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(54) Insole and container for insoles

(57) The invention relates to an insole (4) to be placed in a shoe, wherein the insole comprises two or more layers and wherein at least one of the two or more layers comprises active substances and particularly is impregnated therewith. The invention further relates to an assembly comprising insoles having a toe side and a heel side and a container (1) for accommodating the insoles therein, wherein the container comprises an opening for taking the insoles out of the container, and a lid for reclosable closing of the opening.

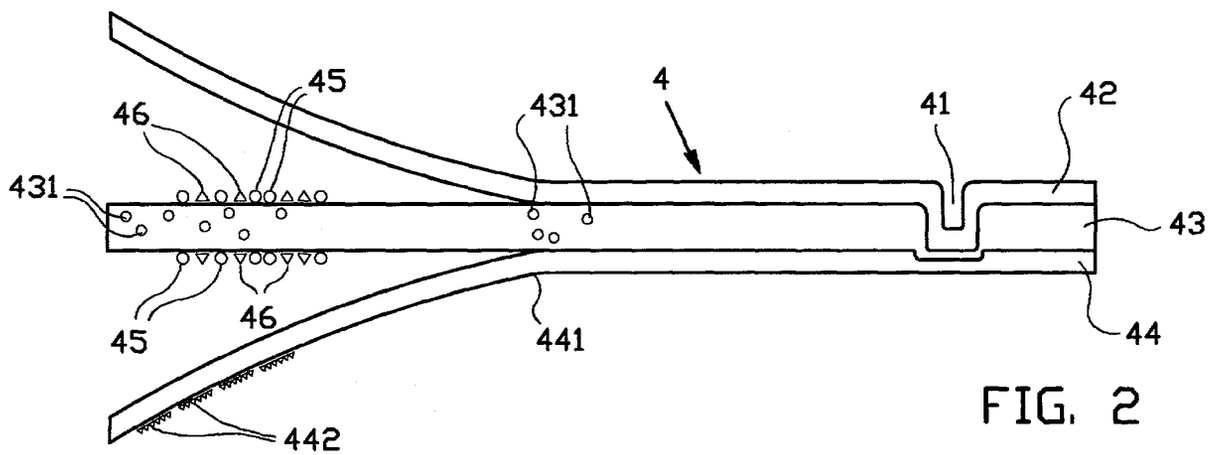

FIG. 2

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Description

[0001] The invention relates to an insole, particularly to a pre-shaped insole, to be placed in a shoe. The invention furthermore relates to a container for insoles, and to an assembly of such a container and at least one insole.

[0002] Insoles have been known for quite some time now in many varieties and variations. Such insoles are often sold packaged in pairs, and are used for offering comfort to the foot. Their principal functions are offering support to the foot in the shoe and offering shock absorption, their secondary function may be the reduction of adverse effects of enclosing the foot in a shoe for a shorter or longer period of time, such as the discomfort of foot odour.

[0003] Many of the existing insoles are meant to be used for a longer period of time. During use over a longer period of time the insoles loose their secondary functions after some time as the effect of active substances providing said secondary functions usually is temporary. Moreover the insoles may after some time loose their shape as a result of which the walking comfort is reduced. A further drawback of such pre-shaped insoles is that they are rather thick which reduces the fit of the footwear of the user. When using such rather thick preshaped insoles a separate insole that shoe manufacturers place in their footwear moreover usually has to be removed for getting the right fit.

[0004] On the other hand thin insoles are known that are meant for single use or for use during a shorter period of time. A drawback of these thin insoles is that they are limp and as a result usually difficult to place in the shoe. In addition the active substances, that may be incorporated in such a thin insole, usually are in direct contact with the ambient as a result the effect of the active substances decreases very rapidly or is totally undone prior to the actual use.

[0005] It is an object of the invention to provide insoles for increasing the comfort of footwear during walking and counteracting the adverse effects of enclosing the foot in a shoe for a longer or shorter period of time.

[0006] A further object of the invention is to package the insoles in new, at least alternative way.

[0007] To that end the invention provides an insole to be placed in a shoe, wherein the insole comprises two or more layers and wherein at least one of the two or more layers comprises active substances and particularly is impregnated therewith.

[0008] Preferably the two or more layers are connected to each other by arranging one or more polymers in between them from a group comprising: ethylene vinyl acetate, polyurethane, polyvinyl acetate, polycaprolactone, polyethylene and copolyamide. In addition to good adhesion properties said one or more polymers offer an important contribution to the firmness of the laminate. The one or more polymers may be added in several forms.

[0009] When it is added as a powder, it is arranged on the substrate to be glued by sprinkling and is subsequently heated (by means of for instance infrared radiation, after which the second substrate is arranged and the laminate is pressed and finally cooled in air.

[0010] Another possibility is the heating of an at room temperature solid polymer to beyond its melting point after which it is arranged as a viscous liquid on the substrate to be glued (so-called "hot melt technique"), after which the second substrate is arranged and pressed and finally the laminate is cooled in air.

[0011] A third possibility is arranging the polymer on the substrate in the form of a waterborne dispersion by means of rollers, after which the second substrate is arranged and pressed and subsequently the laminate is dried in an oven.

[0012] In an embodiment the polymer is arranged in a quantity of 30 to 70 g/m^2, so that there is sufficient adhesion, yet it does not form a blocking layer, so that water vapour and air are still able to pass through. For giving sufficient firmness to the laminate preferably ethylene vinyl acetate, poly vinyl acetate or polycaprolatone are used. Active substances such as for instance moisture and/or odour absorbing substances may be added to these polymers.

[0013] In case the polymer is arranged in the form of a powder, liquid active substances, such as perfumes, preferably as micro capsules or as inclusions mixed with the polymer are incorporated in the glue layer.

[0014] Starch, cyclodextrin, polysaccharides and gelatin may be used for the walls of the micro capsules. Said materials have the advantage of being fully or partially soluble in moisture, as a result of which the micro capsules under the influence of moisture action and friction will not release their contents until desirable to the user.

[0015] In case of an aqueous dispersion the active substances - in liquid or solid form - will have to have the property of being soluble or emulsifiable therein. If such is not the case then these active substances will have to be arranged on the substrate in a separate action, for instance by spraying. This is also the case when the polymer is arranged as a warm molten liquid.

