherical portion.

9. A massaging element **20** according to claim 1, wherein the bulges **50** are distributed over the massaging cushion **46** in a circular pattern.

10. A massaging element **20** according to claim 7, wherein the buLges **92** are fitted with replaceable tips **98**.

11. A massaging element **20** according to claim 2, wherein the support member **34** is fixed to the housing by a retainer ring.

12. A massaging element according to claim 1, wherein the massaging cushion **46** is fixed to the housing by a retaining member **60**.

13. A massaging system comprising one or more massaging elements **20** each having housing **22** fitted with a pressure port **26** being in flow communication with a pressure chambe**r 42**, a massaging cushion **46** made of a resilient material and comprising a plurality of bulges **50** projecting from an external surface **48** thereof and each extending along a longitudinal axis; and a pressure unit **150** for pressurizing the pressure chamber **42**; whereby pressurizing the pressure chamber **42** entails inflation of the massaging cushion **46** such the bulges **50** are displaced in a direction having a first displacement component in a direction **76** corresponding with the longitudinal axis and a second displacement component in a direction **78** essentially normal to said first displacement component.

14. A massaging system according to claim 13, comprising at least two massaging elements **20** wherein pressurizing two juxtaposing pressure elements **120:122** applied to the skin **124** of an individual, the second displacement components **78** entail contraction of the individual's skin **124** between said juxtaposing pressure elements.

15. A massaging system according to claim 13, further comprising a controller **160** for controlling sequence of inflation and deflation of each of the pressure chamber**s 20**, pressure level and flow rate.

16. A massaging system according to claim 15, wherein the controller **160** is programmable or preprogrammed to provide various operational parameters.

17. A massaging system according to claim 13, comprising a plurality of massaging elements arranged on a playable carrying mat.

18. A massaging system according to claim 13, comprising a plurality of massaging elements arranged on an essentially rigid carrying member.

19. A massaging system according to claim 13, comprising a plurality of massaging elements arranged on a surface of a bed **158** or seat **156**.

20. A massaging system **190** according to claim 14, wherein the messaging elements **194** are formed on a mat suitable for supporting two feet.

21. A massaging system according to claim 20, received within a water-tight housing **192**, with one or more water jet nozzles **196** formed in the housing.

22. A massaging system according to claim 21, wherein the one or more water jets are activated by air pressure used for inflating the messaging elements **194**.

