



(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
11.06.2014 Bulletin 2014/24

(51) Int Cl.:
A41D 1/08 (2006.01)

(21) Application number: **12196099.1**

(22) Date of filing: **07.12.2012**

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME

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(54) **Seat pad for cycling trousers**

(57) A seat pad (1) for cycling trousers comprises a front portion (11) adapted to be arranged in a crotch area of a cyclist, and a back portion (12) adapted to be arranged in a perineal area of the cyclist. The front portion (11) and the back portion (12) are joined by one or multiple seams (15) which are running sideways of a longitudinal center line (19) of the seat pad between opposing peripheral areas (17, 18) of the seat pad, wherein the seat pad takes a three-dimensional concave shape in

the joining region (14) of the front portion (11) and back portion (12). The three-dimensional concave shape is formed in that opposing seam joining lines (161, 162) of the front portion (11) and the back portion (12) are joined along the one or multiple seams (15) thereby closing a respective tapered gap (13) between the front portion and back portion on each side of the longitudinal center line (19).

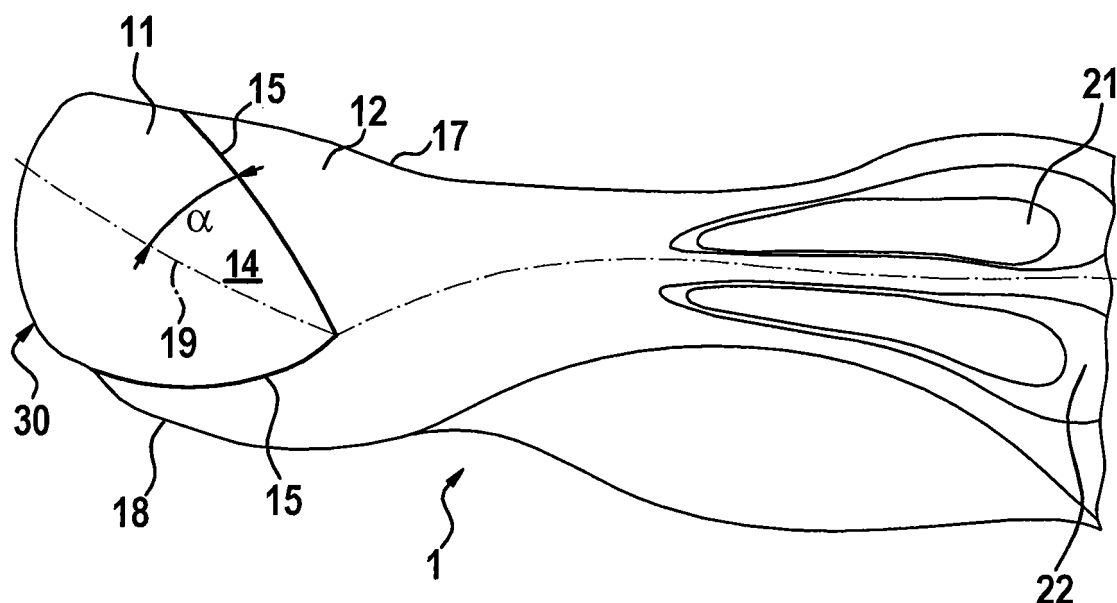


Fig. 2

Description

[0001] *The invention is related to a seat pad for cycling trousers and to cycling trousers comprising such seat pad. Further, the invention is related to a method of manufacturing a seat pad for cycling trousers.

[0002] Typically, cyclists active in cycling sports wear specially designed cycling pants or trousers that are constructed for durability, cushioning between the bicycle seat and the cyclist, minimum chaffing of the cyclist, and comfortable wear such as exhibiting good elastic properties and moisture transport away from the body. To distribute and dissipate the pressure, shock, and vibration transmitted by the bicycle seat, the pants or trousers typically include a padding which is located in most variants in the perineal and buttocks regions, in other variants also in the crotch or front pelvic region of the cyclist. Usually, such seat pads are installed in the crotch and perineal areas of the trousers sewn in place within the elastic material of the garment forming the leg and body portions of the trousers.

[0003] While the seat pads known in the art provide increased protection of the cyclist's anatomical parts which have contact with the padding, there are still some parts of the cyclist's body which, due to their anatomy, may suffer more from intensive motion during pedalling and pressure than others. Such region is, for example, the male genital region which comes into contact with the crotch area of the seat pad. On the one hand, the seat pad should be thin enough to enable intensive pedalling of the legs during cycling without chaffing against the skin. This typically also implies a tight fit of the trousers on the cyclist's body, thus exerting a compression of the seat pad on the genitals. On the other hand, sufficient protection should be given against constant pressure, shock, and vibration transmitted by the bicycle seat.

[0004] In EP 1 972 216 B1, there is disclosed a protection seat for cyclist trousers which is aimed at improving known cyclist trousers obtaining better comfort and protection to delicate body parts during the use. Particularly, a protection seat for the crotch area of a cyclist trousers comprises, in a single piece, a front pubic portion and a perineal-ischiatic rear portion, wherein at least the front portion is formed with a concave shell shape. The concave shell shape is formed by a joint between opposite flaps of a longitudinal median notch made in the front portion of the seat. A method for manufacturing and pre-forming a protection seat for cyclist trousers comprises the steps of shaping the seat with a front portion and a rear portion, making a longitudinal median V-shaped notch on said front portion with an open end, obtaining two opposite flaps, and joining at least a portion of the opposite flaps of said notch, obtaining a front longitudinal joint thus pre-forming a shell-shaped concave region in said front portion of the seat.

[0005] While the pre-formed shell-shaped concave region provides better comfort and protection by a better fit to the anatomical parts, there are still some drawbacks.

For example, the three-dimensional form of the concave shell shape, at least in some parts, is still not sufficiently adapted to the anatomical shape of the genitals. Further, the joint between opposite flaps of the longitudinal median notch may cause chaffing during use when pressed against the cyclist's body.

[0006] It is therefore an object of the invention to provide a seat pad for cycling trousers which provides improved protection and comfort to the wearer during use.

[0007] According to an aspect of the invention, there is provided a seat pad for cycling trousers, comprising a front portion adapted to be arranged in a crotch area of a cyclist, and a back portion adapted to be arranged in a perineal area of the cyclist.

The front portion and the back portion are joined by one or multiple seams, wherein the one or multiple seams are running sideways of a longitudinal center line of the seat pad between opposing peripheral areas of the seat pad. The seat pad takes a three-dimensional concave shape in the joining region of the front portion and back portion, said three-dimensional concave shape being formed in that opposing seam joining lines of the front portion and the back portion are joined along the one or multiple seams thereby closing a respective tapered gap between the front portion and back portion on each side of the longitudinal center line.

[0008] The invention is also related to cycling trousers comprising such a seat pad as described herein according to embodiments of the invention. The invention further concerns a method of manufacturing a seat pad for cycling trousers as described herein.