[0016] Preferably the insole is made so thin as to obtain a proper fit and walking comfort without having to remove the insoles that may be present in the shoe supplied by the manufacturer. In comparison with conventional insoles the thin insoles according to the invention offer a more acceptable fit. In addition the breathing capacity may be better because air has to travel a shorter distance through the thin insole. Furthermore thin insoles according to the invention have the advantage that thin insoles take up less volume, which is advantageous in the processing, the transport and storage, and that a relatively large number of such thin insoles may be packaged in a convenient consumer packaging.

[0017] Preferably the two or more layers each have their own functionality. In an embodiment the insole

comprises a moisture permeable layer.

[0018] Preferably said moisture permeable layer is provided with openings for transport of moisture to an underlying layer of the insole.

[0019] Preferably the moisture permeable layer is entirely or partially made of one or more materials selected from a group comprising: polyester, polypropylene, polyacrylate and viscose.

[0020] Particularly suitable materials for this upper layer are polypropylene and/or polyester, optionally treated with surfactants that ensure accelerated moisture transport.

[0021] Preferably the moisture permeable layer comprises a knitting, fabric or non-woven.

[0022] Preferably the moisture permeable layer is provided with one or more active substances selected from a group comprising: surfactants, perspiration inhibitors, antibacterials, microorganism growth inhibitors, fatty matters, perfumes, odour absorbing substances and odour inhibitors.

[0023] Preferably the perspiration inhibitors comprise one or more selected from a group comprising: aluminium compounds, zinc compounds, tea tree oil and salvia oil.

[0024] Preferably the moisture permeable layer forms an outermost layer of the insole for placing at a side of the insole facing away from the sole of the shoe.

[0025] Preferably the thickness of the moisture permeable layer is smaller than or equal to 0.6 mm, and preferably is larger than or equal to 0.3 mm.

[0026] In an embodiment the insole comprises a shock absorbing layer.

[0027] Preferably said shock absorbing layer is entirely or partially made of an elastomer, such as a rubber, foamed material and/or a non-woven.

[0028] Preferably the shock absorbing layer is entirely or partially made of one or more materials selected from a group comprising: latex foam, polyurethane foam, ethylene vinyl acetate, thermoplastic rubber and polyvinyl acetate.

[0029] Preferably the shock absorbing layer is entirely or partially made of non-woven, and wherein the non-woven comprises one or more materials selected from a group comprising: polyester, viscose, blends of polyester and viscose, and cellulose wood pulp.

[0030] Preferably the shock absorbing layer or an additional layer, comprises a polyester non-woven material, preferably provided or impregnated with a very high dose of active carbon for effective control of undesirable foot odours.

[0031] Preferably the shock absorbing layer is provided with one or more active substances selected from a group comprising: moisture absorbing substances, odour absorbing substances, cooling substances, perfumes, anti-perspirants, antibacterials, cooling substances and active carbon.

[0032] Preferably the moisture absorbing substances comprise cellulose derivatives, preferably carboxymethyl cellulose, hydroxyethyl cellulose, starch, xanthan gum, sodium polyacrylate, viscose and/or wood pulp.

[0033] The active substances may be incorporated in the shock absorbing layer in the form of micro capsules and/or in the form of inclusions.

[0034] The micro capsules and/or inclusions preferably comprise an outer wall that is soluble in moisture.

[0035] Preferably the thickness of the shock absorbing layer is smaller than or equal to 3.0 mm, and preferably is larger than or equal to 0.3 mm.

[0036] In an embodiment the insole comprises a supporting layer.

[0037] Preferably said supporting layer comprises a foam material. Preferably the foam material comprises ethylene vinyl acetate foam and/or polyethylene foam.

[0038] Preferably the supporting layer is perforated.

[0039] Preferably the supporting layer comprises recesses in which a resilient material has been placed. Preferably the resilient material comprises an elastomer, preferably a thermoplastic elastomer. Preferably the recesses are at least arranged in a part of the insole for supporting a heel of the user and/or in a part of the insole for supporting the ball of the foot of the user.

[0040] In a further embodiment the resilient materials comprise visco-elastic materials, such as for instance a thermoplastic elastomer. This particularly occurs in recesses at positions where the ball of the foot and the heel of the foot rest, because during the walking motion the most pressure is exerted at those places. Such an elastomer or visco-elastic part offers a springy effect due to which walking or running requires less energy.

[0041] Preferably said supporting layer forms an outermost layer of the insole for placing at a side of the insole facing the sole of the shoe.

[0042] Preferably the thickness of the supporting layer is smaller than or equal to 6 mm.

[0043] In an embodiment the insole comprises at least three layers, wherein the at least three layers comprise a moisture permeable layer, a shock absorbing layer and a supporting layer. The shock absorbing layer preferably is placed in between the moisture permeable layer and the supporting layer.

[0044] Such an insole generally consists of at least three layers, comprising a moisture permeable upper layer of woven fabric, an intermediate layer having a large shock absorbing and water absorbing capacity, and a bottom layer offering support and able to provide the insole with an optimal fit.

[0045] The upper layer is characterised by its ability to transport the moisture secreted by the foot as fast as possible to the layer or layers of the insole that lie underneath it. An important secondary property of the upper layer is the comfortable feel to the skin of the foot so that the insole can also be used bare-footed. In an embodiment it is preferred that the upper layer further is wear-resistant and colourproof which gives the insole an acceptable durability. In addition the colour of the upper layer is selected such so as to be least striking in

comparison with the colour of the inside of the majority of the commercially available shoes. The material of the upper layer may furthermore be impregnated with substances that inhibit the growth of microorganisms, so as to reduce the development of undesirable foot odours.

[0046] The intermediate layer preferably is made of polyurethane foam having both a large shock absorbing and water absorbing capacity. Polyurethane foam provides an advantageous shock absorption and has a more permanent elasticity and less permanent deformation as a result of discontinuous pressure load during the walking motion than for instance latex foam. The polyurethane foam is for instance made by pressing together and simultaneous binding ground open-celled flexible polyurethane foam, which results in a relative high density of approximately 200 kg/m^3. Another advantage of this material is that it has a large water absorption capacity. Moreover said material is capable of absorbing water very quickly. In addition pigments, active carbon and antibacterials may very well be added to this material.

[0047] In an alternative embodiment the intermediate layer or an additional layer comprises a polyester and/or viscose non-woven with sodium polyacrylate therein. Preferably the sodium polyacrylate is chemically bound, glued or imbibed in the non-woven. Said sodium polyacrylate has a very high moisture absorbing capacity, due to which perspiration moisture of the foot is rapidly taken away.