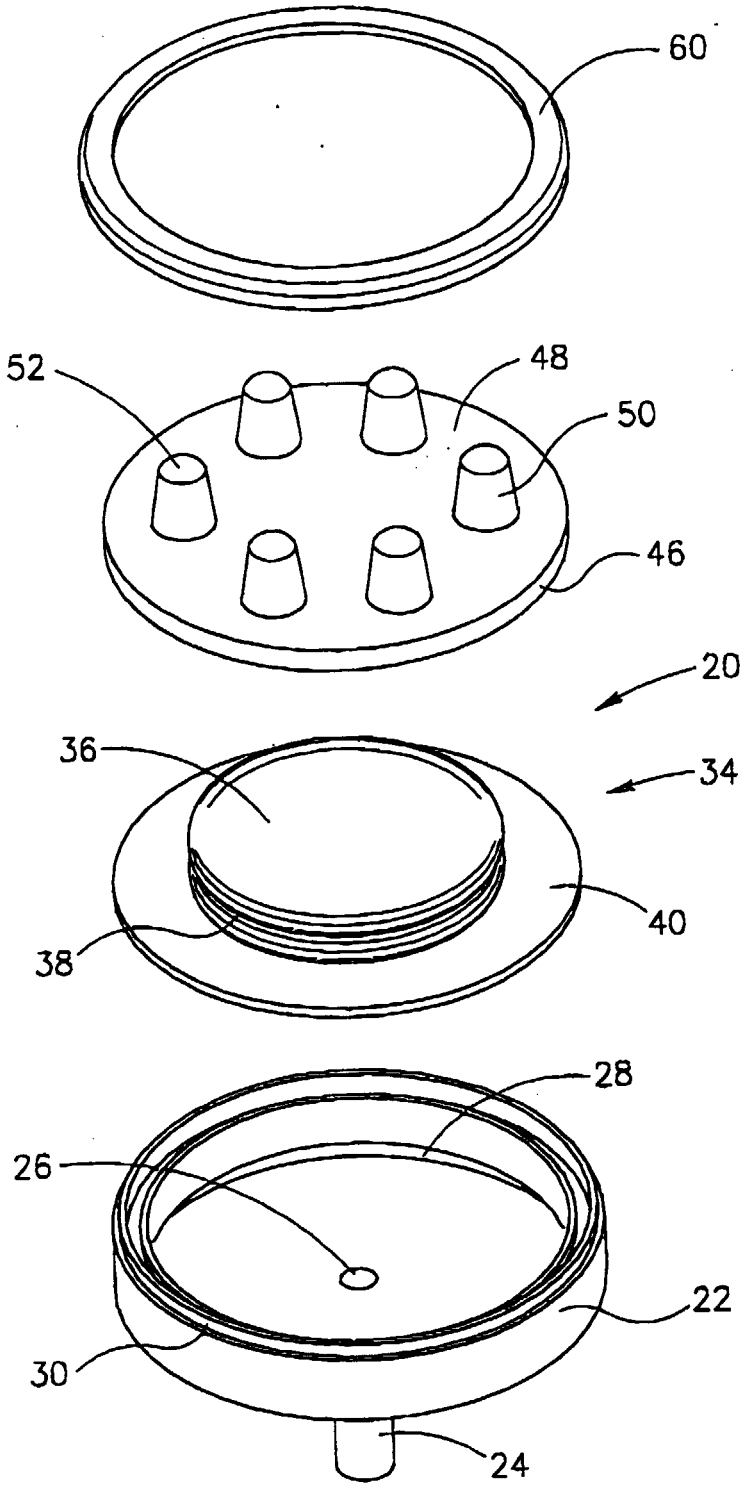

FIG.1

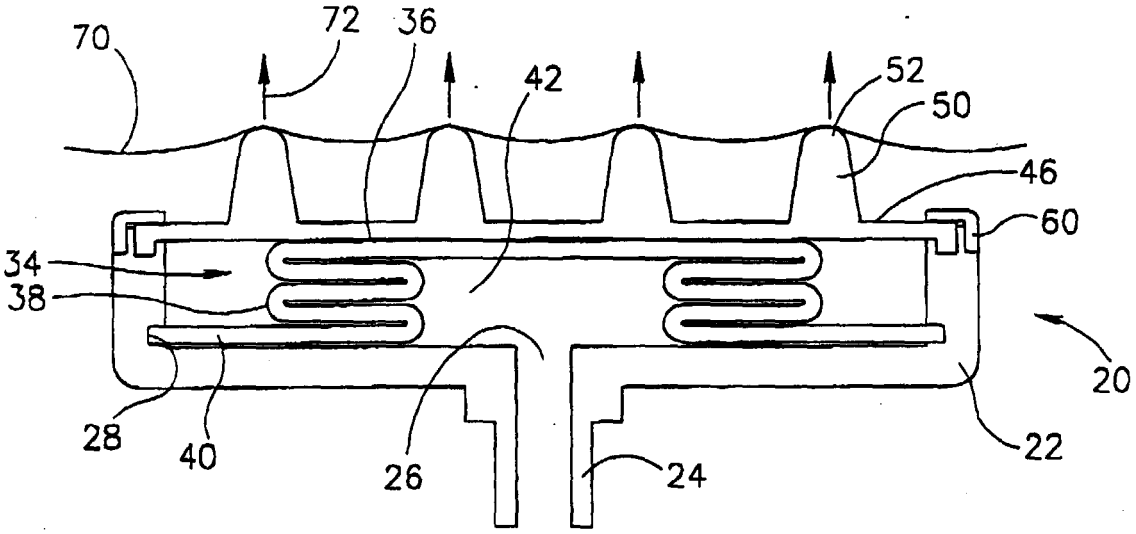
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FIG.2A