[0009] According to the invention, in the joining region of the front and back portion the seat pad can be formed to have a three-dimensional concave shape with improved fitting to the anatomical shape of the wearer in the crotch region, particularly to the anatomical shape of a male cyclist's genitals. This is achieved by provision of one or multiple seams which are running sideways of a longitudinal center line of the seat pad between opposing peripheral areas of the seat pad. Accordingly, the concave shape can be extended more breadthways and less in longitudinal direction, thus obtaining a deeper and broader three-dimensional concave shell shape of the seat pad resulting in reduced compression for the genitals. Furthermore, the one or more seams can be placed sideways in a way that they come into contact with body portions which are subjected to less pressure during cycling than others, such as in the side areas of the genitals, thus reducing chaffing.

[0010] For this purpose, the one or multiple seams are running sideways of the longitudinal center line of the seat pad. This means that the one or multiple seams are running in side direction with respect to the longitudinal center line between opposing peripheral areas of the seat pad. The one or multiple seams may be arranged such that they run through a center part and side parts of the seat pad on both sides of the longitudinal center line, for example crossing or touching the longitudinal center line.

They may be arranged such that they are inclined with respect to the longitudinal center line, for example in a forward or backward direction of the seat pad. In this context, as well as in the following, when it is referred to forward, backward, left, right directions or locations, outer side, inner side, etc., it is referred to directions and locations of the seat pad when worn by the cyclist during use.

[0011] Further adjustments regarding the three-dimensional shape may be made by appropriately placing and forming the respective tapered gap between the front and back portion on each side of the longitudinal center line in combination with the sideways running one or multiple seams. For example, the tapered gap may have opposing seam joining lines which are substantially straight and/or rounded. For example, the seam joining lines may be straight or rounded in any combination, such that one of the seam joining lines is straight while the respective opposing seam joining line is rounded. According to a further variant, one or multiple of the seam joining lines may be straight in some portions and rounded in other portions. They can be rounded in any desired shape, for example, following a half-circle or elliptical line.

[0012] The tapered gap may be substantially V-shaped, wherein V-shape is understood herein to encompass straight as well as rounded seam joining lines as long as the shape of the gap comprises opposing seam joining lines forming legs which are closer to each other in inner regions than in outer regions of the seat pad (i.e. have the form of an approximate V-shape). In principle, the tapered gap may have any form which has opposing seam joining lines which are placed closer to each other in regions towards the longitudinal center line than in the peripheral regions.

[0013] According to an embodiment, the front portion and the back portion are joined by at least one seam which is running on the respective sides of the longitudinal center line between opposing peripheral areas of the seat pad. According to another embodiment, the front portion and the back portion are joined by at least two seams which are respectively running between the longitudinal center line and one of the opposing peripheral areas of the seat pad.

[0014] In a preferred embodiment, the one or multiple seams are inclined with respect to the longitudinal center line. In this way, in combination with an appropriately shaped tapered gap on each side of the longitudinal center line, there may be achieved an improved three-dimensional form of the concave shell providing a good fit for the male genitals in all directions of the seat pad, particularly also in the width direction. For example, the one or multiple seams are inclined with respect to the longitudinal center line in a direction towards the front of the seat pad, i.e. forward of the seat pad. According to another embodiment, the one or multiple seams are inclined with respect to the longitudinal center line in a direction away from the front of the seat pad, i.e. backwards of the seat pad.

[0015] According to an embodiment, the front portion

and back portion are made from two separate parts. For example, the two separate parts are put together and joined at the at least one or multiple seams. Alternatively, the two parts may be already joined in some region of the seat pad, for example in a region around the longitudinal center line, and are then further joined at the at least one or multiple seams. In this way, the front portion and back portion may be constructed to have different properties. For instance, the front portion may be designed to have shielding and/or warming properties to prevent cooling in the scrotal area. The back portion, on the other hand, may be designed to have good cushioning or damping properties for a comfortable rest of the cyclist's pelvic or perineal region on the seat. It should be noted that it is not necessary that the front and back portions are joined continuously along the one or multiple seams, as long as they are joined along the one or multiple seams in some portions of the opposing seam joining lines.

[0016] According to another embodiment, the front portion and back portion are made from one piece. For example, the respective tapered gaps are cut out from the padding piece and the opposing seam joining lines along the gaps are then joined to form a respective dart.

[0017] According to an embodiment, the one or multiple seams are formed by stitching, heat sealing or gluing.

[0018] In a preferred embodiment, the one or multiple seams are running symmetrically with respect to the longitudinal center line of the seat pad. For example, the one or multiple seams are running axially-symmetrically with respect to the longitudinal center line.

[0019] According to an embodiment, the one or multiple seams are intersecting the longitudinal center line of the seat pad at approximately 1/3 of the seat pad length from the front peripheral end of the front portion. In this way, the front portion can be made with anatomical shape and the three-dimensional concave shell shape can be sized and limited to front areas of the seat pad, while other regions of the seat pad in the back portion can be designed to not adversely affect the cyclist's pedaling movement.

[0020] According to an embodiment, the front portion and back portion are made from two different materials. That is, the front portion is made from a different material than the back portion. In this manner, the materials of the front portion and back portion may be constructed to have different properties.

[0021] In a further development of the seat pad according to the invention, at least a part of the front portion comprises a functional barrier layer. The functional barrier layer contributes to a particular function which may be desired, such as the front portion has shielding and/or warming properties to prevent cooling through cold air in the scrotal area to minimize the risk of a testitis.

[0022] For example, the functional barrier layer is wind-proof and preferably also breathable (i.e. water vapor permeable) to keep the body portions warm and guarantee long-lasting comfort. The functional barrier layer may be air permeable.

[0023] For instance, the functional barrier layer is comprised in a two layer or three layer laminate. When used in a two layer laminate, the functional barrier layer may be placed on the outer side, which may be covered by the outer material of the trousers, while the other layer of the laminate may form an inner layer or may be associated with an inner layer of the seat pad providing good comfort, support and wearing properties. When used in a three layer laminate, the functional barrier layer is sandwiched between two layers, wherein an outer side of the front portion may be formed by an outer layer of the laminate.

[0024] For example, the functional barrier layer comprises a porous membrane layer, such as a porous PTFE membrane layer (usually implemented by an expanded polytetrafluorethyl-ene layer), or a non-porous membrane layer, such as a non-porous PU (polyurethane) membrane layer.

[0025] According to another aspect of the invention, a method of manufacturing a seat pad for cycling trousers comprises the steps of providing a front portion adapted to be arranged in a crotch area of a cyclist and a back portion adapted to be arranged in a perineal area of the cyclist, which are to be joined by one or multiple seams, wherein the one or multiple seams are running sideways of a longitudinal center line of the seat pad between opposing peripheral areas of the seat pad such that respective seam joining lines of the front portion and the back portion are arranged opposed to one another defining a respective tapered gap between the front portion and back portion on each side of the longitudinal center line. In a next step, the front portion and the back portion are joined along the one or multiple seams in at least part thereof such that the respective gap is closed, thereby forming a three-dimensional concave shape of the seat pad in the joining region of the front portion and back portion.

