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Remarks:
A request for correction of figure 10 has been filed pursuant to Rule 88 EPC. A decision on the request will be taken during the proceedings before the Examining Division (Guidelines for Examination in the EPO, A-V, 3.).

(54) Protection for cycling pants

(57) The invention concerns an anatomical protection (4) for cycling pants (1) that avoids the occurrence of an unbalanced abutment on the saddle. The protection also leaves a sufficient surface free of padding, for good perspiration. The protection comprises a pair of paddings (3), each having a peripheral region with a greater thickness than a central region, said peripheral region being suitable for centring around an ischiatic tuberosity.

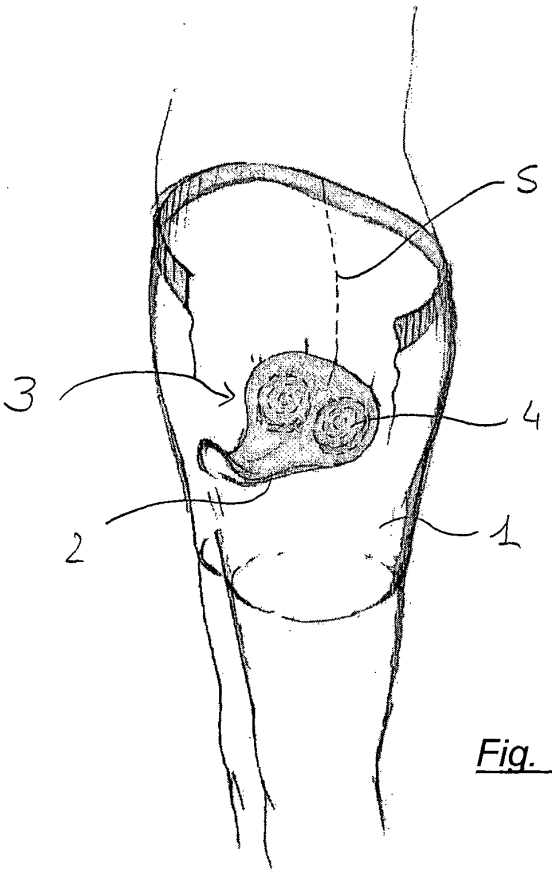


Fig. 1

EP 1 695 637 A1

Description

[0001] The present invention concerns a protection for cycling pants, as well as cycling pants that comprise such a protection and a padding for the protection.

[0002] In the present description and in the attached claims, under the term "cycling pants", any garment such as shorts, long pants, bibs and tights for bicycles, exercise bikes and gym equipment for spinning are meant.

[0003] In the present description and in the attached claims, under the term "seat pad", an insert or reinforcement extending around the crotch of the pants is meant. The shape of a seat pad is essentially that of a pear or a double lobe.

[0004] The seating surface on a bicycle must be kept small both transversally and parallel to the median plane of the bicycle, in order to contain the weight and transversal size of the bicycle and, above all, to allow the legs to make a pedalling motion. The bicycle saddle therefore has essentially the shape of a narrow isosceles triangle in a plan view.

[0005] Abutment on the saddle, rubbing against it caused by the movement of the legs during pedalling and local overheating, as well as impacts, vibrations and shakes due to unevenness of the ground or in the case of a fall, cause various problems and inconveniences, especially during prolonged or competitive use of the bicycle. Unfortunately, there are common problems both at skin level and at muscular level, such as the formation of blisters, sores, irritations, ulcerations, corns, traumas and microtraumas, bruises and wounds and even blood circulation problems and prostate problems.

[0006] In order to protect the body region that suffers from such problems, cycling pants foresee a seat pad made of a material that has suitable characteristics, namely that is soft, hygienic, resistant to skin pH, breathable, anallergic, anti-bacterial, elastic and heat-regulating.

[0007] Among the materials commonly used for the seat pad, natural or synthetic fabric, mesh, knitted fabric, microfibre or animal hides may be cited.

[0008] In the most recent seat pads, the aforementioned material is present in a double layer coupled with a padding.

[0009] In known seat pads, the padding is essentially uniform, of a size and shape such as to be positioned between the cyclist and the entire bicycle saddle.

[0010] Foam paddings, for example PVC, polyurethane and polyester such as MTP (moltoprene), are known.

[0011] Paddings filled with liquid, for example silicon, oil and mixtures thereof, flowable in bags formed, for example by heat-sealing, between two impermeable layers of the seat pad, are also known, e.g. from document U.S. 4,945,571.

[0012] The cycling shorts of such a document, by accompanying the movement of the legs during pedalling, increase the contact surface and better absorb not only the forces perpendicular to the abutment surface of the cyclist, but also the shear stresses.

[0013] The Applicant observes that at the points where the cyclist's body, seated on the saddle, applies the greatest pressure, namely at the ischiatic bones, the padding of the first type of known seat pads compresses more and therefore applies a greater counterpressure with increased inconveniences, besides reducing in thickness with a consequent lesser protective capability. Moreover, the concentration of pressure under the ischiatic bones causes unbalance of the cyclist, with a consequent reduction in performance.

[0014] Flowable paddings, by their very nature, also tend to flow away precisely at the points of greatest pressure from the body, thus inflating in the remaining portions. The consequences are, also in this case, on the one hand the modification of the abutment with consequent loss of equilibrium, and on the other hand the thickness reduction with the consequent lesser protective capability at the points of greatest pressure.

[0015] The fact that known padded seat pads have poor performance is proven by the fact that at a competitive level, a padding of reduced thickness is often preferred, to increase adherence and balance on the saddle, which however provides an as equally low protection against the above drawbacks.

[0016] The technical problem at the basis of the present invention is to provide a protection for cycling pants that provides adequate support and protection of the human body, and that at the same time maintains good adherence and balance with the bicycle saddle.

[0017] Such a problem is solved, according to the present invention, by providing an anatomical protection, which takes into account the body regions that actually abut, so as to avoid the creation of unbalanced abutment on the saddle.

[0018] In such a way, a sufficient surface free of padding is also left, for good breathing.

[0019] In a first aspect thereof, the invention concerns a protection for cycling pants, characterised in that it comprises a pair of paddings, each having a peripheral region with a greater thickness than a central region, said peripheral region being suitable for centring around an ischiatic tuberosity.

[0020] In seated position, the skeleton rests upon the ischiatic bones. When the seating surface is sufficiently large, such as a chair, the human body rests upon a much larger extent, that of the gluteal muscles. Therefore the weight is not relieved (just) on the ischiatic tuberosities, but around them. A high abutment stability follows and also a protection of the thin layer of skin at the ischiatic tuberosities.

[0021] On the other hand, the human body is not suitable for sitting on a limited surface, as a bicycle saddle is. The particular configuration of the protection according to the invention restores the natural seating condition since the

padding adapts to the convex shape of the glutei in the region of the ischiatic tuberosities, increasing the contact surface with the cyclist with respect to a flat padding and therefore improving the cyclist's balance in seated position.

[0022] In an embodiment, each padding comprises a single toroidal element, in other words the central region is hollow. This embodiment is particularly simple and allows a remarkable aeration, thus reducing the problems resulting from excessive perspiration.

[0023] Preferably, however, the material of each padding is also present in the central region.

[0024] In a first variant, the peripheral region of each padding is softer and more deformable than the central region. The protection in such a way becomes analogous to the muscle-adipose mass of the glutei at the ischiatic tuberosities, thus providing a highly anatomic abutment.

[0025] In a second variant, the softness of the central and peripheral regions is selected so that the counterpressure applied on the cyclist is essentially the same for the entire extent of the padding. In this way a uniform distribution of the cyclist's weight in the entire area of the padding is obtained.

[0026] In a third variant, finally, the peripheral region of each padding is less soft and deformable than the central region and allows a greater cyclist's weight to be relieved exactly in such a peripheral region.

[0027] The change in softness between the peripheral region and the central region can also be achieved, with a same thickness of the peripheral region and of the central region, by the use of filling air or gas at a different pressure or by the use of different materials, or else by a combination of difference in thickness and in pressure of the air or gas, or of difference in thickness and in material.

[0028] Advantageously, in each padding aeration paths are made.

[0029] Advantageously, each padding has a proximal surface with a concave envelope contour, which adapts to the convex shape of the glutei in the region of the ischiatic tuberosities and around them, increasing the contact surface with the cyclist with respect to a padding having a flat proximal surface and therefore improving the balance of the cyclist in seated position.

[0030] In the present description and in the attached claims, the terms proximal and distal, respectively, are used in a wider sense with reference to the protection, to indicate the surface facing towards the human body and the outer surface facing towards the bicycle saddle when the cyclist is positioned, respectively.

[0031] The distal surface of each padding can have a concave envelope contour, flat envelope contour or convex envelope contour with a greater radius of curvature than the proximal surface, in such a way increasing the contact surface with the saddle.

[0032] In a particularly preferred way, each padding has a concentric configuration, the concentric rings of the configuration having decreasing thickness towards the centre.

[0033] Such a concentric configuration of rings gives an overall concave shape to each padding, which is well adapted to support the ischiatic bone in an analogous way to the gluteal muscle.

[0034] In an embodiment, each concentric ring comprises a single toroidal element.

[0035] The aeration paths comprise at least one hollow channel in at least one toroidal element, and preferably at least four equally distributed through-channels.

[0036] Alternatively or in addition, the toroidal elements are arranged with an aeration clearance between adjacent concentric rings, possibly joined by crosspieces.