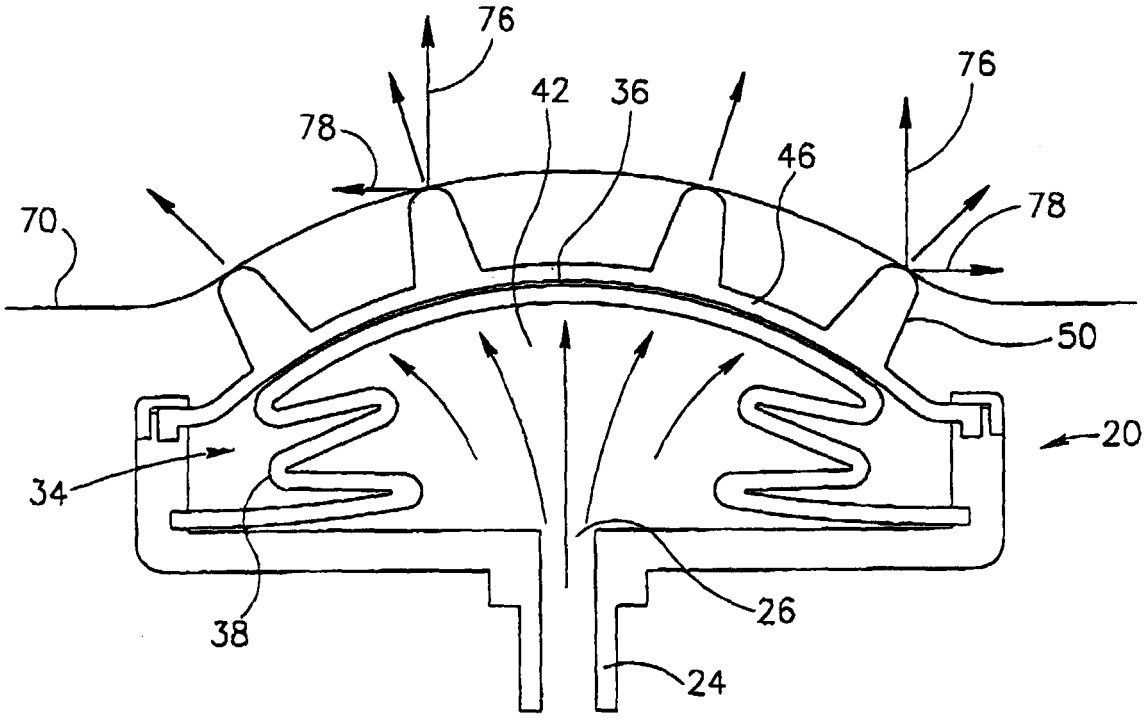
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FIG.2B