[0048] The bottom layer or supporting layer preferably is provided with a foam material, for instance cross-linked ethylene vinyl acetate foam, offering support to the foot and the body. Said ethylene vinyl acetate foam preferably has a density of 115 to 135 kg/m^3, and a hardness of 35 to 40 Shore A. Furthermore the foam material has a low permanent deformability, namely a thickness reduction of 5% at the most after 10800 pressing motions (testing method Satra PM 159), and proper shock absorbing properties characterised by a reduction in the fall deceleration of DIN rubber of at least 25% (testing method Satra TM 142).

[0049] Although the third layer of the insole offers a certain degree of firmness, it usually turns out to be insufficient for obtaining the desired firmness. By using the above-mentioned gluing by means of one or more polymers, a good firmness can be obtained. In an embodiment extra firmness is obtained by providing the insole with a slightly hollow shape. Said hollow shape may for instance be obtained by means of raised edges. The insole may also be given a slight curvature which, after the insole has been placed in the shoe, is ended by the pressure of the foot. In addition the insole may in the longitudinal direction be provided with a line-shaped thinning, along which the insole may bend during insertion. Naturally several line-shaped weakenings may be arranged for this purpose.

[0050] In the case of the alternative embodiments, wherein the intermediate layer comprises a non-woven material, the wanted firmness is obtained by using ethylene vinyl acetate foam having a density of 70 to 90 kg/m^3, a hardness of 20 to 25 Shore A.

[0051] Preferably a bottom layer of ethylene vinyl acetate foam having a closed cell structure is perforated for making the transport of moisture possible. Preferably the perforations have a round shape having a diameter larger than or equal to 1 mm, and preferably smaller than or equal to 5 mm.

[0052] In a embodiment the two or more layers are connected to each other by means of a glue connection, fusing together and/or ultrasonic welding. By laminating the two or more layers by means of glue and heating the laminate (after drying) in an oven of approximately 170°C for at least 1 minute and subsequently pressing it together in a steel die having recesses according to specified dimensions, the insole may be given an optimal fit. For optimal control of foot odours for instance active substances such as perfumes and antibacterials may be added to the glue.

[0053] In an embodiment the insole comprises indentations and/or continuous perforations extending through one or more layers. In an embodiment the one or more layers are pressed together near the indentations and/or continuous perforations.

[0054] Preferably the indentations and/or continuous perforations are defined by hollow needles or little tubes.

[0055] In an embodiment the active substances show a phase transition in a temperature range of 20 to 36 degrees Celsius. In a first further development of the embodiment of the insole compounds may be added that melt at approximately 32 degrees Celsius for extracting energy and heat from the foot, as a result the insole may offer a cooling effect to the feet. In a second further development of this embodiment of the insole compounds may be added that solidify at approximately 30 degrees Celsius for releasing energy, as a result of which the insole may give a heating effect to the feet. Such substances may also be combined, as a result of which at too high a temperature of the foot the substances extract heat and at too low a temperature of the foot release energy. As a result the foot temperature is constantly kept in a comfortable temperature zone.

[0056] In a further embodiment the insole comprises heat-conducting elements. Preferably the heat-conducting elements extend from a portion of the insole which when used is placed near the foot arch to a portion placed near the toes and/or a portion placed near the heel. Heat from the warmer foot arch may thus be transported to the colder projecting parts of the feet.

[0057] In an embodiment the active substances show a phase transition under the influence of a mechanic shock. In a further embodiment at least in one of the layers of the insole one or more compartments have been formed containing the active substances. Preferably the active substances comprise an aqueous solution of sodium acetate. Preferably the aqueous solution of sodium acetate is super cooled so that it crystallises

when the solution is activated by the user by means of a motion of the toes. Due to the mechanic shock crystallisation heat is released as a result of which the insole warms the foot.

[0058] An advantage of this solution is that it can be reused by reactivating the sodium acetate by heating the sole and subsequently cooling it down.

[0059] In an embodiment the insole comprises heat reflecting ceramic fibres. Such ceramic fibres transmit thermal energy as a result of the vibrations in far infrared. The feet may be offered extra warmth by means of the insole in this way as well.

[0060] In an embodiment the active substances are soluble in moisture and during dissolving in moisture are subjected to an endothermal reaction. Preferably the active substances comprise one or more selected from a group comprising: ammonium chloride, potassium nitrate, ammonium nitrate and Glauber salt (Na_2SO_4 * 10 H_2O). When feet secrete perspiration the sole will thus offer a cooling effect to the feet.

[0061] In an embodiment the active substances are enclosed in a semi-permeable matrix. Such a semi-permeable matrix for instance allows perspiration moisture to pass through, yet stops transport of the compounds to the outside. Using such a semi-permeable matrix is particularly advantageous in combination with the active substances incorporated herein, such as for instance the above-mentioned active substances that are soluble in moisture and during dissolving in moisture are subjected to an endothermal reaction.

[0062] In an embodiment the active substances comprise magnetic, antistatic and/or electrically conductive materials.

[0063] Preferably the insole is provided with magnetic means for discharging magnetic fields. Particularly when said magnetic materials are positioned at locations where the so-called gang/ions of the feet are located, said insoles will stimulate the ganglions of the feet and thus improve the blood circulation and increase the oxygen discharge level. As a result the insole may provide the entire body of the user with extra energy.

[0064] Preferably the insole is provided with antistatic and/or electrically conductive materials. Said antistatic and/or electrically conductive materials may stop the build-up of static electricity in the body and discharge it via the ground, as a result of which a safeguard against electric shocks can be obtained.

[0065] In an embodiment the insole has a thickness that decreases from the heel side towards the toe side, and it is preferably provided with upward oriented support portions at the positions where, when used, the foot arch and the heel rest. Preferably the thickness of the insole, at least a portion of the insole for supporting a heel of a user, is smaller than or equal to 6 mm, and preferably smaller than or equal to 4 mm. Preferably the thickness of the insole decreases from a heel side of the insole towards a toe side of the insole. Preferably the thickness of the toe side is smaller than or equal to 1 mm.

[0066] Preferably this embodiment with decreasing thickness relates to a pre-shaped insole to be placed in a shoe. The shape of the insole is selected such so as to offer an optimal fit in the majority of commercially available shoes (of a certain size), and to distribute the pressure of the body exerted on the insole as much as possible over the surface of said insole. This is characterised by accurately chosen lengths and breadths, by the thickness that decreases from the heel side to the toe side and by upward oriented supporting parts at positions where the foot arch and the heel rest. The thickness course is chosen such that it is possible to insert the insole in the shoe without having to remove the inner sole that is already present in the shoe and without causing a squeezing effect.