[0037] In a different embodiment, at least one intermediate concentric ring comprises a plurality of toroidal elements externally tangent to each other.

[0038] The aeration paths then comprise the gaps between the various toroidal elements, so that it is not necessary to make the aeration channels, although they may still be provided.

[0039] Each padding can be made from a yielding impermeable material shaped like at least one bag or circuit, filled with a gas, a liquid or a gel.

[0040] Advantageously, said at least one bag is equipped with a filling valve removably connectable to a small inflater. With such a provision, the cyclist can control the pressure of the padding, based upon his/her own anatomy and upon whether he/she is amateur or professional, in the first case favouring comfort and in the second case favouring adherence to the saddle.

[0041] When each padding foresees a plurality of toroidal elements, the bags consisting of at least two adjacent concentric rings of toroidal elements can be in communication, to allow even higher conformability to the body of the individual cyclist, through the passage of the liquid, gas or gel between one concentric ring and the other.

[0042] Advantageously, in the padding at least two distinct bags are made, one consisting of the peripheral region and one consisting of the central region, each possibly having a respective filling valve. In such a way, it is possible to independently inflate or deflate the peripheral region and the central region of the padding, to shape it optimally for the individual cyclist.

[0043] The corresponding bags of the two paddings provided in a pair of pants can be connected together so as to facilitate a symmetrical pressure of the protection, also during the inflation step.

[0044] Alternatively, each padding can be made from a foam material, preferably the polyester known as moltoprene

or MTP.

[0045] The density of the material can range between about 180 g/m^2 and about 400 g/m^2.

[0046] Preferably each padding has a transversal size from 4 to 10 cm, more preferably in the order of 6 cm.

[0047] In the various embodiments, the thickness of each padding ranges from about 10 mm in the peripheral region to about 4 mm in the central region.

[0048] Each padding is essentially circular.

[0049] Alternatively, each padding can be elongate, for example essentially elliptical, the larger dimensions being essentially parallel.

[0050] Preferably, the protection according to the invention comprises a third padding arranged centrally advanced with respect to the pair of paddings, to provide protection to the cyclist's genital region.

[0051] Preferably, the third padding is softer than the two paddings of the pair.

[0052] The third padding can also have an overall concave shape and a differentiated softness.

[0053] Advantageously, the peripheral regions of the three paddings merge.

[0054] The various paddings of the protection can be directly associated with the cycling pants.

[0055] Preferably, however, the protection according to the invention comprises at least one of a proximal seat pad layer and a distal seat pad layer with which they are associated.

[0056] Advantageously, said at least one seat pad layer is made of a material that is soft, hygienic, resistant to skin pH, breathable, anallergic, anti-bacterial and/or heat-regulating.

[0057] Said at least one seat pad layer can, for example, be made from natural or synthetic fabric, mesh, knitted fabric, microfibre or animal hides.

[0058] The two paddings are arranged at an interaxis distance of 8 cm, 10 cm or 6 cm, respectively in a men's version, in a women's version and in a child's version. Such sizes represent the average values of the distance between the ischiatic tuberosities in men, women and children.

[0059] According to an advantageous aspect of the present invention, the two paddings have an adjustable interaxis distance to adapt to the individual cyclist.

[0060] In an embodiment, the adjustable interaxis distance is obtained through elastic fastening of each padding to said at least one seat pad layer or to the cycling pants.

[0061] In an alternative embodiment, the adjustable interaxis distance is obtained through a pair of pockets formed between the distal seat pad layer and the proximal seat pad layer, or respectively in the cycling pants, each pocket being oversized with respect to a padding, so as to house it with clearance. The provision of pockets that are oversized with respect to the paddings allows them to be moved to position them at the ischium of the individual cyclist. Once correctly positioned, their position can be fixed, for example through sewing.

[0062] In another embodiment, the adjustable interaxis distance is obtained through a device comprising two splines made from a semi-rigid material having a knurled slot, and a pin with disc-shaped heads movable with friction between the overlapping knurled slots. The pin with disc-shaped heads can be free or fixed to the pants or to said at least one seat pad layer.

[0063] Preferably, the two splines extend in converging, essentially radial directions from the two paddings and have a fold that forms two overlapping portions in which the knurled slots are made. In such a way, the pin with disc-shaped heads can be transported into an area of the pants not in contact with the saddle, for example approximately at the height of the waist.

[0064] In a second aspect thereof, the invention concerns cycling pants comprising a protection as indicated above.

[0065] In a third aspect thereof, the invention concerns a padding for a protection as indicated above.

[0066] Characteristics and advantages of the invention shall now be illustrated with reference to embodiments represented as a non-limiting example in the attached drawings, wherein:

- Fig. 1 shows cycling pants according to the invention,
- Fig. 2 shows a partial exploded view of the pants of Fig. 1,
- Fig. 3 shows the pants of Fig. 1 in use,
- Figs. 4-6 show a first embodiment of a padding of the protection according to the invention,
- Figs. 7 and 8 illustrate variants of the embodiment of Figs. 4-6,
- Figs. 9 and 10 illustrate a further variant of the embodiment of Figs. 4-6,
- Figs. 11-13 show a second embodiment of a padding of the protection according to the invention,

- Figs. 14-15 show a third embodiment of a padding of the protection according to the invention,
- Figs. 16 and 17 show other embodiments of a padding of the protection according to the invention,
- Fig. 18 shows an embodiment of the protection according to the invention comprising a third padding,
- Fig. 19 shows another embodiment of the protection according to the invention comprising a third padding, and
- Figs. 20 and 21 show two embodiments for providing an adjustable interaxis distance of the two paddings of the protection according to the invention.

[0067] Cycling pants 1, represented in Fig. 1 of the short type just for illustrative purposes, and made, for example, from LYCRA™, or another elastomer, comprise a seat pad 2 and a protection 3, having two distinct paddings 4, associated with the seat pad 2.

[0068] The seat pad 2, as can be seen more clearly in Fig. 2, forms a reinforcement applied inside the pants 1, extending around the crotch 5 of the pants 1, and is essentially pear shaped or double-lobe shaped.

[0069] As an alternative to the arrangement of Fig. 2, the seat pad 2 can be applied outside the pants 1 or else can form an insert in the material of the pants 1, in other words the material of the pants 1 shall have a hole with a shape matching that of the seat pad 2.

[0070] The seat pad 2 comprises an upper or proximal layer 6 and a lower or distal layer 7, coupled with the pants 1 through sewing, gluing, ultrasound welding or high-frequency welding along the periphery of the seat pad 2.

[0071] The seat pad 2 can, however, comprise just one of the proximal and distal layers 6, 7.

[0072] The seat pad 2 can also be missing, the paddings 4 being coupled directly with the material of the pants 1 for example through sewing, gluing, ultrasound welding or high-frequency welding or by making two closed pockets, as illustrated in fig. 21 described hereafter.,

[0073] The seat pad 2 is made from a material that has suitable characteristics to protect the body region affected by the various problems mentioned above, namely that is elastic, soft, hygienic, resistant to skin pH, breathable, anallergic, anti-bacterial and/or heat-regulating.

[0074] Suitable materials comprise natural or synthetic fabric, mesh, knitted fabric, microfibre or animal hides.

[0075] The two paddings 4 are circular, with a diameter of about 6 cm, and are arranged at an interaxis distance of 8 cm, 10 cm or 6 cm, respectively in a men's version, a women's version and a child's version of the pants 1.

[0076] The outer diameter of the padding 4 can be less or more than 6 cm, up to about 8 cm in the men's version, up to 10 cm in the women's version and up to about 4 cm in the child's version.

[0077] Therefore, the paddings 4 of the protection 3 amount to a much smaller extent than that of the entire seat pad 2, thus leaving a large surface free of padding, suitable for perspiration and that increases adherence and balance on the saddle.

[0078] Each padding 4 can alternatively be elongate, for example essentially elliptical, the larger dimensions being essentially parallel, in other words extending in the direction of the crotch 5 of the pants 1.

[0079] As illustrated in Fig. 3, the paddings 4 of the protection 3 are arranged at the ischiatic tuberosities T of the cyclist, in other words at the actual abutment point of the skeleton on the saddle S.

[0080] Each padding 4 can be made from a foam material - for example PVC, polyurethane, polyester such as MTP (Moltoprene).

[0081] Alternatively, each padding 4 can consist of a gas, a liquid or a gel, for example water, silicon, oil and mixtures thereof, flowable in an impermeable and deformable housing or bag, for example made from PVC.

[0082] Figs. 4-6 illustrate a first embodiment of a padding 4 of the protection 3 according to the invention.

[0083] The padding 4 comprises four toroidal elements 8-11 concentrically arranged. The diameter of the section of the toroidal elements 8-11 decreases from the outermost toroidal element 8 to the innermost toroidal element 11.

[0084] The toroidal elements 8-11 are also arranged asymmetrically about the median plane of the padding 4, so as to create a proximal surface 12 of the padding 4 having a concave envelope contour.

[0085] Such a concave shape of the paddings 4 adapts to the convex shape of the glutei in the region of the ischiatic tuberosities, thus increasing the contact surface with the cyclist with respect to a padding having a flat proximal surface and thus improving the cyclist's balance in seated position.

[0086] In order to provide the necessary perspiration, the toroidal elements 8-11 are equipped with a plurality of through-channels 13.

[0087] Alternatively or in addition to the through-channels 13, the toroidal elements 8-11 can be arranged with a certain clearance between pairs of adjacent toroidal elements, possibly joined by crosspieces, so as to provide the necessary aeration.