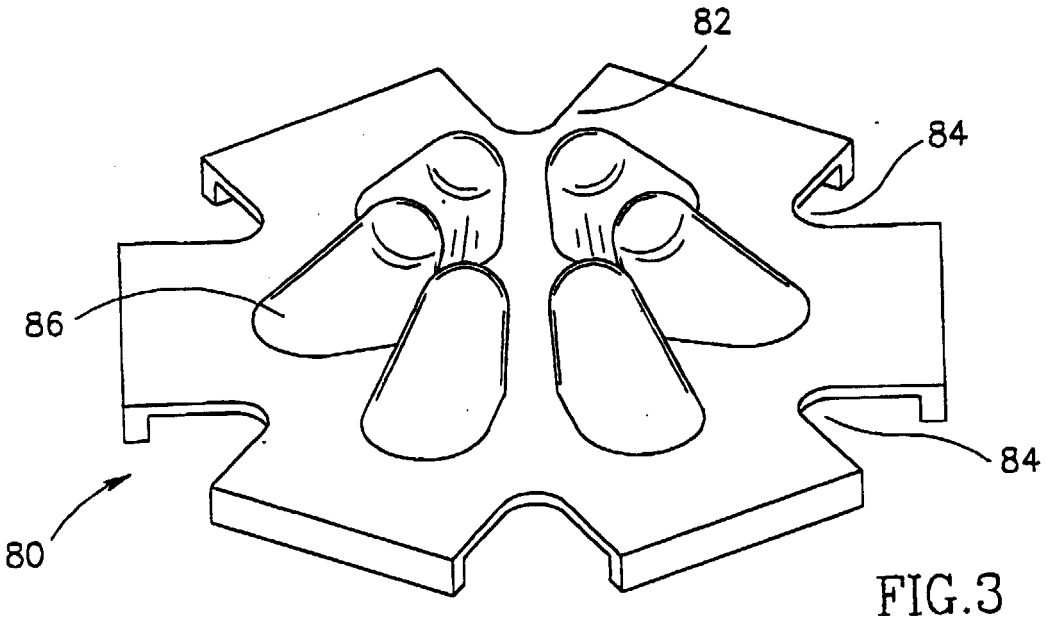

FIG.3

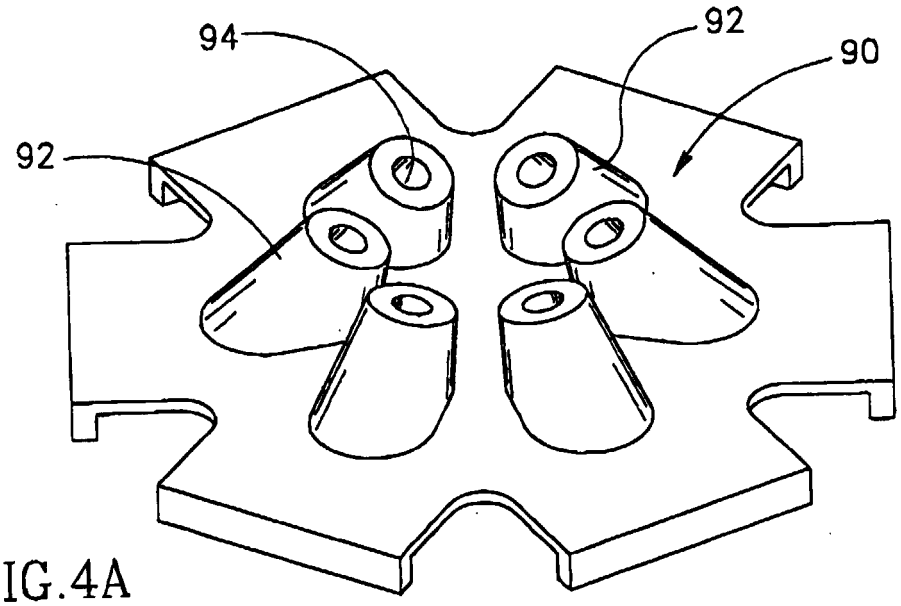

FIG.4A