[0026] According to an embodiment, the front portion and back portion are made from one padding piece and the respective gap is formed by making a cut-out into the padding piece removing material therefrom.

[0027] According to another embodiment, the front portion and the back portion are made from at least two pieces which are joined together at the one or multiple seams.

[0028] Further advantageous features and aspects of the invention are evident from the dependent claims.

[0029] The invention will now be described by way of example according to multiple embodiments with reference to the following Figures, in which:

Fig. 1 shows a top view of a seat pad construction according to an embodiment of the invention, in which the seam joining lines of the front and back portion are not yet joined,

Fig. 2 shows a perspective view of the seat pad construction according to Fig. 1 with joined seam

joining lines closing the respective gaps between the front and back portion,

Fig. 3 shows a top view of a seat pad construction according to another embodiment of the invention, in which the seam joining lines of the front and back portion are not yet joined,

Fig. 4 shows a perspective view of the seat pad construction according to Fig. 3 with joined seam joining lines closing the respective gaps between the front and back portion,

Fig. 5 shows top views of a seat pad construction according to another embodiment of the invention, in which in Fig. 5A the seam joining lines of the front and back portion are not yet joined, and in which in Fig. 5B the seam joining lines are joined closing the respective gaps between the front and back portion,

Fig. 6 shows a schematic view of an exemplary cycling trousers having a seat pad according to an embodiment of the invention as described herein.

[0030] Fig. 1 shows a top view of a seat pad construction according to a first embodiment of the invention in a stage during manufacture. It shows a seat pad 1 for cycling trousers which serves as a protection seat for a cyclist when sitting on a seat or saddle of a bicycle. The seat pad may be made part of a cycling trousers, for example, may serve as an insert which is sewn around its perimeter to corresponding portions of a cycling trousers as commonly known and as schematically shown in Fig. 6. It comprises a front portion 11 and a back portion 12 which may be made from two separate parts. The front portion 11 and back portion 12 may be connected, or not, before they are joined at the seam or seams closing the respective gaps 13, as set out in more detail below, or may be unconnected before they are joined at the seam or seams. Alternatively, the front and back portions 11, 12 may be made from one piece, wherein the respective gap 13 may be formed by a corresponding cut out or may be preformed, as appropriate.

[0031] The front portion 11 is adapted to be arranged in a crotch area of a cyclist, thus supporting the cyclist's front pelvic region, crotch or groin region, including particularly the male genitals. The back portion 12 is adapted to be arranged in a perineal area of the cyclist, thus supporting the cyclist in the pelvic or perineal region. In accordance with a preferred embodiment, the back portion of the seat pad is equipped with at least a pair of shaped pads 21, 22, which may be equally spaced apart and mirroring one another, i.e. symmetrical, with respect to the longitudinal center line 19 of the seat pad which runs through the seat pad longitudinally along its length. The shaped pads 21, 22 may serve for cushioning and damp-

ing during cycling, as commonly known in the art.

[0032] Fig. 2 shows a perspective view of the seat pad construction according to Fig. 1 with joined seam joining lines closing the respective gaps 13 between the front and back portions 11, 12 of the seat pad 1, thereby forming a three-dimensional concave shell shape in the joining region as set out in more detail below.

[0033] Figures 3 and 4 show a seat pad 1 according to a second embodiment of the invention in which corresponding parts are designated with the same reference numerals as in Figures 1 and 2. Figures 3 and 4 also show respective top and perspective views of the seat pad construction according to the second embodiment with unjoined and joined seam joining lines, respectively.

[0034] In the following, the structure and manufacture of embodiments of a seat pad according to the invention will be explained in more detail with reference to Figures 1 to 5:

The front portion 11 and the back portion 12 are arranged opposed to one another in the direction of the longitudinal center line 19 as shown in Figs. 1 and 3, such that they touch in the region of the center line 19 in order to form a seat pad 1 when joined together. The front and back portions 11, 12 are to be joined by one or multiple seams 15, 16. In the embodiment of Fig. 1 and 2, the portions 11, 12 are to be joined by one seam 15 which is running on the respective sides, i.e. left and right sides, of the longitudinal center line 19 between the opposing peripheral areas 17, 18 of the seat pad. The front and back portions 11, 12 are arranged such that the seam joining lines 161 of the front portion and seam joining lines 162 of the back portion 12 are arranged opposed to one another defining a respective tapered gap 13 between the front portion and back portion on each side of the longitudinal center line 19. The front portion 11 and the back portion 12 are joined along the seam 15 in at least part thereof such that the respective gap 13 is closed, as shown in Fig. 2, forming a respective dart. With this closing of the gaps 13 on each side of the longitudinal center line 19, a three-dimensional concave shape of the seat pad is formed in the joining region 14 of the front portion 11 and back portion 12. By joining both opposing seam joining lines along the respective gap 13, the seat pad 1 assumes a three-dimensional shape like a concave shell in the connecting region 14, thus supporting an anatomical space for the male genitals. The specific three-dimensional shape results from the one or multiple seams which work like a respective dart. By means of the one or multiple seams running on both sides of the longitudinal center line 19 as described, the shape of the three-dimensional form may be made broader and better-fitting and, in addition, preventing a centrally running seam along the longitudinal center line 19 which may cause chaffing.

[0035] In the embodiment of Fig. 2, the seam is running through the seat pad from one side of the center line 19 to the other opposing side of the center line 19. For example, the seam 15 runs from one peripheral area 17 of the seat pad on one side of the center line 19 to an opposing peripheral area 18 of the seat pad. The seam 15 is running sideways of the center line 19 between the opposing peripheral areas 17, 18. This means that the seam 15, when the respective seam joining lines 161, 162 are joined (Fig. 2), is running in side direction at an angle with respect to the longitudinal center line 19 between the opposing peripheral areas 17, 18 of the seat pad. The seam 15 is preferably inclined forwards or backwards with respect to the center line 19, but may be in principle also rectilinear to the center line 19. In Figs. 1, 2, the seam 15 is inclined in forward direction of the seat pad, i.e. in a direction towards the front of the seat pad.

[0036] In the embodiment of Figs. 3 and 4, the portions 11, 12 are joined, in principle, in the same manner, but by two seams 15, 16 which are respectively running between the longitudinal center line 19 and one of the opposing peripheral areas 17, 18 of the seat pad. For example, the seam 15 runs from the peripheral area 17 of the seat pad on one side of the center line 19 to or near the center line 19. The seam 16 runs from the opposing peripheral area 18 of the seat pad on the other side of the center line 19 to or near the center line 19, where it may touch the seam 15. Like the seam 15 in Figs. 1 and 2, the seams 15, 16 are running sideways of the longitudinal center line 19 between the opposing peripheral areas 17, 18. This means, the seams 15, 16, when the respective seam joining lines 161, 162 are joined (Fig. 4), are respectively running in side direction at an angle with respect to the longitudinal center line 19. The respective seam 15, 16 is preferably inclined with respect to the center line 19, such as forwards or backwards, as in the previous embodiment. In Figs. 3, 4, the seams 15, 16 are inclined in backward direction of the seat pad, i.e. in a direction away from the front of the seat pad. The seams 15, 16 may be arranged such that they run through a center part and side parts of the seat pad on both sides of the longitudinal center line 19, for example touching the longitudinal center line 19.