[0067] In an embodiment the side edges of the insole comprise a raised edge. In this way the insole is able to better support the foot, particularly the heel of the user, and particularly sideward as well. Due to this raised edge the foot is also cooled off to a lesser degree at lower ambient temperatures.

[0068] In an embodiment the insole comprises an outermost layer which at a side oriented to an outer side of the insole is provided with size marks. The insole may thus be cut to size by the user.

[0069] According to a further aspect the invention provides a method for manufacturing an insole as described above, wherein:

the two or more layers are laminated by means of glue;
the laminate after drying is heated in an oven, and subsequently is pressed into the wanted shape in a die.

[0070] Preferably the die presses the laminate in the wanted profile shape.

[0071] Preferably the wanted profile shape of the insole comprises a raised edge at the side edges of the insole.

[0072] According to a further aspect the invention provides an assembly comprising insoles having a toe side and a heel side and a container for accommodating the insoles therein, wherein the container comprises an opening for taking one or more of the insoles out of the container, and a lid for reclosable closing of the opening.

[0073] With the container according to the invention the possibility is offered for packaging a large number of insoles in one packaging, wherein when needed a new pair of insoles can be taken out of the packaging, after which the packaging can be reclosed.

[0074] On the one hand the invention thus provides a new and alternative packaging for insoles that is environment-friendlier than the commonly used disposable packaging in which the known insoles packaged in pairs are offered in shops.

[0075] On the other hand the assembly according to

the invention, wherein two or more pairs of insoles are placed in the container, provides a spare stock of insoles. When the pair of insoles in use lose their shape and/or their secondary functions after some time, there are further pairs of insoles in the container for replacing the used ones. By regularly using new insoles the comfort of footwear during walking and the disadvantageous effects of enclosing the foot in a shoe for a longer period of time may be counteracted.

[0076] In an embodiment the lid and/or the container comprise a substantially airtight closure for closing off the opening. Due to the airtight closure it is at least substantially prevented that the active substances in the insoles in the container prematurely loose their effect.

[0077] In an embodiment the container comprises an elongated box having a first and a second end, wherein the first end comprises the opening and wherein the second end is permanently closed. By placing the opening at an end the insoles may easily be taken out of the container substantially without bending or folding them.

[0078] Preferably the first end and the lid comprise a first and a second circumferential edge, respectively, wherein the first and the second circumferential edge overlap each other for closing the opening. Thus the lid and the first end may be slid over each other for closing off the opening. In a simple embodiment the first circumferential edge comprises a neck and the second circumferential edge comprises a collar, wherein the collar can be slid over the neck.

[0079] In a further embodiment the first and the second circumferential edge comprise first and second closing means, respectively, wherein the first and second closing means in cooperation with each other form a closure, preferably a reclosable and/or airtight closure.

[0080] In a simple embodiment the first and the second closing means comprise a groove and a projecting rib, respectively, wherein the groove is placed at a side facing the second circumferential edge and at least partially runs around the first circumferential edge and wherein the rib is placed at a side facing the first circumferential edge and at least partially runs around the second circumferential edge for forming a closure in cooperation with the groove. Preferably the elongated box comprises longitudinal side walls defining a substantially rectangular cross-section, wherein two opposite longitudinal side walls are provided with the groove or the rib.

[0081] In a further embodiment the lid forms a cap for enclosing the first end of the container. Preferably the cap is provided with thumb surfaces for releasing the cap from the first end of the container by pressing in. Preferably the cap comprises longitudinal side walls defining a substantially rectangular cross-section, wherein the thumb surfaces preferably are placed at two opposite longitudinal side walls of the cap. By pressing in the thumb surfaces of the cap which surfaces are situated at opposite longitudinal side walls, the cap will deform, as a result of which the two other longitudinal side walls that are situated substantially perpendicular to the longitudinal side walls having the thumb surfaces, deform oriented to the outside wherein a groove and rib closure as described above is released after which the cap can be taken off from the container.

[0082] In an embodiment the elongated box comprises longitudinal side walls defining a substantially rectangular cross-section, wherein two opposite longitudinal side walls of the elongated box at least in part substantially follow the contours of an insole. Preferably the second end substantially follows the contours of a heel side of the insole. Preferably the first end substantially follows the contours of a toe side of the insole. Thus the container with lid has the same contours as the insoles placed therein, wherein the cap for closing the opening is placed at the toe side of the elongated box and the insoles placed therein.

[0083] Preferably the cap is formed such that it encloses a part of the insole, preferably at the toe side of the insole. After taking away the cap the insoles, at least the toe side thereof, protrude from the container and may thus easily be taken out of the container.

[0084] According to a further aspect the invention provides a container, adapted and intended for use in an assembly for containing insoles as described above.

[0085] According to a further aspect the invention provides a case for a stack of insoles comprising an opening for taking the insoles out of the case, and a lid for reclosable closing of the opening. Preferably the case has a toe side and a heel side, respectively, wherein the lid preferably is placed at a toe side of the case. Preferably the case and/or the lid comprise a substantially airtight closure for closing the opening.

[0086] The invention will be further elucidated on the basis of the further exemplary embodiments shown in the attached drawings, in which:

Figure 1 shows a schematic top view of an insole according to the invention;

Figure 2 shows a schematic view in cross-section, partially in exploded condition, of a part of the insole of figure 1,

Figure 3 shows a schematic view of a container for accommodating the insoles according to the invention therein;

Figure 4 shows a schematic view of the container of figure 3, wherein the cap for reclosable closing of the opening is detached, and

Figures 5A and 5B show schematic bottom views of the cap.

[0087] Figures 1 and 2 show a top view and a part of a view in cross-section of an exemplary embodiment of an insole 4 according to the invention. The upper side

of said insole 4 is provided with indentations 41 that are regularly distributed over the surface. Said indentations 41 can be made by pressing a stamp into the upper side of the insole 4. The layers 42, 43, 44 of the insole 4 are pressed together as shown in figure 2.

[0088] The exemplary embodiment of the insole 4 as shown in figure 2 comprises three layers, namely a moisture permeable upper layer 42, a moisture absorbing layer 43 and a supporting layer 44.

[0089] The moisture absorbing intermediate layer 43 is provided with moisture absorbing substances 431. Due to the indentations 41 an improved moisture transport to the moisture absorbing intermediate layer 43 is achieved.