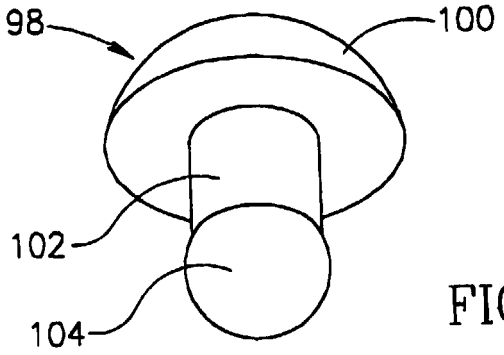

FIG.4B

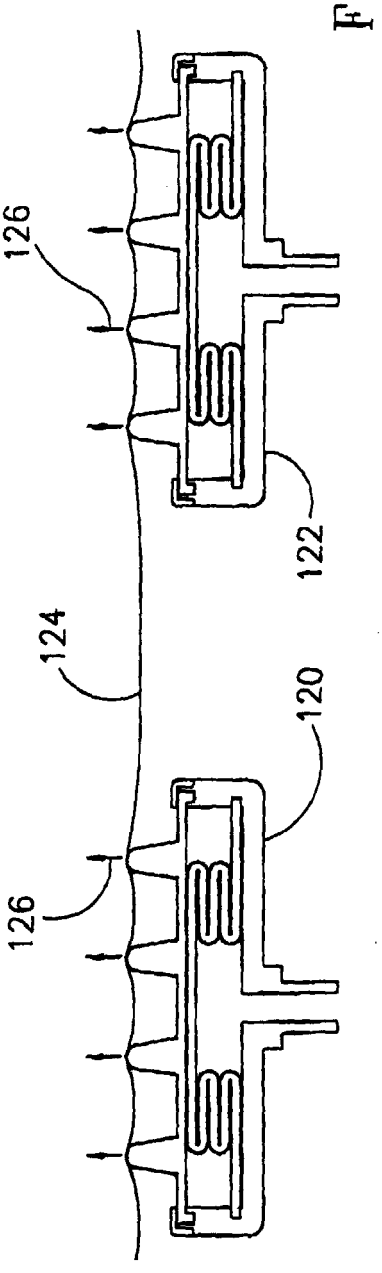

FIG.5A