[0037] The features described with respect to the seam 15 in Figs. 1 and 2 and the seams 15, 16 in Figs. 3, 4 and 5 may be used and applied interchangeably, for example, the seam 15 in Figs. 1, 2 may be inclined backwards and the seams 15, 16 in Figs. 3, 4, 5 may be inclined forwards. Likewise, as will be described in more detail below, the one or multiple seams 15, 16 work as a respective dart, so that the terms "seam" and "dart" are also meant interchangeably herein.

[0038] Preferably, to achieve an improved three-dimensional concave shell shape, the seam 15 in Fig. 2 and the seams 15, 16 in Fig. 4, 5, respectively, are running symmetrically with respect to the longitudinal center line 19, particularly axially-symmetrically with respect to the longitudinal center line 19.

[0039] Regarding the angle at which the seam 15 or seams 15, 16 are running with respect to the longitudinal center line 19, the angle α (Fig. 2, 4) with respect to the center line 19 is advantageously in a range between 10° and 140° with respect to the center line 19 in the front portion 11. If the seam is running and inclined in forward direction of the seat pad (i.e. $\alpha < 90^\circ$), it may be advantageous if the angle α of the seam is closer to 90° (e.g. 60°-80°) in order to avoid or reduce potential pressure marks in the front portion of the seat pad. Preferably, if the seam or seams are running and inclined in forward direction (Fig. 2) of the seat pad, the angle α is advantageously around 40°. If the seam or seams are running and inclined in backward direction (Fig. 4) of the seat pad, the angle α is advantageously around 100°.

[0040] According to an embodiment, it is advantageous if the seam or seams are running and inclined in backward direction, as shown in Fig. 4, since seams can be avoided in the front area of the seat pad where seams may be undesired. Moreover, the part of the seat pad in front of the seam or seams can have an increased area which may be provided with a windproof material, as set out herein, so that wind protection can be increased in area.

[0041] According to one embodiment, the seam joining lines 161, 162 are substantially straight (Figs. 1-4) or rounded (Fig. 5). For example, when unjoined (Figs. 1, 3, 5A), the seam joining lines 161, 162 have inner ends close together with straight lines or tangent lines forming an angle β between them of, e.g., 10°-60°, preferably 15°-50°, more preferably 20°-40°. The opposite open ends of the seam joining lines 161, 162 at the peripheral areas 17, 18 may have the same angle β between them. Alternatively, as shown in Fig. 5A, particularly when the seam joining lines 161, 162 have rounded shape, the opposite open ends may diverge so that tangent lines to the open ends at the peripheral areas 17, 18 form a larger angle β between them than at the inner ends. The choice of the angle β is particularly dependent upon the stiffness and thickness of the material of the seat pad adjacent the seam joining lines. If the material is quite stiff, then smaller angles may be sufficient. According to an embodiment, as shown in Fig. 4, the angle β is around 22°.

[0042] Preferably, seam joints are made along the entire extension of the respective seam, joining the seam joining lines 161, 162 continuously along their length. The seam joints may also be made only in some regions of the seams which may suffice in holding the front and back portions 11, 12 together along the seams.

[0043] In one embodiment, the seam 15 in Fig. 2 and the seams 15, 16 in Figs. 3, 5A are intersecting the longitudinal center line 19 of the seat pad at approximately 1/3 of the seat pad length from the front peripheral end of the front portion 11 to achieve a desired and appropriately arranged three-dimensional shape of the region 14. The intersecting of the longitudinal center line 19 may vary between $\pm 25\%$ of the 1/3 of the seat pad length from the front peripheral end of the front portion 11. Ac-

cording to an embodiment, the intersecting of the longitudinal center line 19 may vary between $\pm 20\%$ of the 1/3 of the seat pad length from the front peripheral end of the front portion 11. For example, if the longitudinal size of the seat pad 1 along the longitudinal center line 19 is about 40 cm, the longitudinal center line 19 is intersected at about 11-15 cm.

[0044] In an embodiment in which the front portion 11 comprises a windproof material, as set out in more detail below, it may be appropriate that the front portion 11 is longer in length in order to provide sufficient protection against wind for the delicate body portions. In this case, the seam 15 in Fig. 2 and the seams 15, 16 in Figs. 3, 5A may be intersecting the longitudinal center line 19 of the seat pad at a location greater than 1/3 of the seat pad length from the front peripheral end of the front portion 11. Particularly, the location may be at around 4/9 of the seat pad length from the front.

[0045] Regarding the gaps 13 on each side of the center line 19, they may be tapered in any desired form in a way that the seam joining lines 161, 162 are closer to each other in an inner region than in an outer region of the seat pad before they are joined. They may be tapered in a general V-shape with straight or rounded legs of a V and with the open end arranged peripherally of the seat pad. In Fig. 5A, for example, they are tapered with rounded seam joining lines 161, 162 (i.e., in a somehow rounded V-shape), which are directed backwards, but which may also be directed forwards.

[0046] Alternatively to having two separate parts, i.e. having a seat pad made from at least two pieces which are joined together at the one or multiple seams 15, 16, the front portion 11 and back portion 12 may also be made from one padding piece and the respective gap 13 may be formed by making a cut-out into the padding piece removing the material of the gaps 13 therefrom. The cut-out may be made such that the front and back portions 11, 12 are still connected in a central region of the seat pad, e.g. near the longitudinal center line 19. Again, the respective cut-outs may be made such that the gaps 13 are inclined forwards or backwards with the desired shape and angles.

[0047] In all embodiments, the one or multiple seams 15, 16 may be formed by stitching, heat sealing or gluing. Irrespective of whether the front and back portions 11, 12 are made from one or multiple pieces, they may be made from two different materials. For example, the front portion 11 may comprise a warming and/or windproof material, whereas the back portion may comprise a material optimized for cushioning.

[0048] In an advantageous embodiment, at least a part of the front portion 11, preferably the whole front portion, comprises a functional barrier layer 30. The functional barrier layer 30 may be comprised in a two layer or three layer laminate. In a two layer laminate, the barrier layer 30 may be arranged on an inner side or outer side of the laminate. In a three layer laminate, the barrier layer 30 is typically arranged between an outer and inner layer,

such as a respective textile layer, to achieve good resistance and long-life properties on the outer side and good wearing comfort on the inner side of the seat pad.