[0088] In fig. 6, the envelope contour of the distal surface 14 of the padding 4 is convex according to a greater radius

of curvature than the concavity of the proximal surface 12, so that overall the padding 4 has the aforementioned anatomical shape.

[0089] According to variants of the padding 4, the toroidal elements 8-11 are arranged so as to create a distal surface 14 that is essentially flat (Fig. 7) or even concave (Fig. 8), to increase the contact surface with the saddle S.

[0090] When the padding 4 is of the impermeable housing or bag type, as illustrated in figs. 9 and 10, where the through-channels 13 are omitted, valves 15 can be provided, removably connectable to a small inflater P, so as to allow the pressure of the padding 4 to be adapted to the requirements of the individual cyclist, based upon his/her own anatomy and upon whether he/she is amateur or professional.

[0091] More specifically, the inside of the padding 4 is divided into two, an outer bag consisting of the two outermost toroidal elements 8 and 9 and an inner bag consisting of the penultimate toroidal element 10, each circuit being equipped with a respective valve 15. The inner toroidal element 11, on the other hand, lacks a valve because of its small size.

[0092] The padding 4 can be divided into three or more bags or circuits for the liquid or gas or gel, or else a single bag can be provided. The corresponding bags of the two paddings 4 can be connected together so as to facilitate a symmetrical inflation thereof (see, for example, Fig. 19 described hereinafter).

[0093] A small tube (not shown) can also be provided from the toroidal element 10 to transfer the related valve 15 to the periphery of the padding 4.

[0094] In a first solution, the pressure can be the same for all of the toroidal elements 8-11. In this way, since the counterpressure applied by the toroidal elements 8-11 is an inverse function of the diameter of the section of the toroidal elements themselves, the peripheral region of the padding 4 is softer and more deformable than the central region, and becomes analogous to the muscle-adipose mass of the glutei at the ischiatic tuberosities, thus providing a highly ergonomic support.

[0095] In a second solution, the pressure of the toroidal elements 8-11 can be adjusted so that the counterpressure applied by the toroidal elements 8-11 themselves is essentially the same for the entire extent of the padding 4. In this way a uniform distribution of the cyclist's weight in the entire area of the padding 4 is obtained.

[0096] In a third solution, finally, the pressure of the toroidal elements 8-11 can be adjusted so that the counterpressure applied by the toroidal elements 8-11 themselves is greater in the peripheral region with respect to that of the central region of the padding 4 that, therefore, is harder in the peripheral region and allows a greater cyclist's weight to be relieved exactly in such a peripheral region.

[0097] The possibility of changing the pressure of the padding 4 uniformly or independently in the peripheral and central regions of the padding 4 allows the padding 4 itself to be adapted to the needs of the individual cyclist.

[0098] The padding 4 according to the embodiment illustrated in figs. 11-13 also comprises a concentric arrangement of toroidal elements 16-23 and more precisely an outer toroidal element 16, an inner toroidal element 23 and six toroidal elements 17-22 arranged in a ring between the outer toroidal element 16 and the inner toroidal element 23.

[0099] Also in this case, the diameters of the section of the toroidal elements 16, 17-22 and 23 are selected so as to create a proximal surface 12 of the padding 4 having a concave envelope contour and a distal surface 14 that is convex (fig. 13) or else that is flat or concave in an analogous way to figs. 7 and 8.

[0100] In the embodiment of figs. 11-13, the diameters of the section of the toroidal elements 17-22 and 23 are the same, but the toroidal element of the inner concentric ring 23 could have a smaller diameter of the section.

[0101] Also in this case, the thickness of the peripheral region is greater than the central region of the padding 4 and therefore, pressure and material being equal, the peripheral region is softer, in an analogous way to the muscle-adipose mass of the glutei at the ischiatic tuberosities.

[0102] The necessary perspiration is provided by the hollow spaces inside each toroidal element 16-23 and by the essentially triangular spaces that are formed between the toroidal elements 16, 17-22 and 23 of the three concentric rings.

[0103] Also in the case of the embodiment of figs. 11-13, through-channels can be provided to further increase the aeration of the padding 4.

[0104] Also in the case of the embodiment of figs. 11-13, when the padding 4 is of the type with liquid or gas or gel, one or more bags can be provided, equipped with a respective pressure adjustment valve, joining the inner spaces of some of the toroidal elements 16-23.

[0105] The padding 4 according to the embodiment illustrated in figs. 14-15 also comprises a concentric arrangement of toroidal elements 24-42 and more specifically, from the outside to the inside, an outer toroidal element 24, a concentric ring consisting of ten toroidal elements 25-34 (the toroidal elements 27 and 28 are omitted in fig. 14), a concentric ring consisting of five toroidal elements 35-39, and a concentric ring consisting of three toroidal elements 40-42.

[0106] The diameters of the section of the toroidal elements of the various concentric rings decrease from the outside towards the inside, so as to create a proximal surface 12 of the padding 4 having a concave envelope contour.

[0107] The distal surface 14 is shown with a flat envelope contour in fig. 15, so that the thickness of the peripheral region is greater than the central region of the padding 4, and therefore, pressure and material being equal, the peripheral region is softer.

[0108] Also in the embodiment of fig. 14, the envelope contour of the distal surface 14 could nevertheless be convex

or concave with a greater radius of curvature than the proximal surface 12.

[0109] The necessary perspiration is provided by the hollow spaces inside each toroidal element 25-42 and by the essentially triangular spaces that are formed between the toroidal elements 24, 25-34, 35-39 and 40-42 of the four concentric rings.

[0110] Also in the case of the embodiment of figs. 14-15, through-channels can be foreseen (also just in the outer toroidal element 24) to further increase the aeration of the padding 4.

[0111] Also in the case of the embodiment of figs. 14-15, when the padding 4 is of the impermeable bag type, one or more circuits can be provided, equipped with a respective filling valve.

[0112] The number of toroidal elements illustrated in the embodiments of the various figures described above should be taken as merely illustrative, it being possible that there is a smaller or greater number of concentric rings and a smaller or greater number of toroidal elements in each concentric ring.

[0113] It should be understood that a single toroidal element with a diameter corresponding to the outer toroidal element 8, 16 or 24 and with the same or a smaller diameter of the section also fulfils the purposes of the protection 3 according to the invention.

[0114] Each padding 4 according to the invention can also consist of a single piece 43 or many concentric pieces of foam material, for example polyester known with the abbreviation MTP, or of a single bag filled with liquid, gas or gel, as illustrated in fig. 16 and in fig. 17.

[0115] The necessary aeration is provided by a plurality of through-channels 13.

[0116] Whilst the proximal surface 12 is advantageously convex in both of the embodiments shown, the distal surface 14 is flat in fig. 16 and convex in fig. 17, with a greater radius of curvature than that of the proximal surface 12 so as to have the desired thickness decrease from the peripheral region to the central region.

[0117] The distal surface 14 could also be concave, in the same way as the embodiment of fig. 8.

[0118] It should be clear that the number and arrangement of the through-channels 13 in the padding 4 of the various figures are merely given as an example.

[0119] Fig. 18 illustrates a seat pad 2 with a protection 3 that comprises, in addition to the pair of paddings 4, a third padding 44 arranged centrally advanced with respect to the paddings 4, suitable for providing suitable protection to the genital region of the cyclist.

[0120] Each of the paddings 4 and 44 can be according to any one of the embodiments and variants described above, they being shown with concentric toroidal elements just as an example.

[0121] Preferably, the third padding 44 is softer than the two paddings 4.

[0122] Fig. 19 illustrates a variant of the protection 3 of fig. 18, in which the peripheral regions of the three paddings 4 and 44 merge.

[0123] In fig. 19, the protection 3 is of the gas or air type and the three peripheral regions of the three paddings 4 and 44 form a single bag, equipped with a respective filling valve 15 removably connectable to a small inflater P.

[0124] Although not shown, the central regions of the paddings 4 (and possibly of the padding 44) could also have a filling valve for each bag formed in them.

[0125] The third padding 44 of the embodiments of figs. 18 and 19 can also have an overall concave shape and a differentiated softness as described above with reference to the paddings 4.

[0126] Of course, moreover, the protection 3 of figs. 18 and 19 can also be associated directly with the cycling pants 1, without providing for the seat pad layers 6 and 7.

[0127] Although not shown in figs. 18 and 19, it should be manifest that also in such a protection 3, a suitable number of through-channels shall be provided for perspiration.

[0128] Fig. 20 illustrates a device 45 for adjusting the interaxis distance between the two paddings 4, to adapt it to the individual cyclist. Such an adjustment device 45 comprises two splines 46 made of a semi-rigid material and having a knurled slot 47, and a pin with disc-shaped heads 48 movable with friction between the overlapping knurled slots 47. The pin with disc-shaped heads 48 can be loose or fixed to the pants 1 or to the seat pad 2.

[0129] More specifically, the two splines extend in converging, essentially radial directions from the two paddings 4 and have a fold 49 that forms two overlapping portions in which the knurled slots 47 are made. In such a way, the pin with disc-shaped heads 48 can be transferred into an area of the pants 1 not in contact with the saddle, for example approximately at the height of the waist.

[0130] In the various embodiments, the thickness of the padding 4 ranges from about 10 mm in the peripheral region to about 4 mm in the central region.

[0131] In the case of a foam embodiment, for example the polyester known with the abbreviation MTP, the density can be variable from about 180 g/m^2 to about 400 g/m^2 to provide the effect of a smaller or greater counterpressure in the abutment area.