[0090] At its bottom side 441, the supporting layer 44 is at least partially provided with antiskid 442, as a result of which the insole 4 slides less over the inner sole of a shoe.

[0091] The three layers 42, 43, 44 are laminated into an insole by means of a glue connection. The intermediate layer between the layers 42, 43, 44 therefore comprises glue 45 for instance comprising one or more polymers such as discussed above. In addition said intermediate layer is provided with aromatic substances 46 such as perfumes.

[0092] Figure 3 shows an exemplary embodiment of a container 1 for insoles 4 according to the invention. The container 1 comprises a flat box 2 having a substantially rectangular cross-section. At a first end 21 the box 2 is provided with an opening which is reclosably closed off by a cap 3. In this exemplary embodiment both the box 2 and the cap 3 are made of synthetic material. At a second end 22 the box is furthermore permanently closed.

[0093] The longitudinal side walls 23, 24 of the flat box 2 and the cap 3 comprise an upper side 24, 31 and a bottom side (not shown) which together substantially follow the contours of an insole 4. In this exemplary embodiment the first end 21 of the box 2 and the cap 3 follow the contours of a toe side of the insole 4, and the second end 22 of the box 2 follows the contours of a heel side of the insole 4. Because the toe side of the insole 4 comprises the widest portion of said insole 4, the opening is placed at or near the widest portion of the box 2, as a result of which the insoles 4 can easily be placed in the box 2 and can easily be taken out of the box 2 by the user.

[0094] Due to their shape and/or surface, the upper side 24 and the bottom side (not shown) of the box 2 are especially suitable for placing informative texts or pictures, brand indications and/or advertisements on them.

[0095] The cap 3 of the preferred embodiment as shown in figure 3 encloses the toe side of insoles 4 placed in the box 2. The upper side 31 and the bottom side (not shown) of the cap 3 is provided with thumb surfaces 32 for releasing the cap 3 from the box 2 by pressing them in, as described below.

[0096] Figure 4 shows the preferred embodiment of figure 3 with the box 2 and the cap 3 in a separated condition. A stack 7 of insoles 4 is schematically indicated which can be accommodated in the container 1. In figure 4 the entire stack 7 is partially slid out of the box 2. When the entire stack 7 is slid into the box 2 only a small portion of the toe side of the insoles 4 protrudes from the box 2, which small portion is enclosed by the cap 3 when the container 1 is closed off.

[0097] In the opened condition as shown in figure 4 the first end 21 of the box 2 is provided with a circumferential edge 8. The transition of the longitudinal side planes 23, 34 of the box 2 to the circumferential edge 8 comprise a step 82 oriented towards the inside of the box 2. A circumferential edge 9 of the cap 3 can now be fittingly slid over the circumferential edge 8 of the box 2 for closing off the opening of the box 2. Here the outer sides of the side walls 31, 33, 35, 36 of the cap 3 substantially continuously connect to the outer sides of the longitudinal side planes 23, 24 of the box 2.

[0098] The container 1 according to this exemplary embodiment is also provided with closing means formed by grooves 81 in the circumferential edge 8 and ribs 10 extending towards the inner side of the cap 3. When closing or reclosing the container 1, the cap 3 is slid over the circumferential edge 8 of the box 2. When the circumferential edge 9 of the cap 3 at least substantially abuts the step 82 of the box 2, the projecting ribs 10 fall into the grooves 81 for forming a closure. As a result a substantially airtight closure between the cap 3 and the box 2 is achieved.

[0099] In an exemplary embodiment the longitudinal side walls 24, 23 of the box 2 and the side walls 31, 34, 35, 36 of the cap 3 are formed as a surface that is convex to the outside, such as shown in relation to the cap 3 in figure 5A. For opening the container 1 the thumb surfaces or pressure surfaces 32, 34 at the upper side 31 and the lower side 33 of the cap 3 have to be pressed in in the direction A as shown in figure 5B. As a result the cap 3 is deformed such that the side walls 35, 36 give way in the direction B as shown in figure 5B. As a result the ribs 10 are at least partially lifted out of the grooves 81 due to which the closure can be released for opening the container 1.

[0100] It is observed here that the embodiments of the invention described above are meant to illustrate the invention and not to limit the invention. A person skilled in the art will certainly be capable of designing alternative embodiments that fall within the scope of protection of the attached claims.

Claims

1. Insole to be placed in a shoe, wherein the insole comprises two or more layers and wherein at least one of the two or more layers comprises active substances and particularly is impregnated therewith.

2. Insole according to claim 1, wherein the two or more layers comprise a moisture permeable layer, wherein said moisture permeable layer preferably is provided with openings for a transport of moisture to an underlying layer of the insole, wherein the moisture permeable layer preferably comprises a knitting, fabric or non-woven, wherein the moisture permeable layer preferably forms an outermost layer of the insole for placing at a side of the insole facing away from the sole of the shoe, and wherein the thickness of the moisture permeable layer preferably is smaller than or equal to 0.6 mm, and preferably is larger than or equal to 0.3 mm.

3. Insole according to claim 2, wherein the moisture permeable layer is entirely or partially made of one or more materials selected from a group comprising: polyester, polypropylene, polyacrylate and viscose.

4. Insole according to claim 2 or 3, wherein the moisture permeable layer is provided with one or more active substances selected from a group comprising: surfactants, perspiration inhibitors, antibacterials, microorganism growth inhibitors, fatty matters, perfumes, odour absorbing substances and odour inhibitors.

5. Insole according to claim 4, wherein the perspiration inhibitors comprise one or more selected from a group comprising: aluminium compounds, zinc compounds, tea tree oil and salvia oil.

6. Insole according to claim 1, wherein the two or more layers comprise a shock absorbing layer, wherein said shock absorbing layer preferably is entirely or partially made of a foam material and/or a non-woven, and wherein the thickness of the shock absorbing layer preferably is smaller than or equal to 3.0 mm, and preferably is larger than or equal to 0.3 mm.

7. Insole according to claim 6, wherein the shock absorbing layer is entirely or partially made of one or more materials selected from a group comprising: latex foam, polyurethane foam, ethylene vinyl acetate, thermoplastic rubber and polyvinyl acetate.

8. Insole according to claim 6, wherein the shock absorbing layer is entirely or partially made of non-woven, and wherein the non-woven comprises one or more materials selected from a group comprising: polyester, viscose, blends of polyester and viscose, and cellulose wood pulp.