[0049] Preferably, the functional barrier layer is windproof and advantageously water vapor permeable. Providing the front portion 11 with a windproof barrier layer contributes to keep the scrotal and delicate body portions warm and protected from cold air to guarantee a long-lasting comfort. In this way, cooling through wind can be avoided in the scrotal area to minimize the risk of a testitis.

[0050] In a further embodiment, the seat pad 1 may be provided with a functional barrier layer over its whole or substantially whole area. Preferably, the functional barrier layer is windproof and advantageously water vapor permeable. In this way protection in the whole area of the seat pad can be increased.

[0051] According to an embodiment, the barrier layer may comprise a porous membrane layer, such as a porous PTFE (e.g., made from expanded polytetrafluorethylene) membrane layer, or a non-porous membrane layer, such as a continuous PU (polyurethane) membrane layer. A porous PTFE membrane layer may also be combined with a non-porous PU membrane layer in a composite barrier layer.

[0052] The barrier layer may be waterproof. For example, the barrier layer is windproof, waterproof and water vapor permeable. For instance, the barrier layer is waterproof in that it bears a water pressure of at least 8 kPa (according to ISO 811 - 1981). It may have a water vapor transmission resistance $Ret < 20 \text{ m}^2\text{Pa/W}$ (ISO 11092). A material is water vapor permeable which has a water vapor transmission resistance Ret of lower than $100 \text{ m}^2\text{Pa/W}$.

[0053] The barrier layer may be air impermeable: Air impermeability according to an air permeability $< 1 \text{ l/m}^2/\text{s}$ (ISO 9237; 100 cm^2 , 2,5 kPa). The barrier layer may be windproof: Windproof according to an air permeability $< 50 \text{ l/m}^2/\text{s}$ (ISO 9237-1995; 100 cm^2 , 2,5 kPa). For example, the barrier layer has an air permeability of not more than $6 \text{ l/m}^2/\text{s}$ (according to ISO 9237).

[0054] Fig. 6 shows a schematic view of an exemplary cycling trousers having a seat pad according to the invention as described herein. It shows an example of a skin-tight trousers 40 having a seat pad 1 as described herein above in a front view of the trousers. The seat pad 1, particularly its front portion 11, is arranged at the crotch or groin area 41 of the trousers 40 to protect the cyclist's crotch or front perineal body area and extends backwards to also protect the cyclist's central and rear perineal body area which is in contact with the bicycle seat during use. The seat pad 1 is associated with the trousers 40, e.g. by sewing, or may be formed integrally with the trousers 40. The connecting region 14 of the front and back portions of the seat pad having the three-dimensional concave shell shape is arranged appropriately in the crotch or groin area 41 of the trousers 40 to support and protect the male genitals, as described above. Typically, the seat pad 1 is preformed with the three-dimensional shape in

the connecting region 14 and then joined with the trousers 40.

5 Claims

1. A seat pad (1) for cycling trousers, comprising

- a front portion (11) adapted to be arranged in a crotch area of a cyclist,
- a back portion (12) adapted to be arranged in a perineal area of the cyclist,
- wherein the front portion (11) and the back portion (12) are joined by one or multiple seams (15), wherein the one or multiple seams (15) are running sideways of a longitudinal center line (19) of the seat pad between opposing peripheral areas (17, 18) of the seat pad, wherein the seat pad takes a three-dimensional concave shape in the joining region (14) of the front portion (11) and back portion (12),
- said three-dimensional concave shape being formed in that opposing seam joining lines (161, 162) of the front portion (11) and the back portion (12) are joined along the one or multiple seams (15) thereby closing a respective tapered gap (13) between the front portion and back portion on each side of the longitudinal center line (19).

2. Seat pad according to claim 1, wherein the front portion (11) and the back portion (12) are joined by at least one seam (15) which is running on the respective sides of the longitudinal center line (19) between opposing peripheral areas (17, 18) of the seat pad, or by at least two seams (15) which are respectively running between the longitudinal center line (19) and one of the opposing peripheral areas (17, 18) of the seat pad.

3. Seat pad according to claim 1 or 2, wherein the one or multiple seams (15) are inclined with respect to the longitudinal center line (19).

4. Seat pad according to one of claims 1 to 3, wherein the front portion (11) and back portion (12) are made from two separate parts.

5. Seat pad according to one of claims 1 to 3, wherein the front portion (11) and back portion (12) are made from one piece.

6. Seat pad according to one of claims 1 to 5, wherein the one or multiple seams (15) are formed by stitching, heat sealing or gluing.

7. Seat pad according to one of claims 1 to 6, wherein the one or multiple seams (15) are running symmetrically with respect to the longitudinal center line (19)

of the seat pad, particularly axially-symmetrically with respect to the longitudinal center line (19).

8. Seat pad according to one of claims 1 to 7, wherein the one or multiple seams (15) are intersecting the longitudinal center line (19) of the seat pad at approximately $1/3 \pm 25\%$ of the seat pad length from the front peripheral end of the front portion (11). 5
9. Seat pad according to one of claims 1 to 8, wherein the front portion (11) and back portion (12) are made from two different materials. 10
10. Seat pad according to one of claims 1 to 9, wherein at least a part of the front portion (11) comprises a functional barrier layer. 15
11. Seat pad according to claim 10, wherein the functional barrier layer is windproof. 20
12. Seat pad according to one of claims 10 or 11, wherein the functional barrier layer is water vapor permeable. 25
13. Seat pad according to one of claims 10 to 12, wherein the functional barrier layer comprises a porous membrane layer, particularly a porous PTFE membrane layer. 30
14. Seat pad according to one of claims 1 to 13, wherein the one or multiple seams (15) are inclined with respect to the longitudinal center line (19) in a direction towards the front of the seat pad. 35
15. Seat pad according to one of claims 1 to 13, wherein the one or multiple seams (15) are inclined with respect to the longitudinal center line (19) in a direction away from the front of the seat pad. 40
16. Cycling trousers comprising a seat pad (1) according to one of claims 1 to 15. 45
17. A method of manufacturing a seat pad (1) for cycling trousers, comprising the steps of: 50
 - providing a front portion (11) adapted to be arranged in a crotch area of a cyclist and a back portion (12) adapted to be arranged in a perineal area of the cyclist, which are to be joined by one or multiple seams (15), wherein the one or multiple seams (15) are running sideways of a longitudinal center line (19) of the seat pad between opposing peripheral areas (17, 18) of the seat pad such that respective seam joining lines (161, 162) of the front portion (11) and the back portion (12) are arranged opposed to one another defining a respective tapered gap (13) between the front portion and back portion on each side of the longitudinal center line (19), 55

- joining the front portion (11) and the back portion (12) along the one or multiple seams (15) in at least part thereof such that the respective gap (13) is closed, thereby forming a three-dimensional concave shape of the seat pad in the joining region (14) of the front portion (11) and back portion (12).