[0132] As an alternative to the adjustment device illustrated in Fig. 20, the interaxis distance between the paddings 4 can be adjustable by providing an elastic fastening thereof to the seat pad 2 or to the pants 1, or else by providing two oversized pockets 50 in the seat pad 2 or in the pants 1, as illustrated in Fig. 21.

[0133] Thanks to the concave configuration of the proximal surface of the paddings 4, they shall automatically centre under the ischiatic tuberosities when the pants 1 are worn.

[0134] It is clear that the invention can be applied not only to bicycles, but also to exercise bikes and gym equipment for spinning.

[0135] The change in softness between the peripheral region and the central region of each padding 4 can also be achieved with the same thickness of the peripheral region and of the central region, using filling air or gas at a different pressure or using different materials.

[0136] For example, in the embodiments of figs. 4 and 9, the toroidal elements 8-11 could be of the same diameter, but be kept at a different pressure, or in the embodiments of figs. 16 and 17, the single piece 43 of foam material could be replaced by a central core and a peripheral annulus of two different materials.

[0137] Furthermore, the change in softness between the peripheral region and the central region can be achieved by a combination of difference in thickness and in pressure of the air or gas or of difference in thickness and in material.

Claims

1. Protection (3) for cycling pants, **characterised in that** it comprises a pair of paddings (4), each having a peripheral region with a greater thickness than a central region, said peripheral region being suitable for centring around an ischiatic tuberosity (T).

2. Protection (3) according to claim 1, **characterised in that** in each padding (4) the peripheral region is softer than the central region.

3. Protection (3) according to claim 1, **characterised in that** in each padding (4) the peripheral region is less soft than the central region.

4. Protection (3) according to claim 1, **characterised in that** in each padding (4) the peripheral region and the central region are equally soft.

5. Protection (3) according to any one of the previous claims, **characterised in that** in each padding (4), the peripheral region and the central region are filled with air or gas at different pressures.

6. Protection (3) according to any one of the previous claims, **characterised in that** in each padding (4), the peripheral region and the central region are filled with different materials.

7. Protection (3) according to any one of the previous claims, **characterised in that** in each padding (4) aeration paths (13) are made.

8. Protection (3) according to any one of the previous claims, **characterised in that** each padding (4) has a proximal surface (12) with a concave envelope contour.

9. Protection (3) according to any one of the previous claims, **characterised in that** each padding (4) has a distal surface (14) with an envelope contour selected from concave, flat and convex with a greater radius of curvature than a radius of curvature of the proximal surface (12).

10. Protection (3) according to any one of the previous claims, **characterised in that** each padding (4) has a concentric configuration, the concentric rings of the configuration having decreasing thickness towards the centre.

11. Protection (3) according to claim 10, **characterised in that** each concentric ring comprises a single toroidal element (8-11).

12. Protection (3) according to claim 10, **characterised in that** at least one intermediate concentric ring comprises a plurality of toroidal elements (17-22, 25-34, 35-39, 40-42) externally tangent to each other.

13. Protection (3) according to any one of the previous claims, **characterised in that** each padding (4) is made from a yielding impermeable material shaped like at least one bag, filled with a flowable material selected from a gas, a liquid or a gel.

14. Protection (3) according to claim 13, **characterised in that** said at least one bag is equipped with a filling valve (15).

15. Protection (3) according to any one of claims 13-14, **characterised in that** bags consisting of at least two adjacent concentric rings of toroidal elements are in communication.

16. Protection (3) according to any one of claims 13-15, **characterised in that** in each padding (4) at least two distinct bags (8-9, 10) are made, one consisting of the peripheral region and one consisting of the central region.

17. Protection (3) according to claim 16, **characterised in that** the corresponding bags of the two paddings (4) are connected together.

18. Protection (3) according to any one of claims 1-12, **characterised in that** each padding (4) is made from a foam material.

19. Protection (3) according to claim 18, **characterised in that** the density of the material ranges between about 180 g/m^2 and about 400 g/m^2.

20. Protection (3) according to any one of the previous claims, **characterised in that** each padding (4) has a transversal size from 4 to 10 cm.

21. Protection (3) according to any one of the previous claims, **characterised in that** each padding (4) has a thickness of about 10 mm in the peripheral region and a thickness of about 4 mm in the central region.

22. Protection (3) according to any one of the previous claims, **characterised in that** each padding (4) is essentially circular.

23. Protection (3) according to any one of the previous claims, further comprising a third padding (44) arranged centrally advanced with respect to the pair of paddings (4).

24. Protection (3) according to claim 23, **characterised in that** the third padding (44) is softer than the two paddings (4) of the pair.

25. Protection (3) according to any one of claims 23-24, **characterised in that** the peripheral regions of the three paddings (4, 44) merge.

26. Protection (3) according to any one of the previous claims, further comprising at least one of a proximal seat pad layer (6) and a distal seat pad layer (7).

27. Protection (3) according to claim 26, **characterised in that** said at least one seat pad layer (6, 7) is made from a material that is soft, hygienic, resistant to skin pH, breathable, anallergic, anti-bacterial and/or heat-regulating.

28. Protection (3) according to any one of claims 26-27, **characterised in that** said at least one seat pad layer (6, 7) is made from a material selected among natural fabric, synthetic fabric, mesh, knitted fabric, microfibre or animal hides.

29. Protection (3) according to any one of the previous claims, **characterised in that** the two paddings (4) are arranged at an interaxis distance selected from 8 cm, 10 cm and 6 cm.

30. Protection (3) according to any one of the previous claims, **characterised in that** the two paddings (4) have an adjustable interaxis distance.

31. Protection (3) according to claim 30, **characterised in that** each padding (4) is housed with clearance in an oversized pocket (50).

32. Protection (3) according to claim 30, **characterised in that** it comprises a device for adjusting the interaxis distance between the paddings (4), comprising two splines (46) made of a semi-rigid material having a respective knurled slot (47), and a pin with disc-shaped heads (48) movable with friction between the overlapping knurled slots (47).

33. Protection (3) according to claim 32, **characterised in that** the two splines (46) extend in converging, essentially radial directions from the two paddings (4) and have a fold (49) that forms two overlapping portions in which the knurled slots (47) are made.