9. Insole according to claim 8, wherein the shock absorbing layer comprises a layer of sodium polyacrylate, wherein the sodium polyacrylate is cross-linked with the non-woven.

10. Insole according to any one of the claims 6-9, wherein the shock absorbing layer is provided with one or more active substances selected from a group comprising: moisture absorbing substances, odour absorbing substances, perfumes, anti-perspirants, antibacterials, cooling substances and active carbon.

11. Insole according to claim 10, wherein the moisture absorbing substances comprise cellulose derivatives, preferably carboxymethyl cellulose, hydroxyethyl cellulose, starch, xanthan gum, sodium polyacrylate, viscose and/or wood pulp.

12. Insole according to any one of the claims 6-11, wherein the active substances are incorporated in the shock absorbing layer in the form of micro capsules and/or in the form of inclusions, and wherein the micro capsules preferably comprise an outer wall that is soluble in moisture.

13. Insole according to claim 1, wherein the two or more layers comprise a supporting layer, wherein said supporting layer preferably comprises a foam material, wherein said supporting layer preferably forms an outermost layer of the insole for placing at a side of the insole facing the sole of the shoe, and wherein the thickness of the supporting layer preferably is smaller than or equal to 6 mm, preferably smaller than or equal to 4 mm.

14. Insole according to claim 13, wherein the foam material preferably comprises ethylene vinyl acetate foam and/or polyethylene foam.

15. Insole according to claim 13 or 14, wherein the supporting layer is perforated.

16. Insole according to claim 13, 14 or 15, wherein the supporting layer comprises recesses in which a resilient material has been placed, wherein the resilient material preferably comprises an elastomer, preferably a thermoplastic elastomer, and wherein the recesses preferably are at least arranged in a part of the insole for supporting a heel of the user and/or a part of the insole for supporting the ball of the foot of the user.

17. Insole according to any one of the preceding claims, wherein the insole comprises at least three layers, wherein the at least three layers comprise a moisture permeable layer, a shock absorbing layer and a supporting layer, wherein the shock absorbing layer preferably is placed in between the moisture permeable layer and the supporting layer.

18. Insole according to any one of the preceding claims, wherein the two or more layers are connected to each other by means of a glue connection, fusing together and/or ultrasonic welding.

19. Insole according to any one of the preceding claims, wherein the insole comprises indentations and/or continuous perforations extending through one or more layers, wherein preferably the one or more layers are pressed together near the indentations and/or continuous perforations, and wherein the indentations and/or continuous perforations preferably are defined by hollow needles or little tubes.

20. Insole according to any one of the preceding claims, wherein the active substances show a phase transition in a temperature range of 20 to 36 degrees Celsius.

21. Insole according to any one of the preceding claims, wherein the insole comprises heat-conducting elements, which preferably extend from a portion of the insole which when used is placed near the foot arch to a portion placed near the toes and/or the heel.

22. Insole according to any one of the preceding claims, wherein the active substances show a phase transition under the influence of a mechanic shock, wherein preferably at least in one of the layers of the insole one or more compartments have been formed containing the active substances, wherein the active substances preferably comprise an aqueous solution of sodium acetate.

23. Insole according to any one of the preceding claims, wherein the insole comprises heat reflecting ceramic fibres.

24. Insole according to any one of the preceding claims, wherein the active substances are soluble in moisture and during dissolving in moisture produce an endothermal reaction, wherein the active substances preferably comprise one or more selected from a group comprising: ammonium chloride, potassium nitrate, ammonium nitrate and Glauber salt.

25. Insole according to claim 24, wherein the active substances are enclosed in a semipermeable matrix.

26. Insole according to any one of the preceding claims, wherein the active substances comprise magnetic, antistatic and/or electrically conductive materials.

27. Insole according to any one of the preceding claims, wherein the thickness of the insole decreases from a heel side of the insole towards a toe side of the insole, wherein the thickness of a portion of the insole for supporting a heel of a user, preferably is smaller than or equal to 6 mm, preferably smaller than or equal to 4 mm.

28. Insole according to claim 27, wherein the thickness of a portion of the insole for supporting the toes of a user is smaller than or equal to 1 mm.

29. Insole according to any one of the preceding claims, wherein the side edges of the insole comprise a raised edge.

30. Insole according to any one of the preceding claims, wherein the insole comprises an outermost layer which at a side oriented to an outer side of the insole is provided with size marks.

31. Method for manufacturing an insole according to any one of the preceding claims, wherein:

the two or more layers are laminated by means of glue;
the laminate after drying is heated in an oven, and subsequently is pressed into the wanted shape in a die,

wherein preferably the die presses the laminate in the wanted profile shape, and wherein the wanted profile shape preferably provides the insole with a raised edge at the side edges of the insole.

32. Method according to claim 31, wherein the glue comprises one or more polymers from a group comprising: ethylene vinyl acetate, polyurethane, polyvinyl acetate, polycaprolactone, polyethylene and copolyamide.

33. Assembly comprising insoles having a toe side and a heel side and a container for accommodating the insoles therein, wherein the container comprises an opening for taking one or more of the insoles out of the container, and a lid for reclosable closing of the opening, wherein the lid and/or the container preferably comprise a substantially airtight closure for closing off the opening.

34. Assembly according to claim 33, wherein the container comprises an elongated box having a first and a second end, wherein the first end comprises the opening and wherein the second end is permanently closed.

35. Assembly according to claim 34, wherein the first end and the lid comprise a first and a second circumferential edge, respectively, wherein the first and the second circumferential edge overlap each other for closing the opening, wherein preferably the first circumferential edge comprises a neck and

the second circumferential edge comprises a collar, wherein the collar can be slid over the neck.

36. Assembly according to claim 35, wherein the first and the second circumferential edge comprise first and second closing means, respectively, wherein the first and second closing means in cooperation with each other form a closure.

37. Assembly according to claim 36, wherein the first and the second closing means comprise a groove and a projecting rib, respectively, wherein the groove is placed at a side facing the second circumferential edge and at least partially runs around the first circumferential edge and wherein the rib is placed at a side facing the first circumferential edge and at least partially runs around the second circumferential edge for forming a closure in cooperation with the groove.

38. Assembly according to claim 36 or 37, wherein the elongated box comprises longitudinal side walls defining a substantially rectangular cross-section, wherein two opposite longitudinal side walls are provided with the groove or the edge.