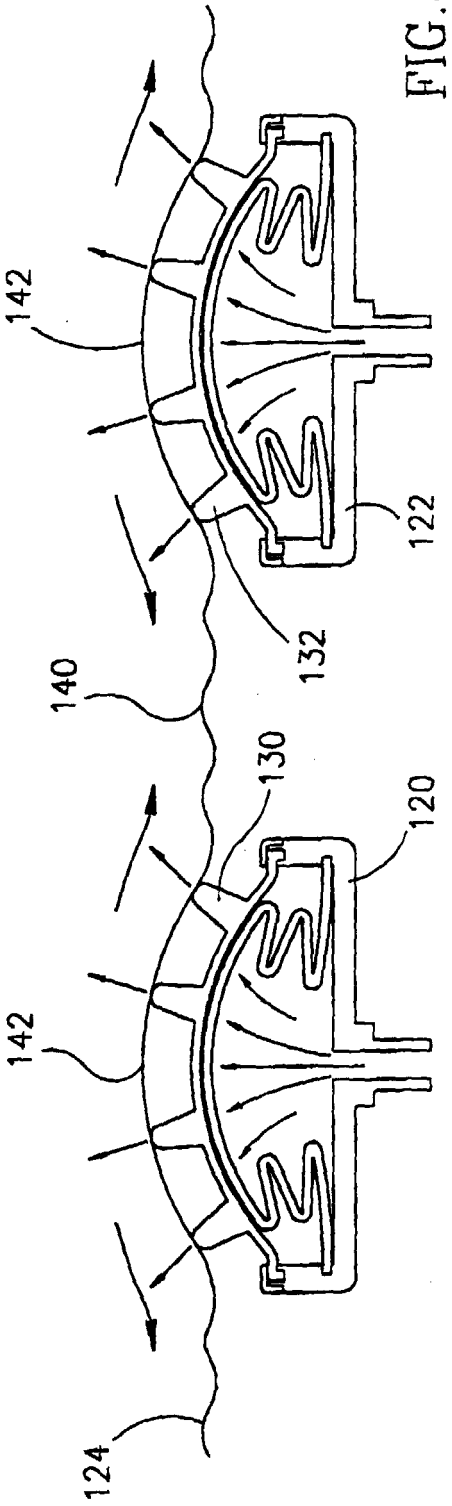

FIG.5B

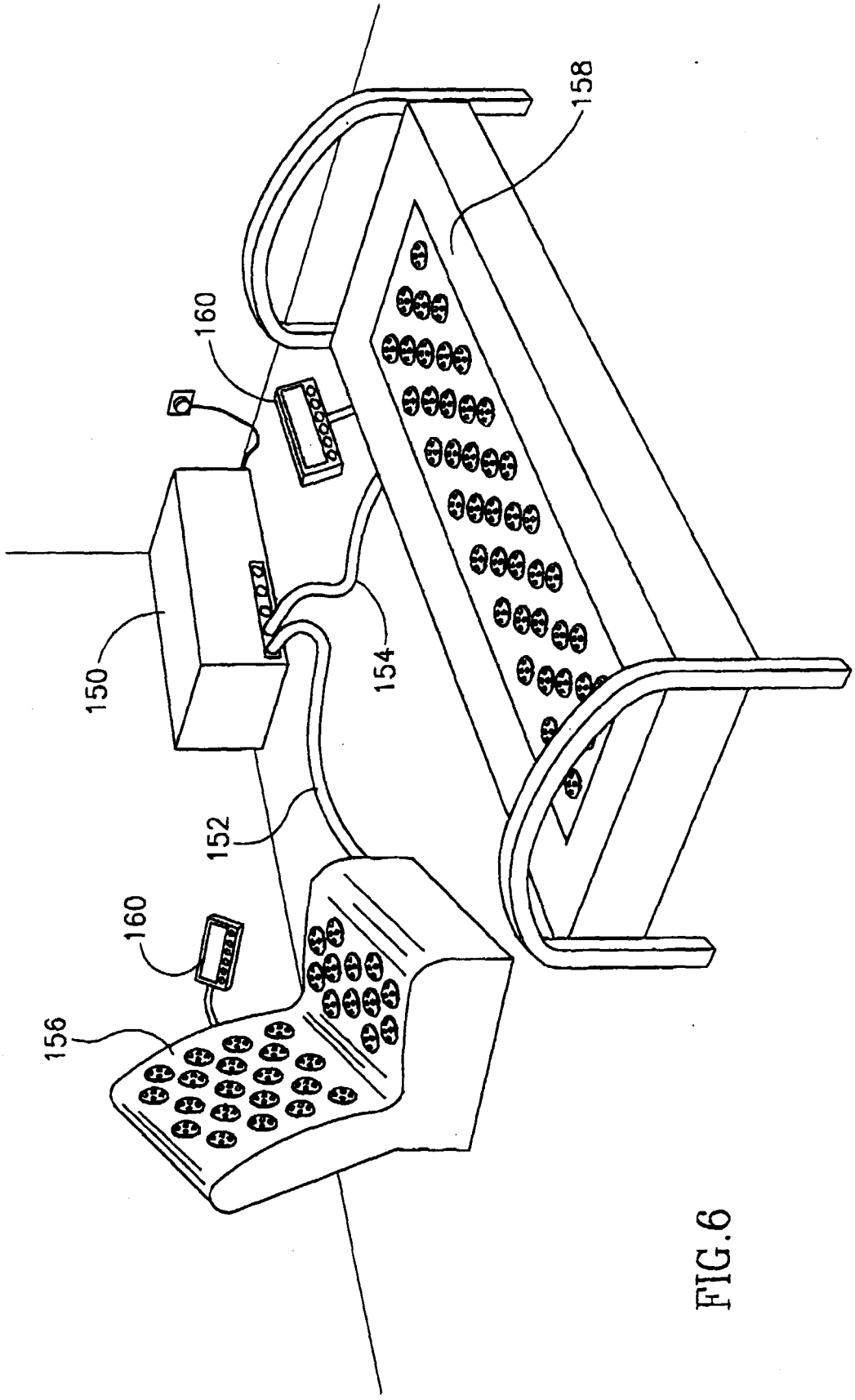

FIG.6