34. Cycling pants (1) comprising a protection (3) according to any one of the previous claims.

35. Padding (4) for a protection (3) according to any one of claims 1-33.

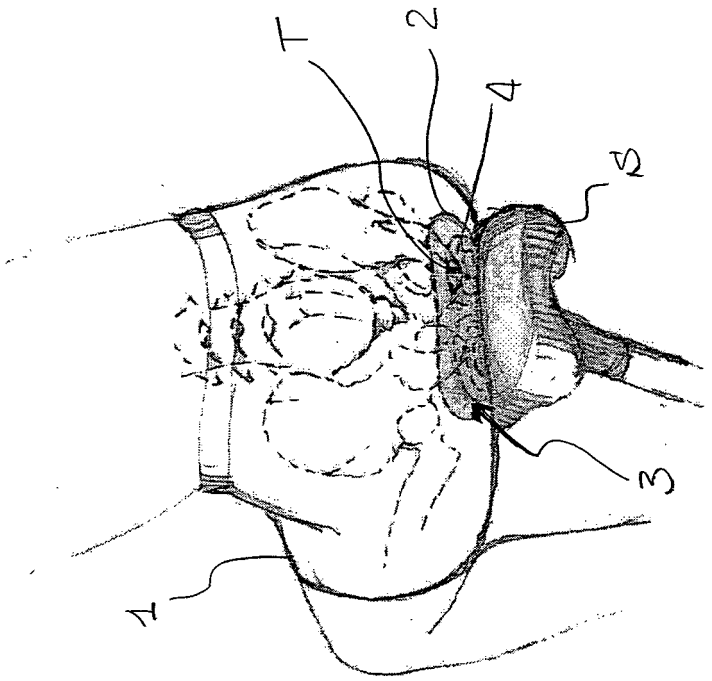


Fig. 3

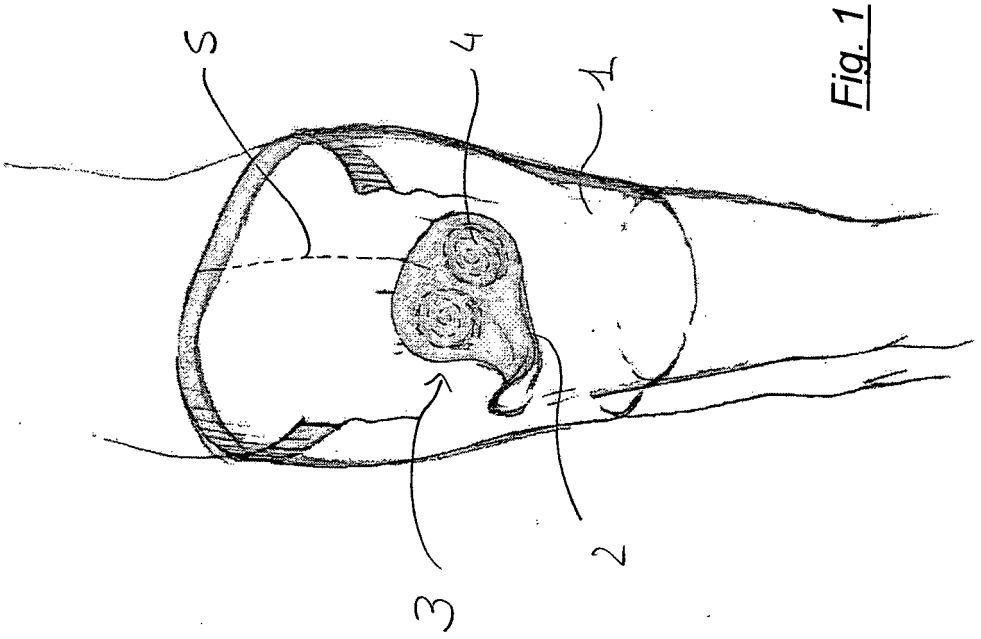


Fig. 1

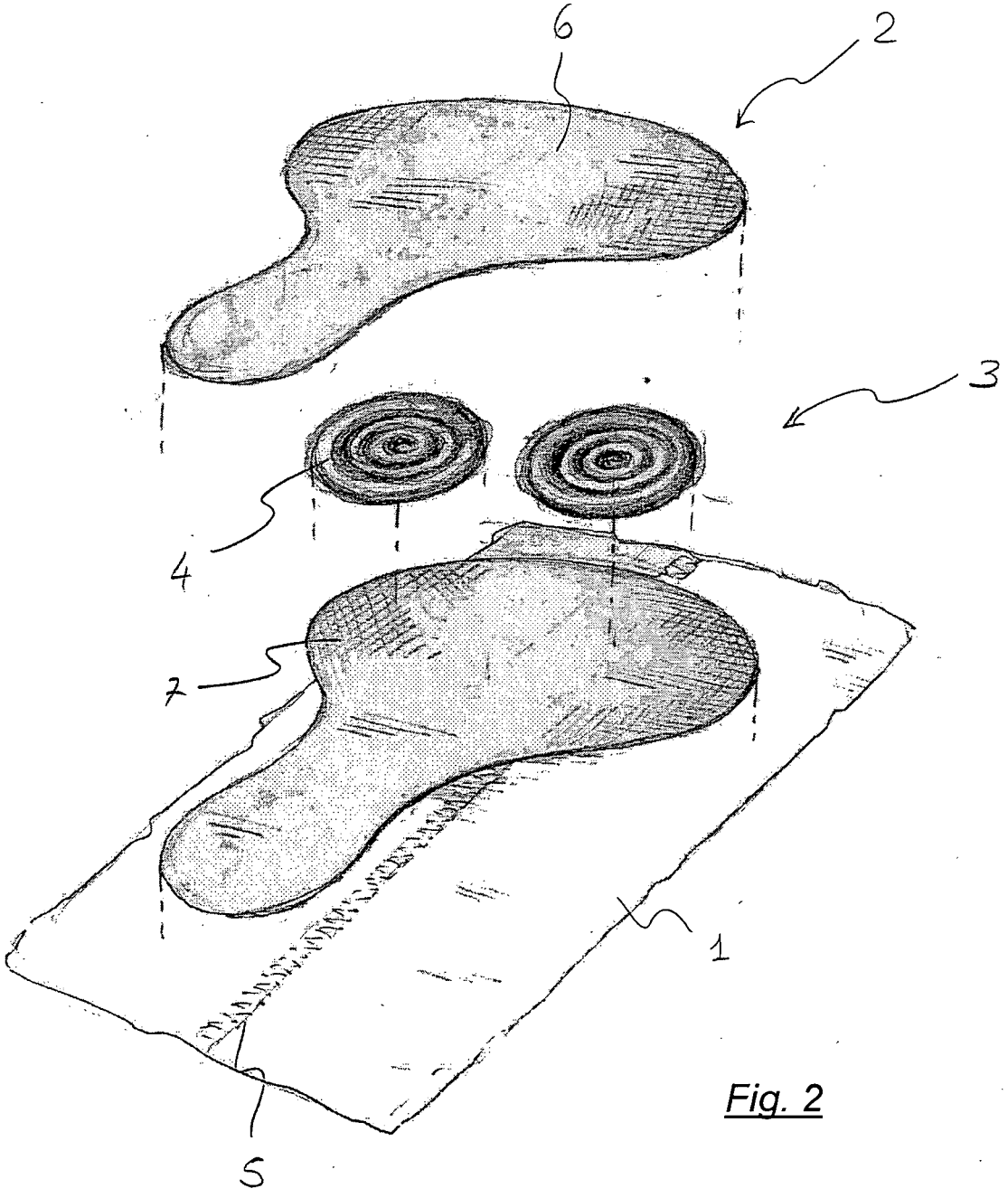


Fig. 2

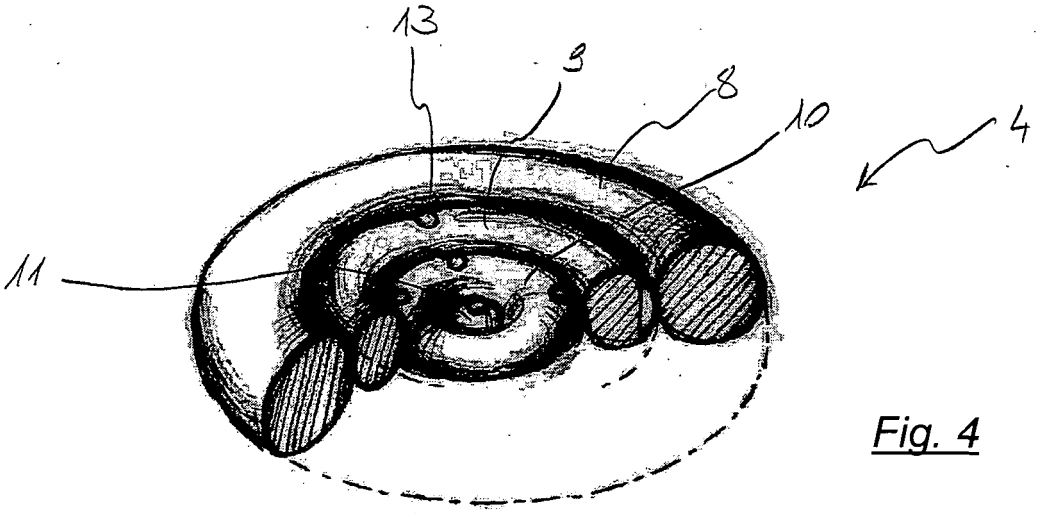