39. Assembly according to any one of the claims 34-38, wherein the elongated box comprises longitudinal side walls defining a substantially rectangular cross-section, wherein two opposite longitudinal side walls of the elongated box at least partially substantially follow the contours of an insole, wherein preferably the second end substantially follows the contours of a heel side of the insole, and wherein preferably the first end substantially follows the contours of a toe side of the insole.

40. Assembly according to claim 39, wherein the lid forms a cap for enclosing a toe side of insoles placed in the container, wherein the cap preferably is provided with thumb surfaces for releasing the cap from the first end of the container by pressing in, and wherein the cap preferably comprises longitudinal side walls defining a substantially rectangular cross-section, wherein the thumb surfaces preferably are placed at two opposite longitudinal side walls of the cap.

41. Container, adapted and intended for use in an assembly according to claims 33-40, for containing insoles.

42. Case for a stack of insoles comprising an opening for taking the insoles out of the case, and a lid for reclosable closing of the opening, wherein the case preferably has a toe side and a heel side, respectively, wherein the lid preferably is placed at a toe side of the case, and wherein the case and/or the lid preferably comprise a substantially airtight closure for closing the opening.

43. Use of a case according to claim 42 for containing insoles.

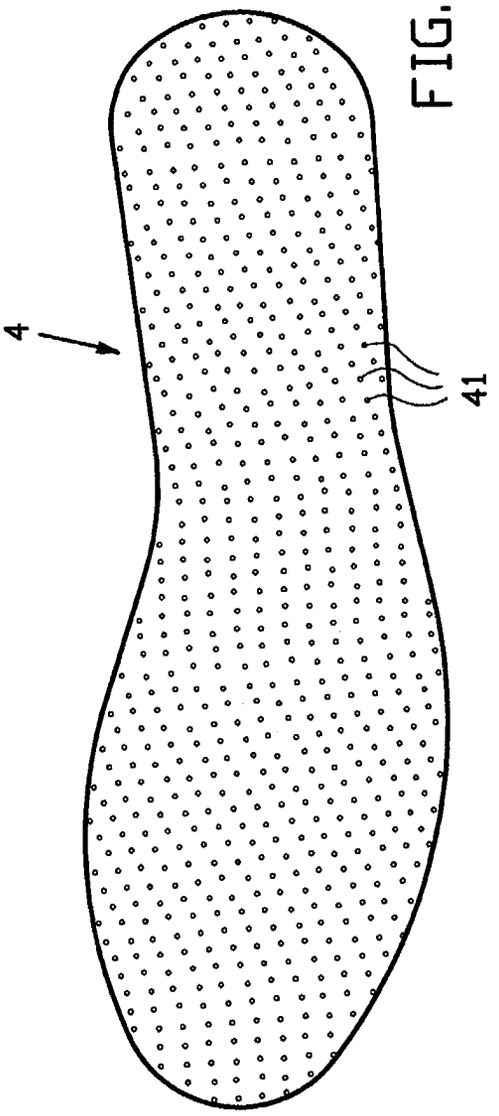

FIG. 1

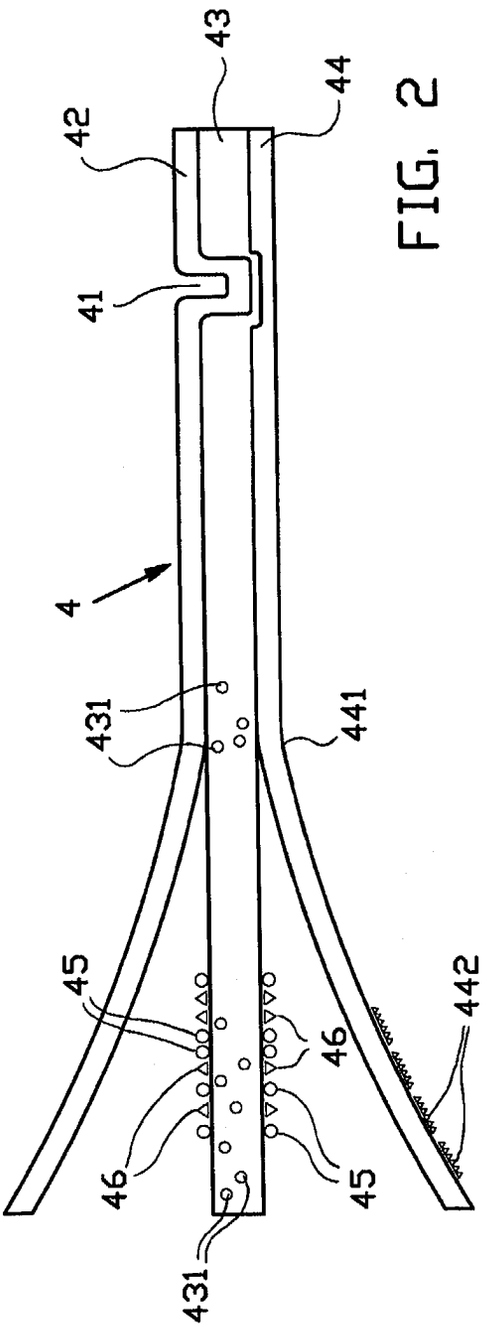

FIG. 2

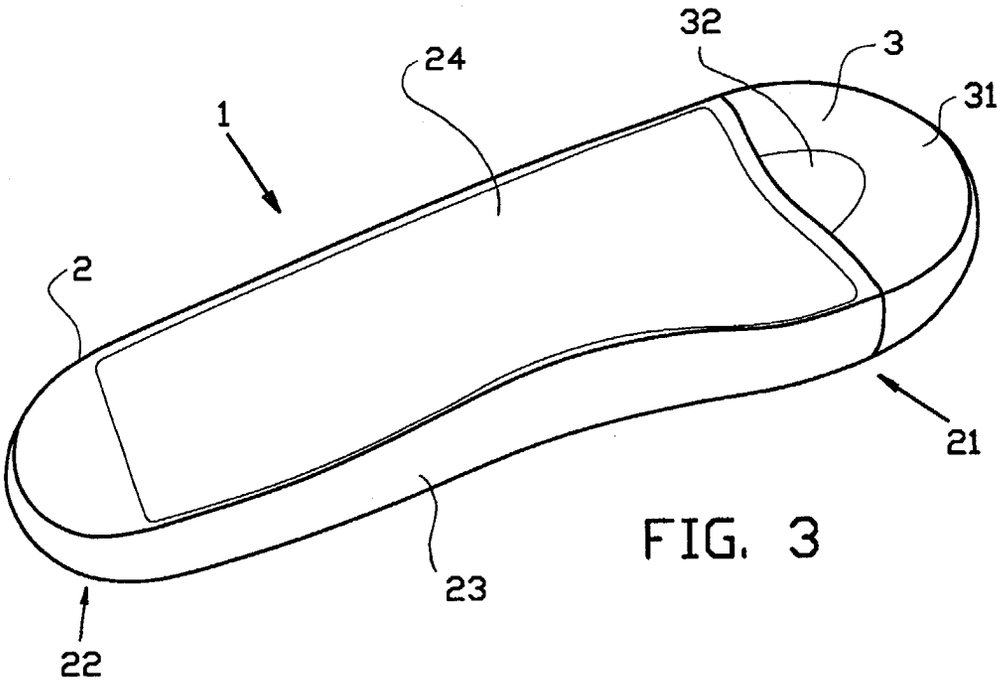

FIG. 3

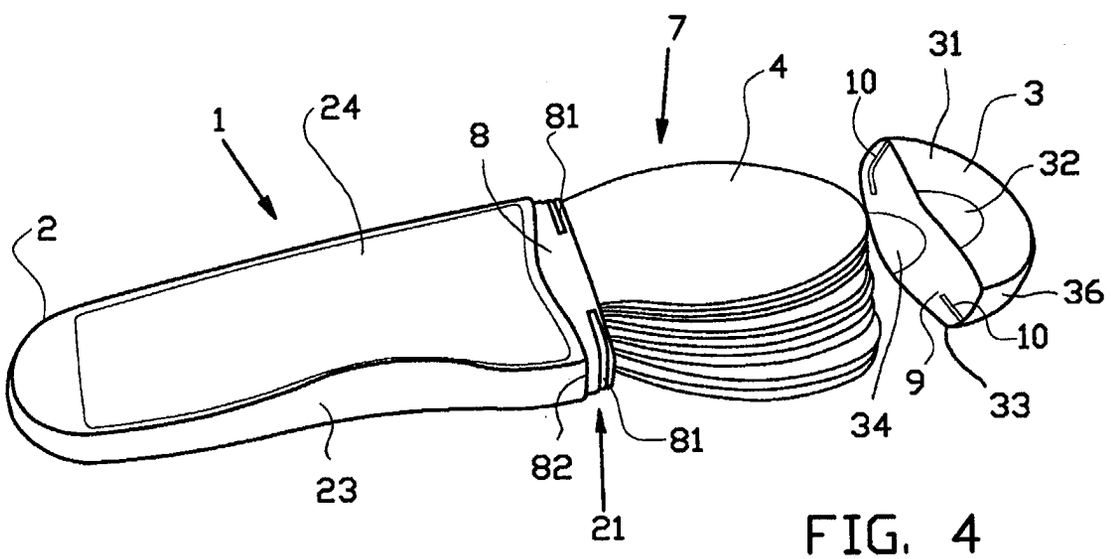

FIG. 4

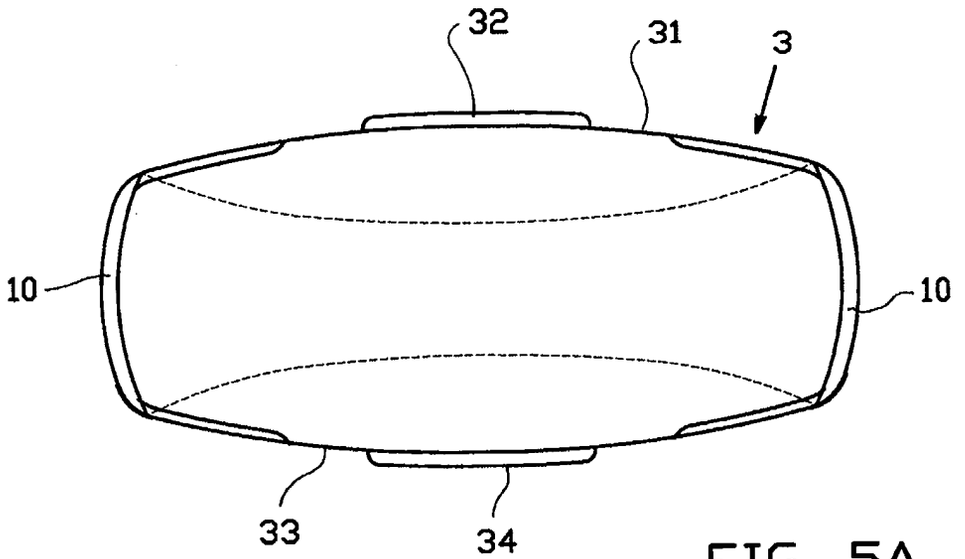

FIG. 5A

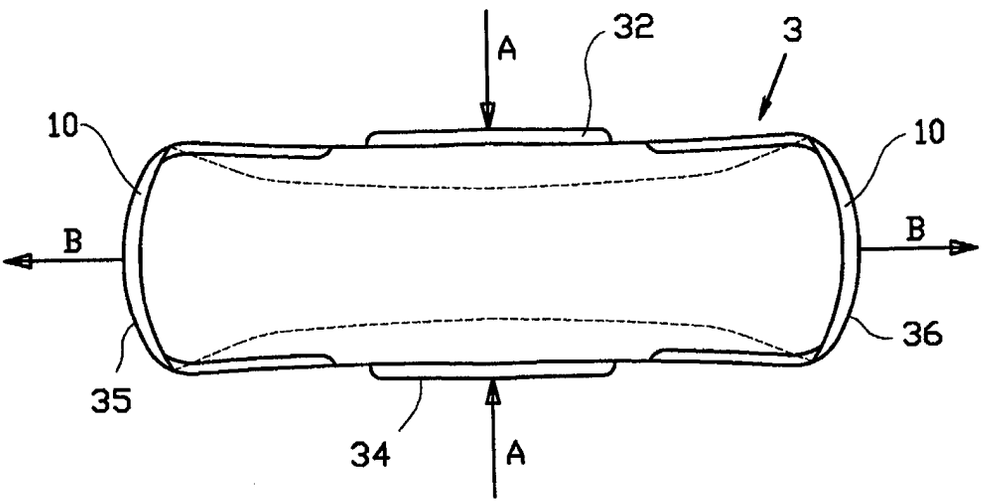

FIG. 5B