18. The method according to claim 17, wherein the front portion (11) and back portion (12) are made from one padding piece and the respective gap (13) is formed by making a cut-out into the padding piece removing material therefrom.
19. The method according to claim 17, wherein the front portion (11) and the back portion (12) are made from at least two pieces which are joined together at the one or multiple seams (15).
20. The method according to one of claims 17 to 19, wherein the respective gap (13) is substantially V-shaped with the open end arranged peripherally of the seat pad.

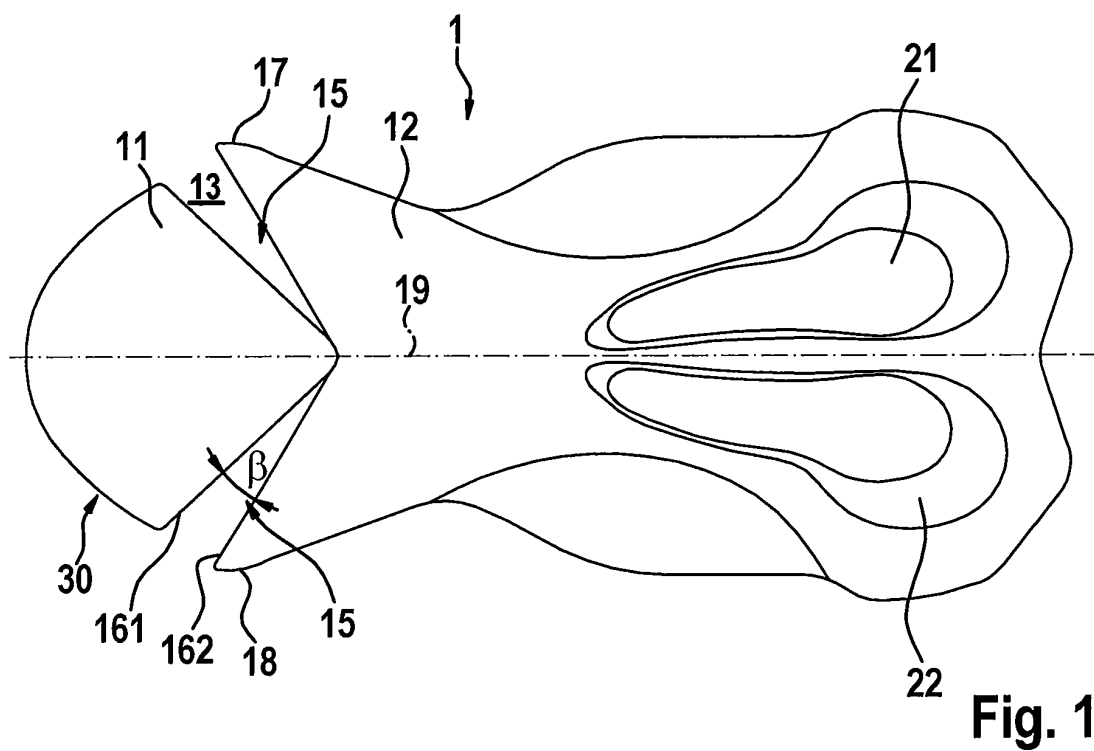


Fig. 1

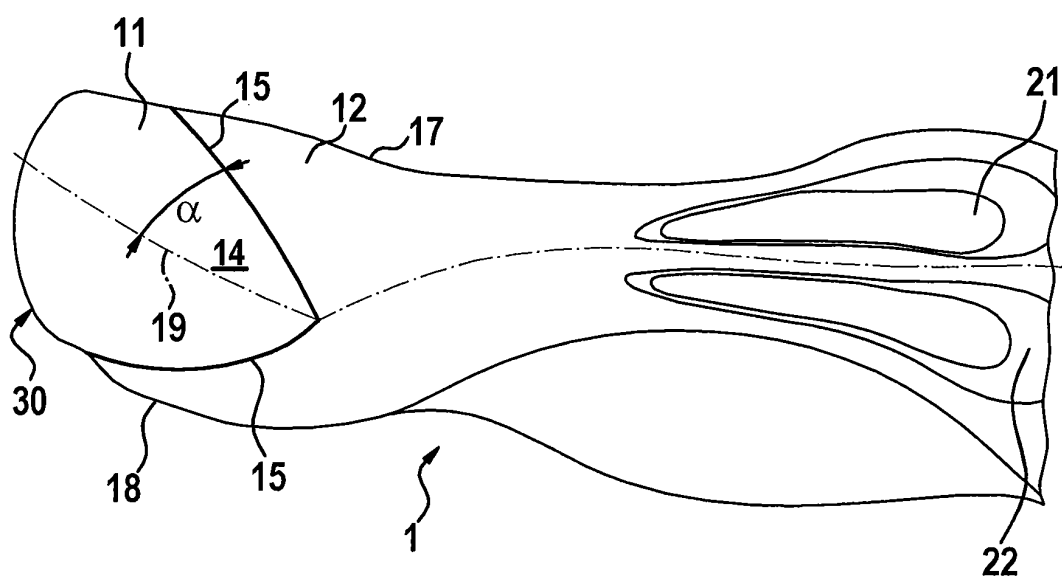


Fig. 2

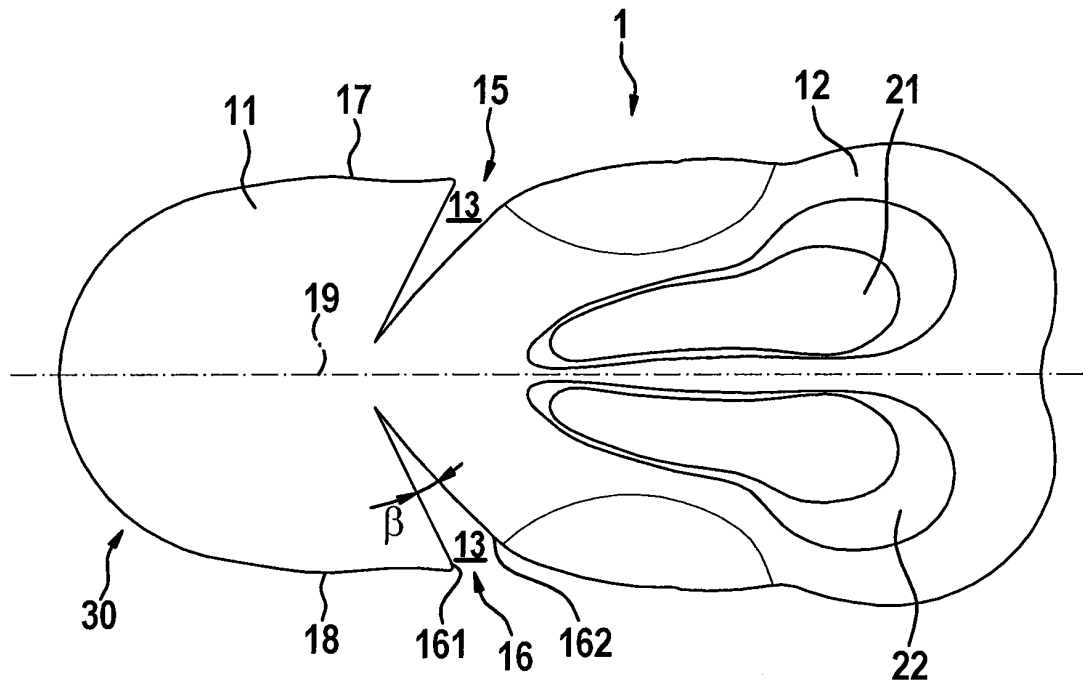


Fig. 3

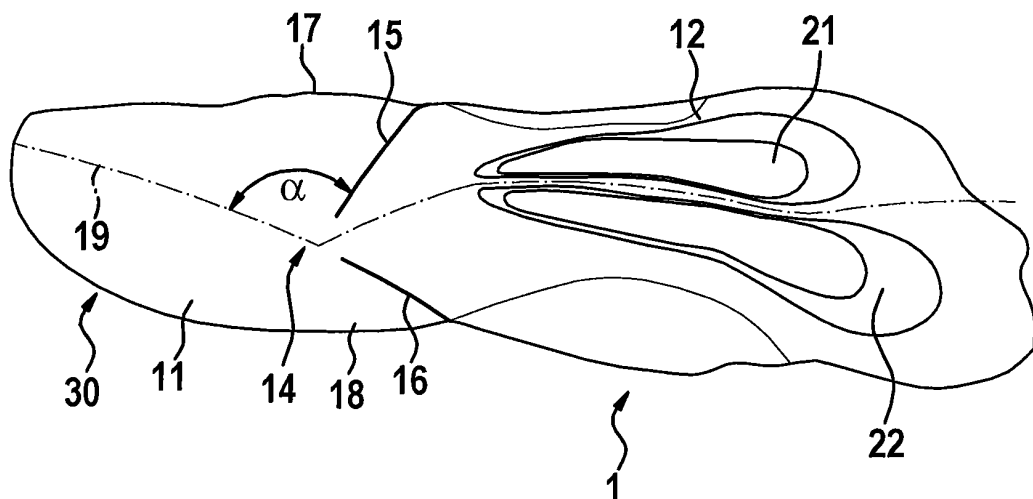


Fig. 4

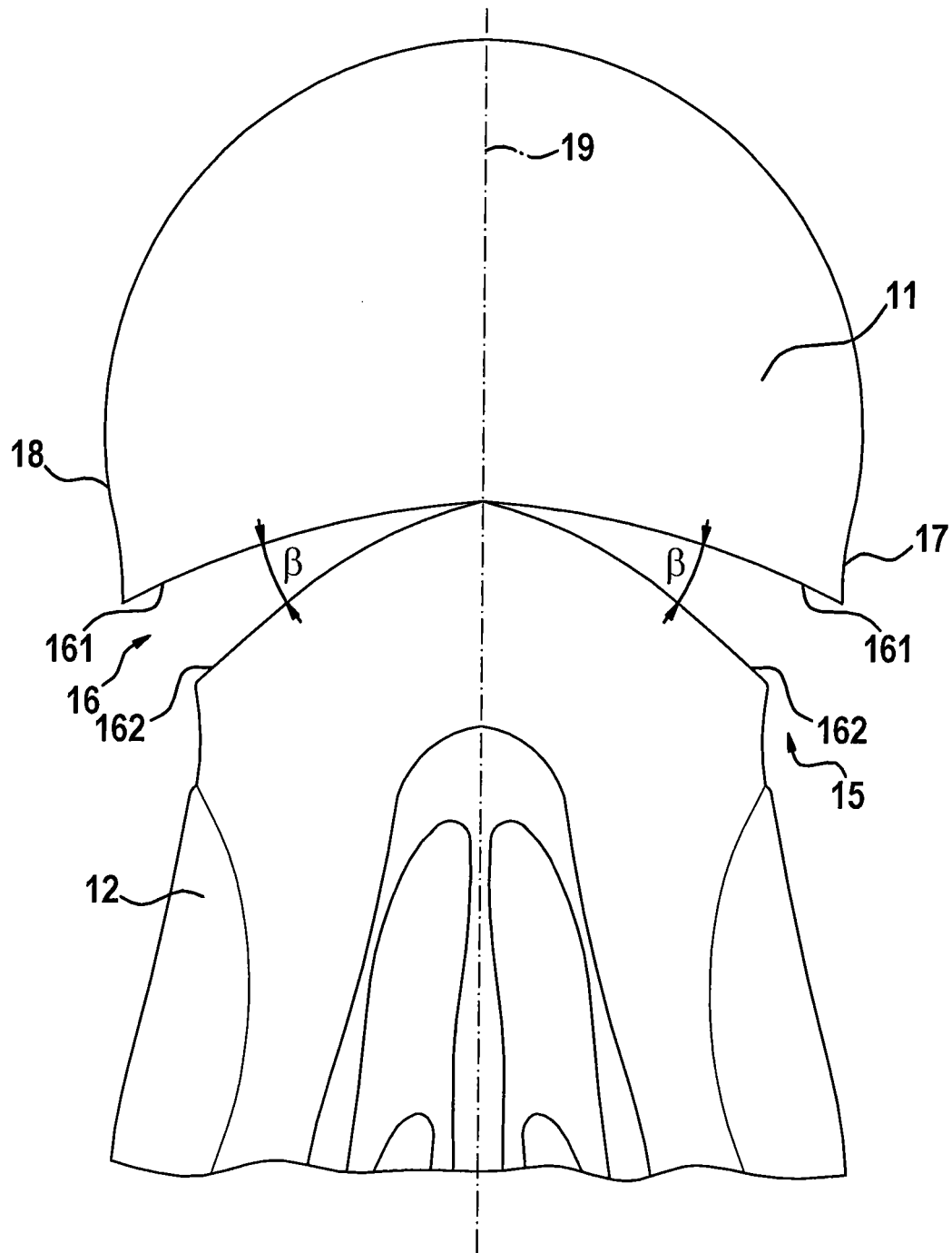


Fig. 5A

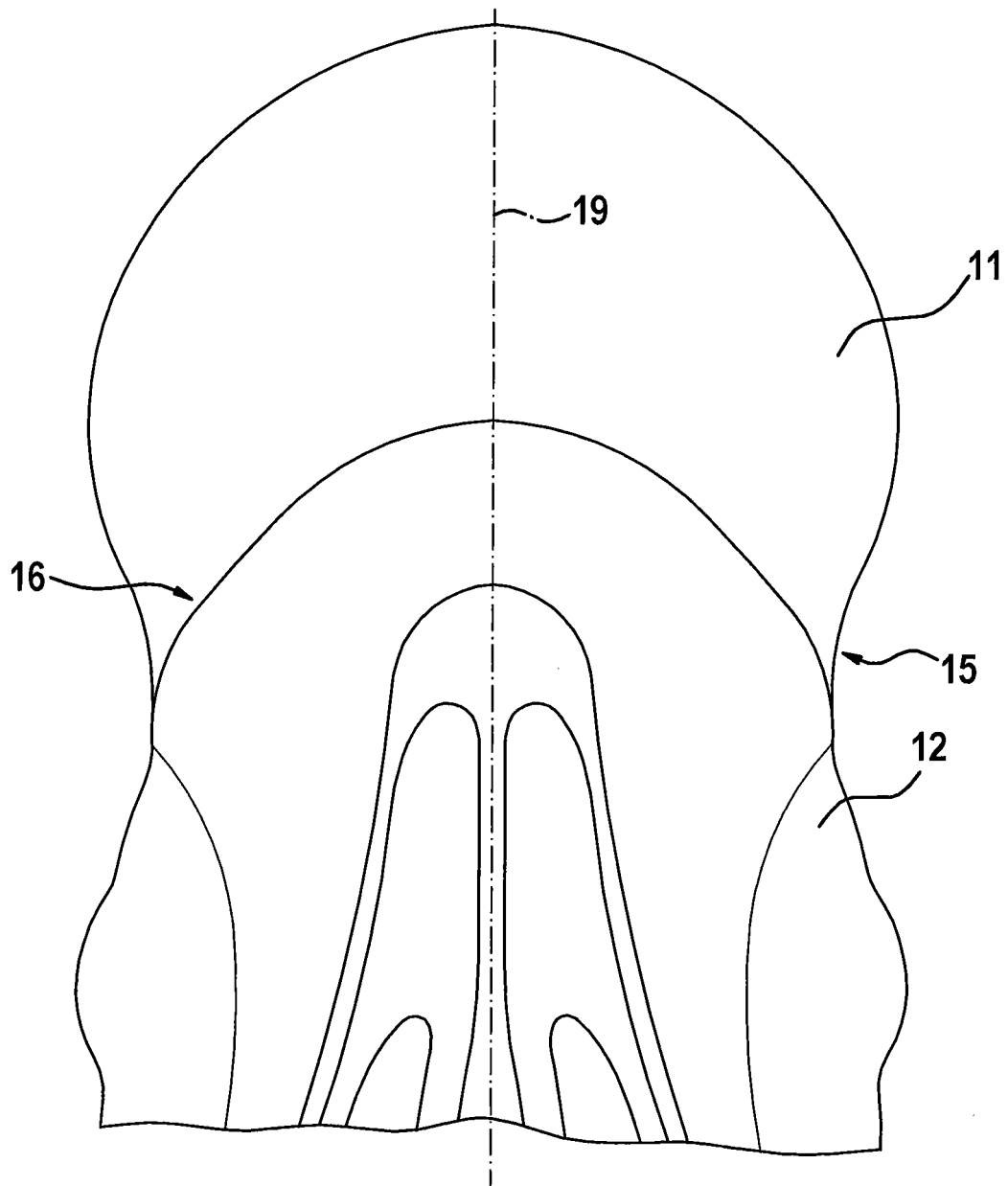