Fig. 4

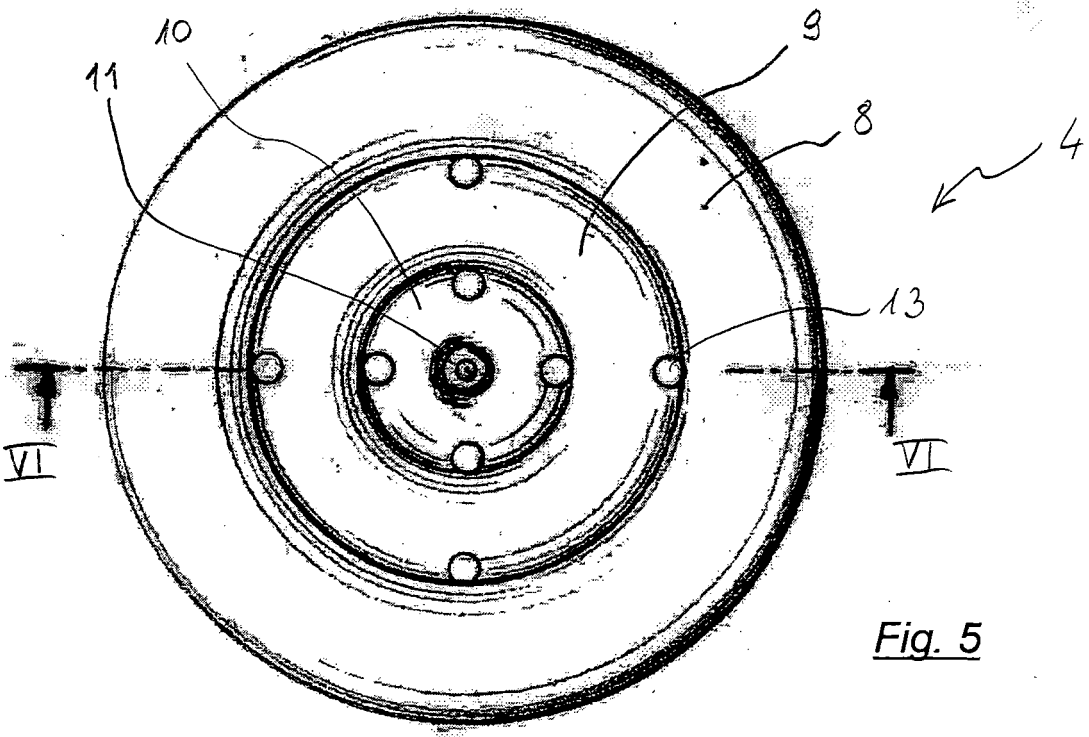


Fig. 5

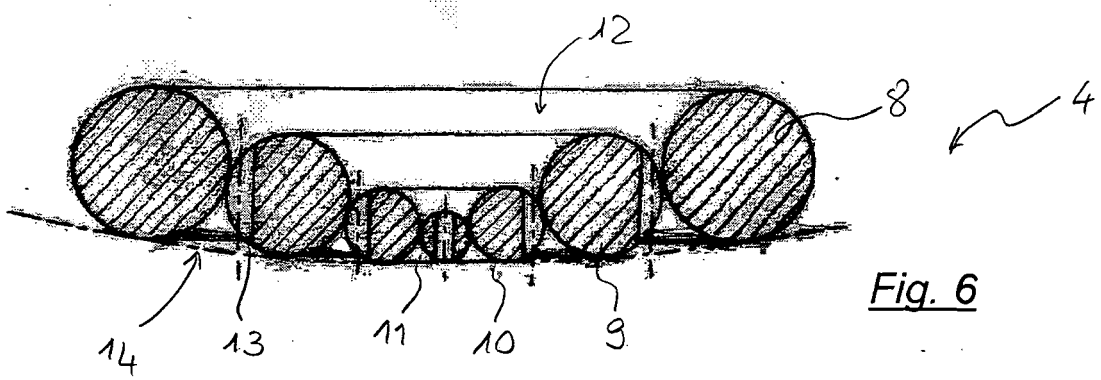


Fig. 6

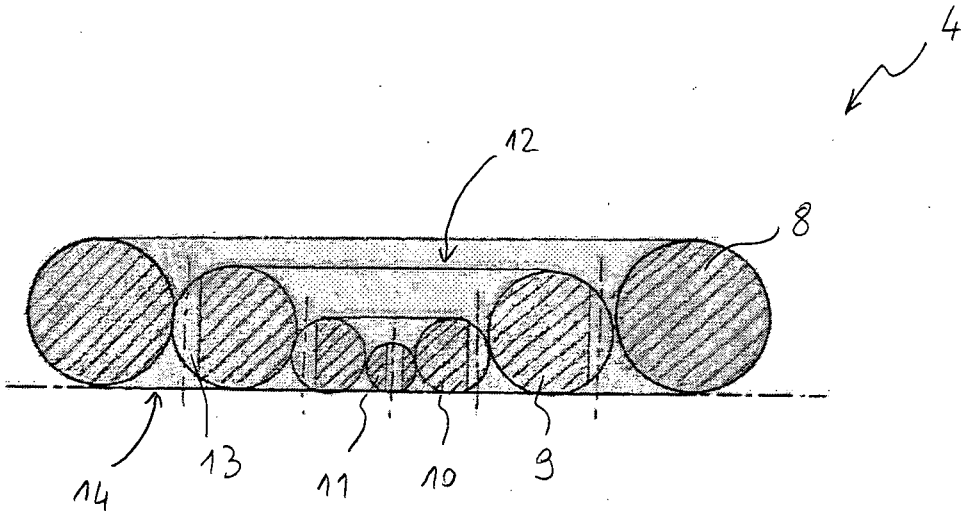


Fig. 7

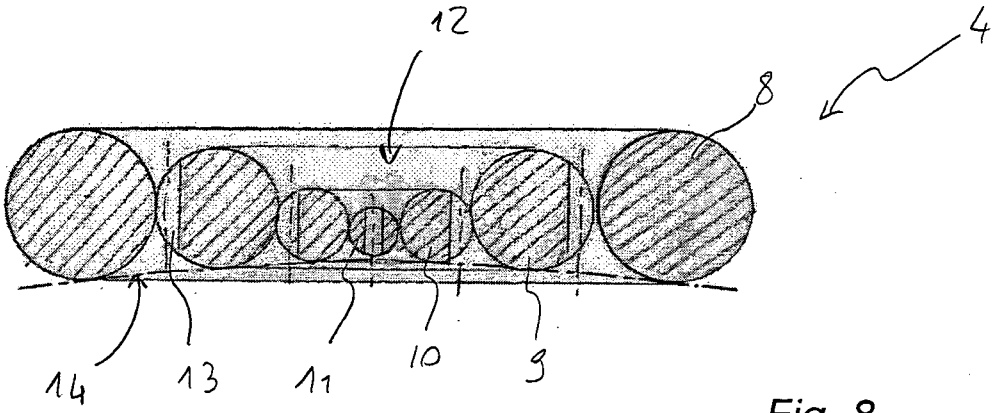


Fig. 8

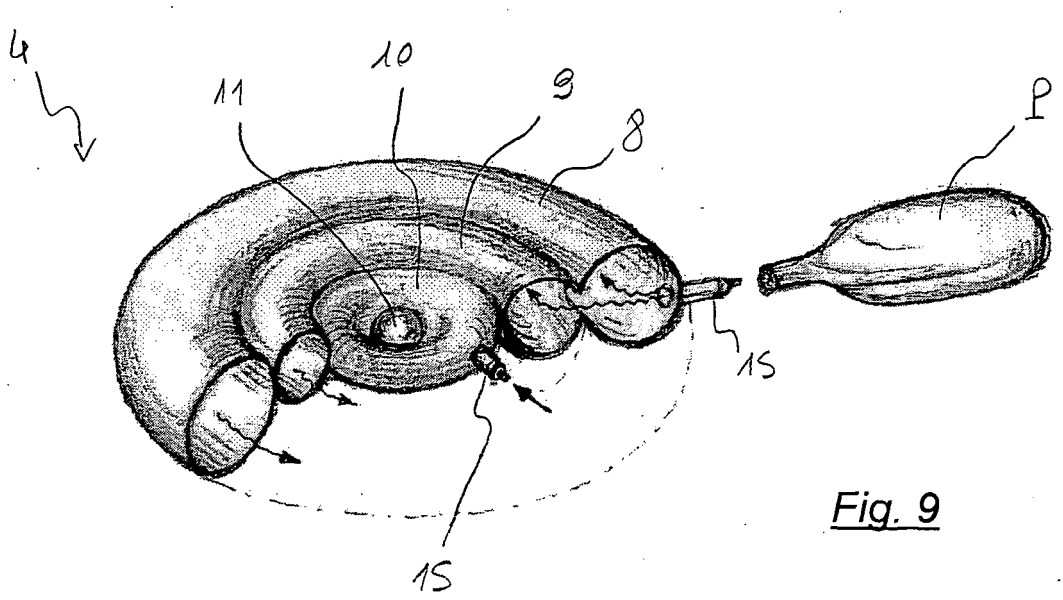


Fig. 9

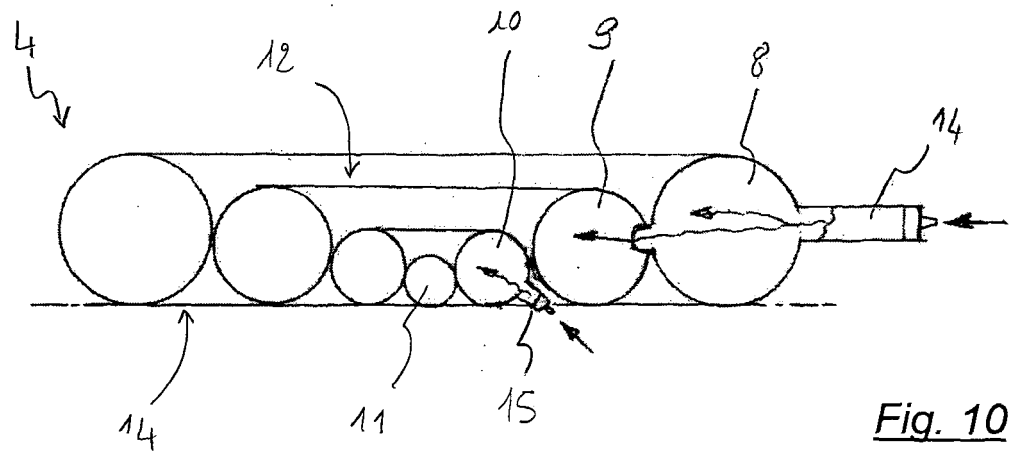


Fig. 10

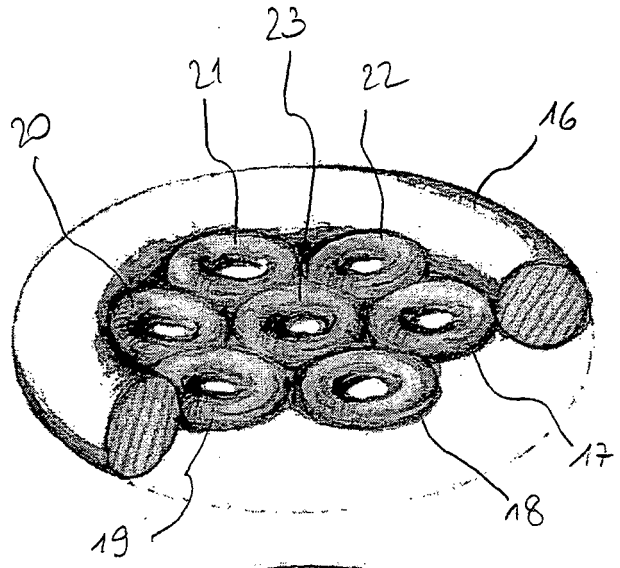