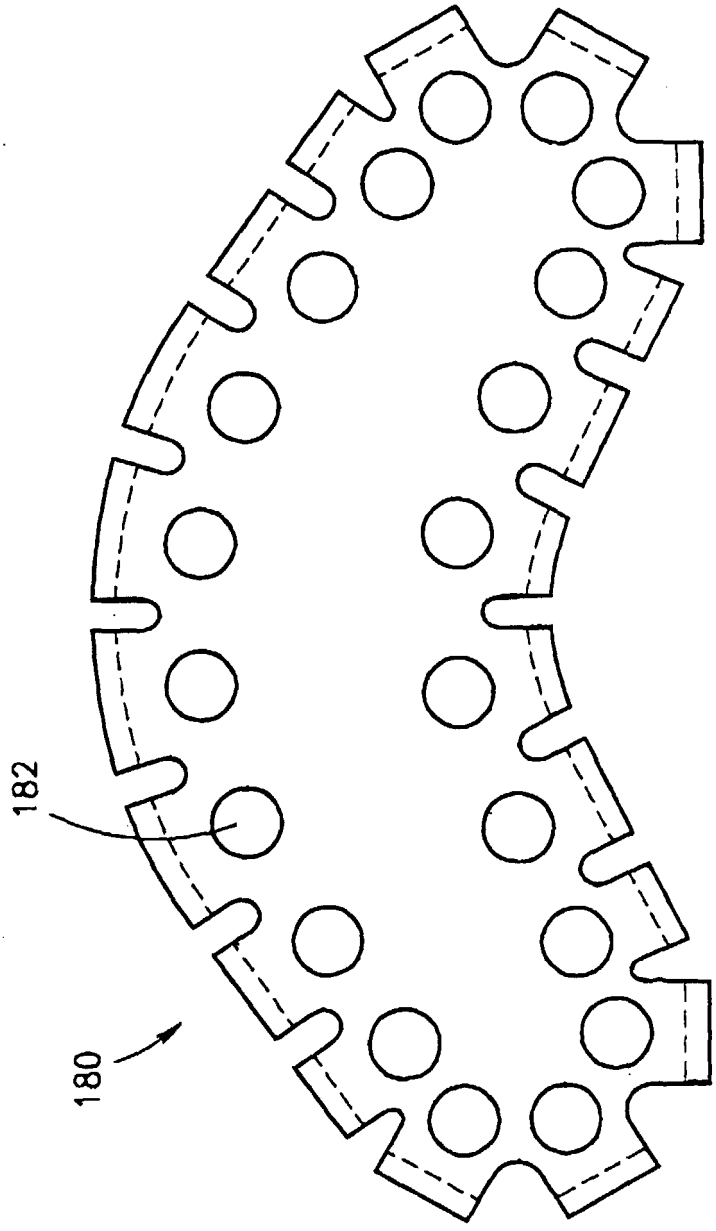

FIG.7

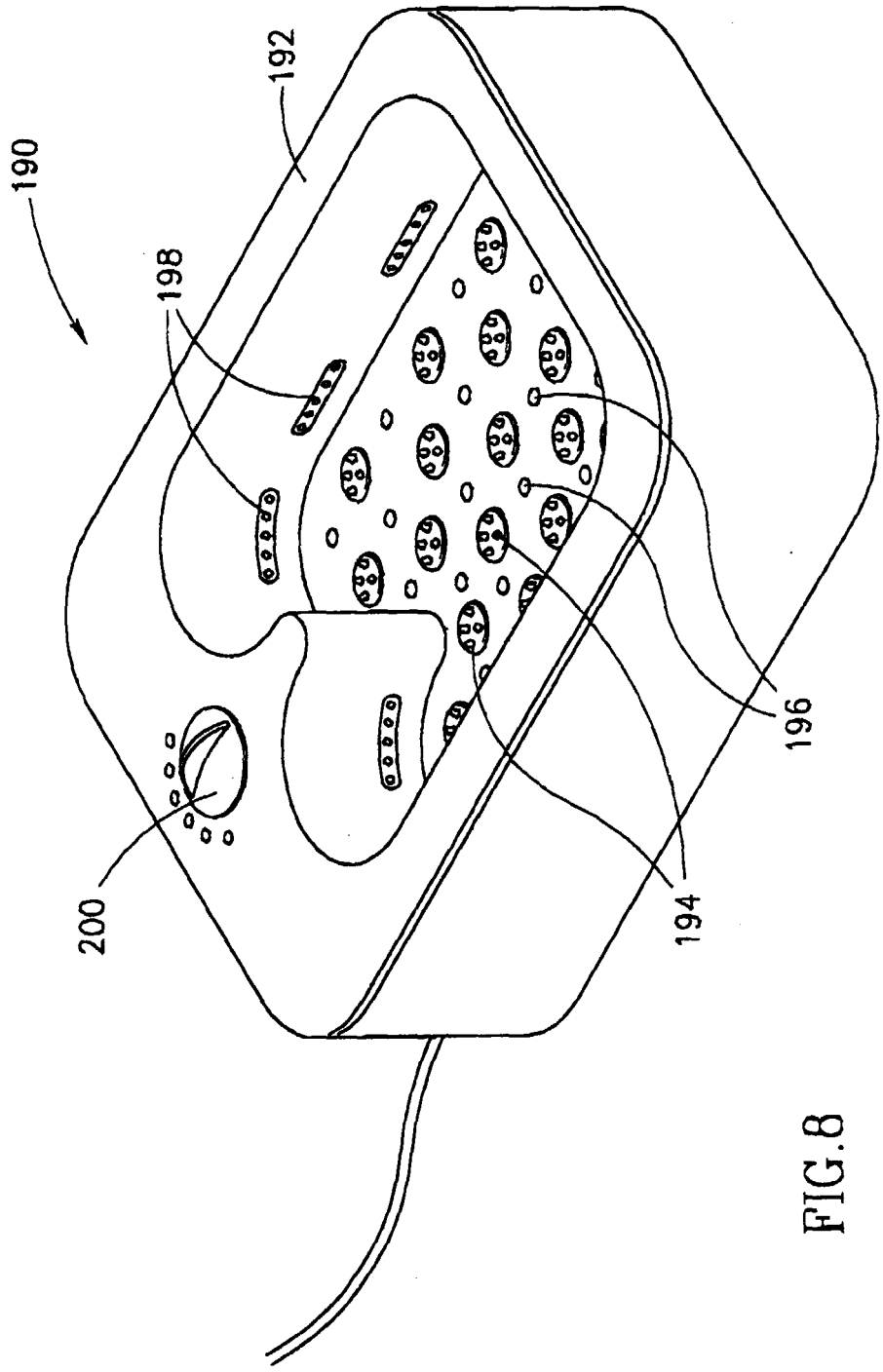

FIG.8