Fig. 5B

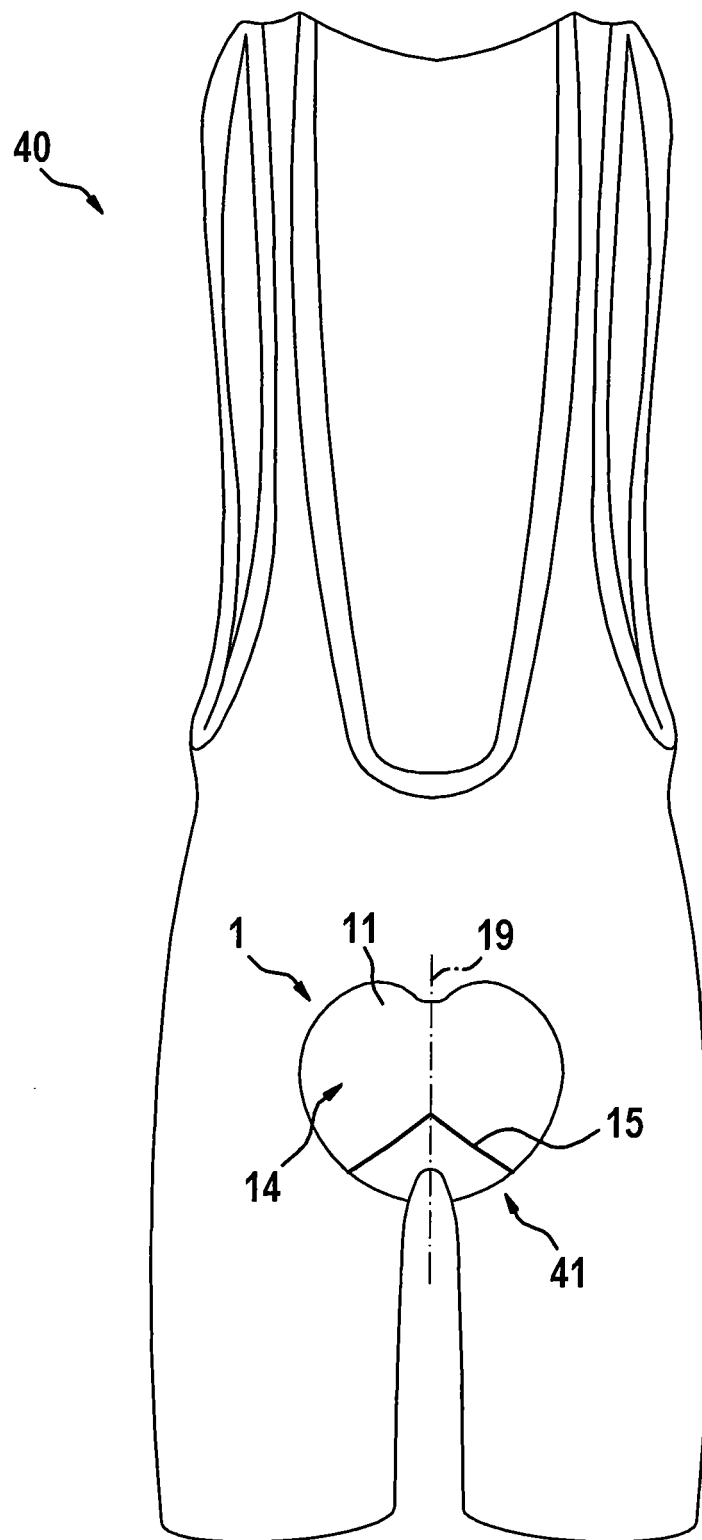


Fig. 6



EUROPEAN SEARCH REPORT

Application Number
EP 12 19 6099

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 13 May 2013	Examiner D'Souza, Jennifer
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons ----- & : member of the same patent family, corresponding document	

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

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