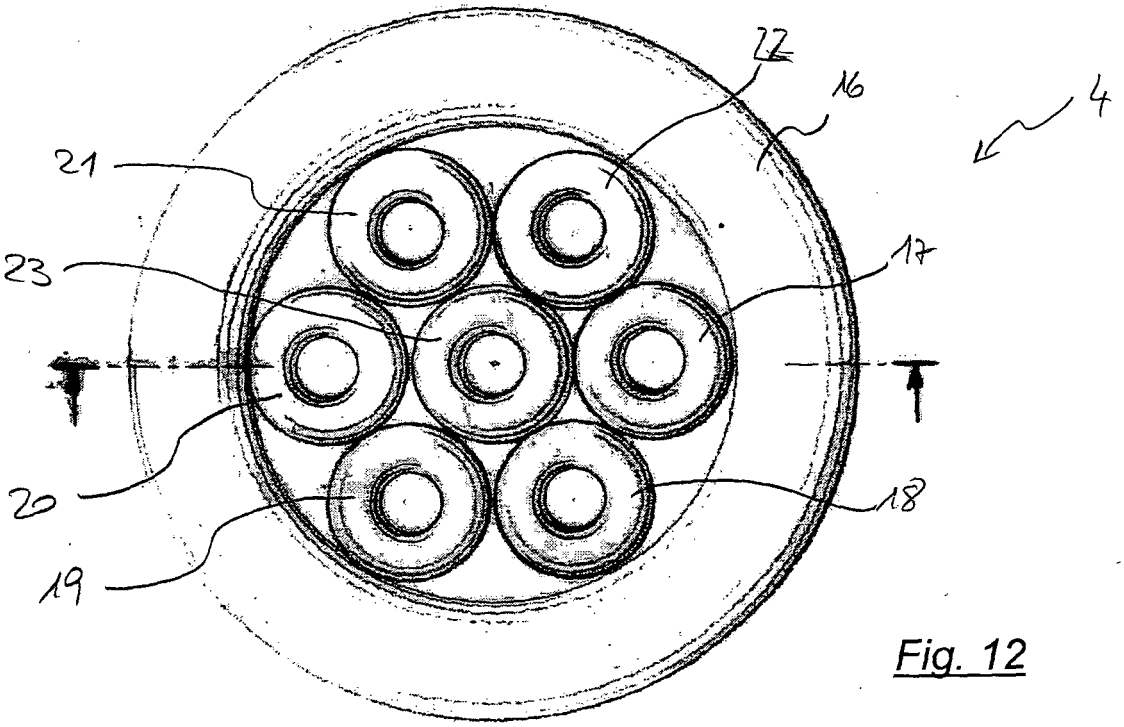


Fig. 11



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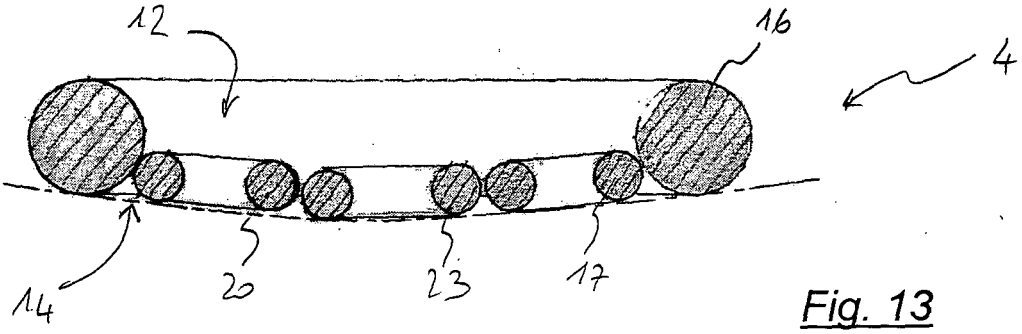

Fig. 13

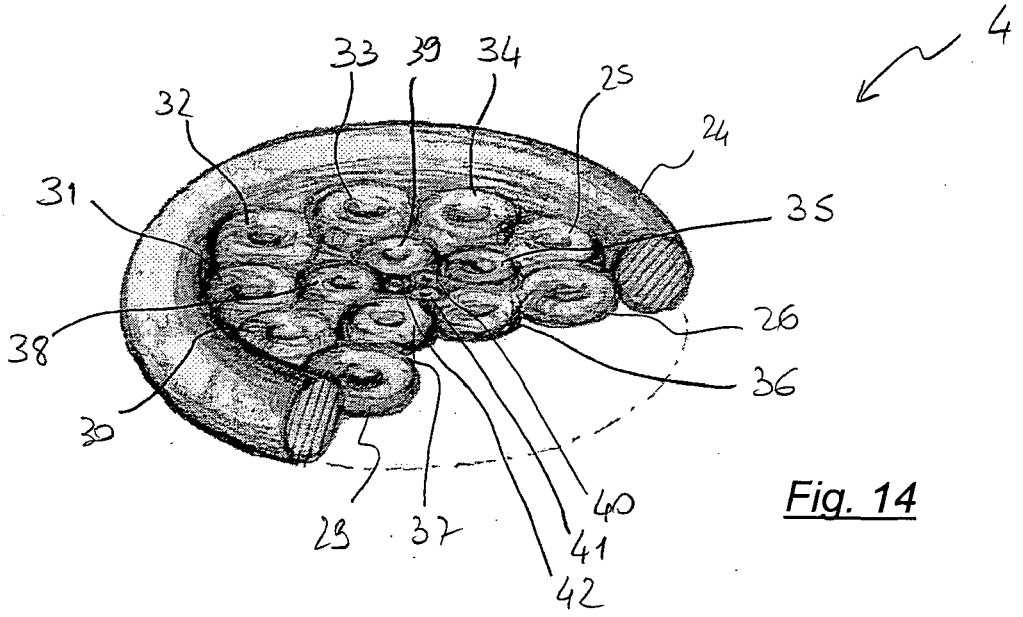
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Fig. 14

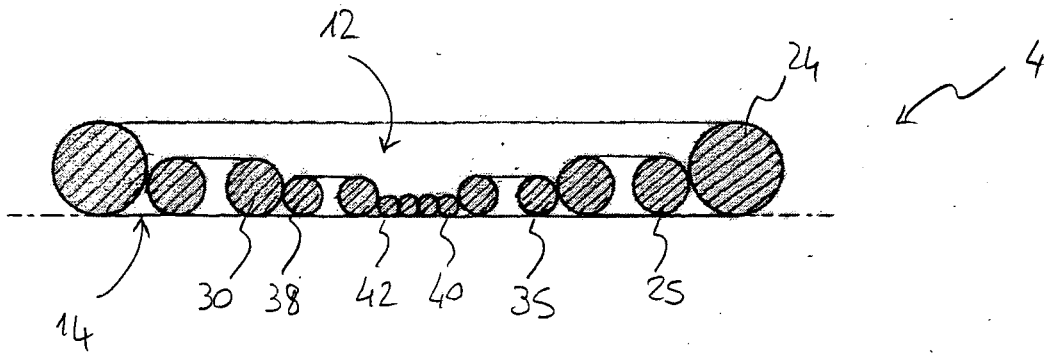
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Fig. 15

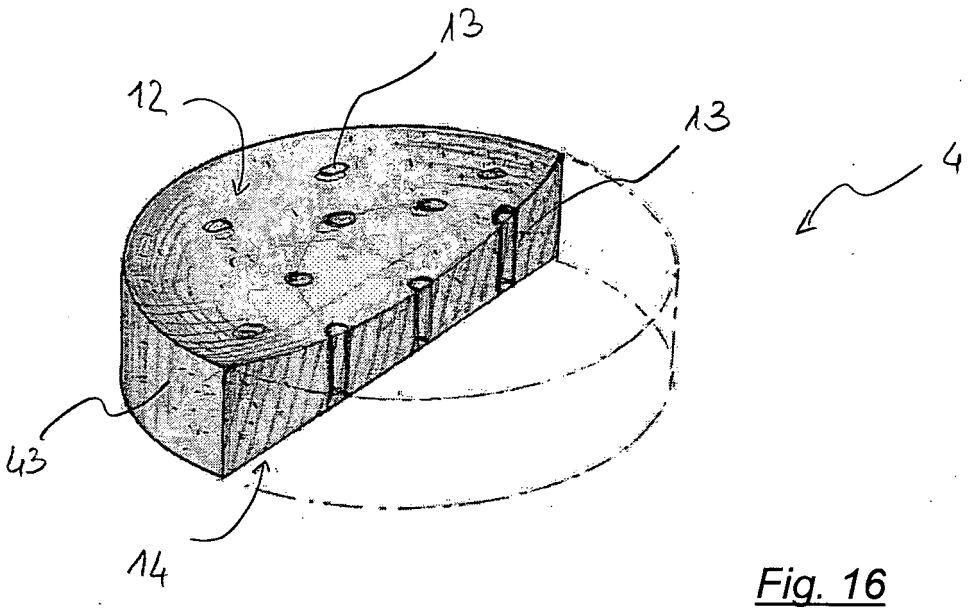

Fig. 16

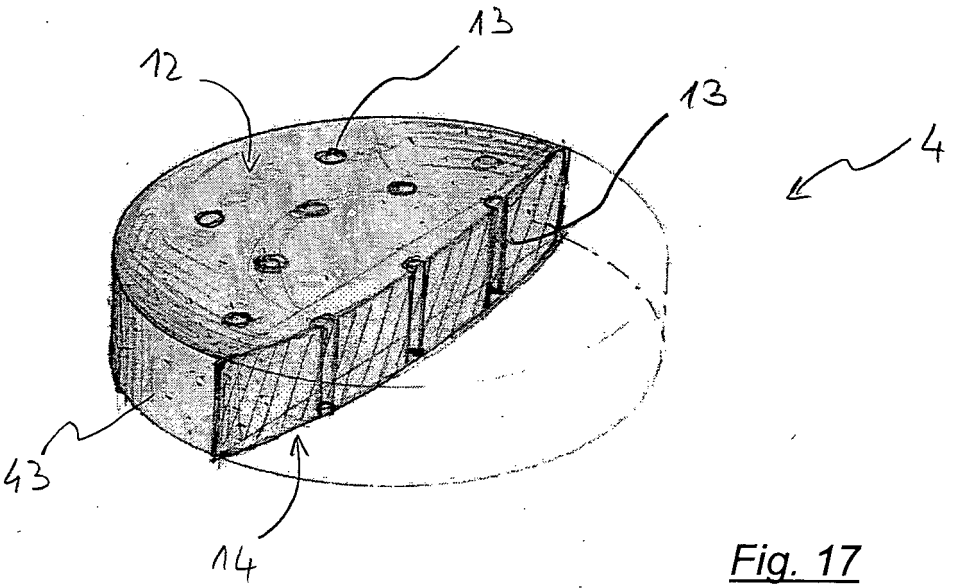

Fig. 17

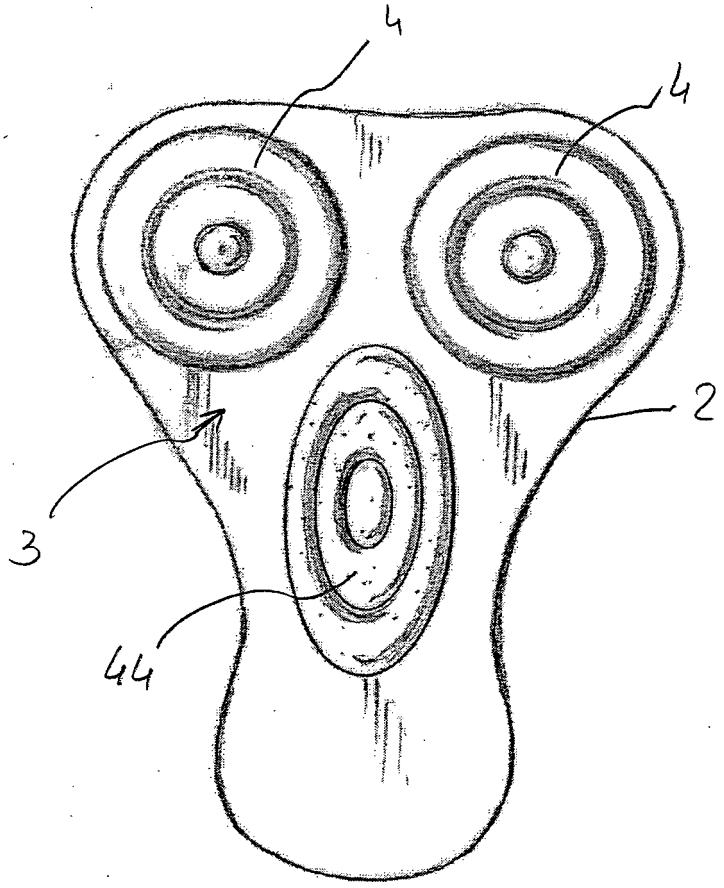

Fig. 18

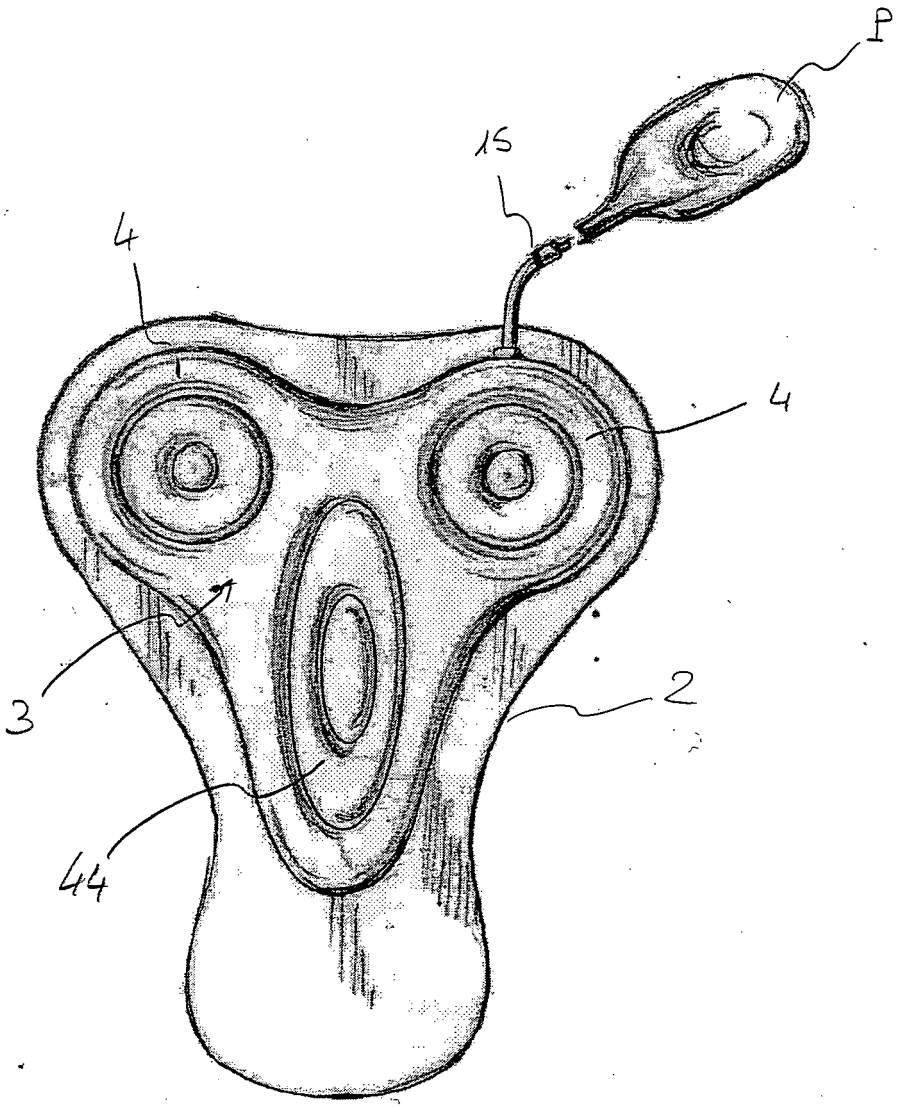

Fig. 19

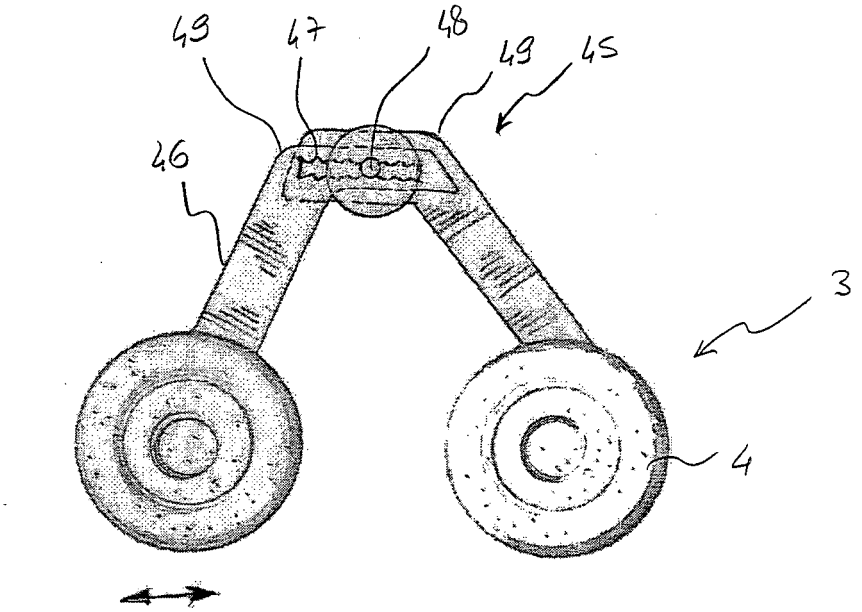

Fig. 20

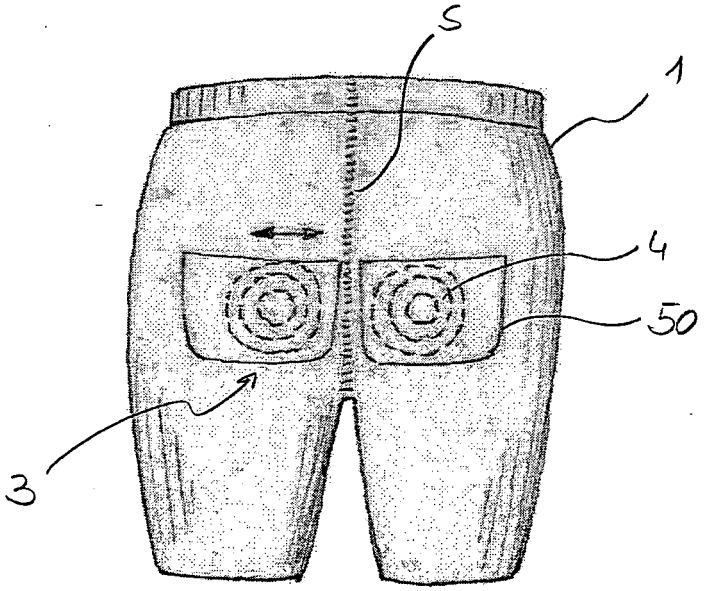

Fig. 21

European Patent Office

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Application Number
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A41D
A61F
B62J
A47C

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	22 July 2005	D'Souza, J

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