TROUSERS FOR CYCLIST AND METHOD OF MAKING SAME

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ABSTRACT

Trousers for use by cyclists and method of making such trousers, including an insert for protecting cyclist body zones resting against one of a bicycle seat or a saddle, the insert comprising at least one piece of material fastened at its borders to a fabric of the trousers by way e.g. of stitching. The insert includes a base layer made of expandable material, the base layer having a side adapted to be in direct contact with a body of a cyclist. An elastic fabric, elastic in all directions, is fastened onto the side of the base layer, wherein the elastic fabric adapts itself in its dimensions to the movements of a body of a cyclist.
TROUSERS FOR CYCLIST AND METHOD OF MAKING SAME

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This objective is met using the present invention by having the insert consist of a base layer made of expanded material, onto which, on the side directly contacting the body of the cyclist, a fabric, elastic in all directions is fastened in a manner adapting itself in its dimensions to the body movements of the cyclist.

[0010] Owing to the application of an insert, which is soft as it is composed of a base layer made from expanded material, and covered by a fabric, elastic in all directions, perfect adaptation of the insert to the body movements of the cyclist is obtained in such a manner that no relative movement occurs between the skin of the cyclist and the surface of the insert, which could cause friction and thus result in abrasion of the skin.

[0011] Before beginning the description of various preferred examples of realization of the present invention, two general aspects thereof are to be clarified more precisely, namely:

[0012] The present invention does not concern the actual shape of the insert to be inserted in the appropriate zone of the seat of the trousers. The insert thus can present a shape similar to the one provided in the above-mentioned EP-0776615-A2, and can also be of any other shape deemed advantageous.

[0013] The term “fabric elastic in all directions” herein is understood, in a general sense, to designate a two-dimensional textile aggregate of fiber threads made from natural or synthetic fibers and/or continuous filaments intertwined in such a manner that an elasticity of the fabric is ensured, which essentially is homogeneous in all directions, i.e. in any direction it is subject to tensile tension.

[0014] According to an aspect of the invention, trousers for use by cyclists include an insert for protecting cyclist body zones resting against one of a bicycle seat or a saddle, the insert comprising one single piece of material fastened at its borders to a fabric of the trousers, e.g., by way of stitching. The insert comprises a base layer made of expandable material, the base layer having a side adapted to be in direct contact with a body of a cyclist. An elastic fabric, elastic in all directions, is fastened onto the side of the base layer, wherein the elastic fabric adapts itself in its dimensions to the movements of a body of a cyclist.

[0015] According to another aspect of the invention, the base layer may be made from foam rubber. The elastic fabric may comprise a fabric made with elastomer fibers with an elastic elongation capacity of more than 5%. The base layer may comprise a soft expandable material. The soft expandable material, in its load-free relaxed state, may be of a thickness (h) ranging from approximately 1 mm to approximately 8 mm and preferably from approximately 3 mm to approximately 5 mm.

[0016] According to yet another aspect of the invention, the elastic fabric may be fastened to the base layer of expandable material by using adhesives, the adhesive remaining elastic in a fixed state after application. The elastic fabric may be fastened to the base layer by way of stitching, using a stitch bonding process. The elastic fabric may be fastened to the base layer by way of a hot vulcanizing process. The elastic fabric may comprise a woven fabric, using threads with elastomeric fibers in a weft as well
as in a warp. The elastic fabric may comprise a knitted fabric, knitted using a thread with elastomeric fibers.

Moreover, according to the invention, trousers for use by cyclists include an insert for protecting cyclist body zones resting against one of a bicycle seat or a saddle, the insert comprising one single piece of material fastened at its borders to a fabric of the trousers by way of stitching. The insert comprises a base layer made of soft expandable material, the base layer having a side adapted to be in direct contact with a body of a cyclist. An elastic fabric, elastic in all directions, is fastened onto the side of the base layer, wherein the elastic fabric adapts itself in its dimensions to the movements of a body of a cyclist. The soft expandable material, in its load-free relaxed state, may be of a thickness (h) ranging from approximately 1 mm to approximately 8 mm.

According to the invention, the elastic fabric may be fastened to the base layer of expandable material using adhesives, the adhesive remaining elastic in a fixed state after application. Alternatively, the elastic fabric may be fastened to the base layer by way of stitching, using a stitch bonding process. Furthermore, the elastic fabric may be fastened to the base layer by way of a hot vulcanizing process. The elastic fabric may comprise a woven fabric, using threads with elastomeric fibers in a weft as well as in a warp. The elastic fabric may comprise a knitted fabric, knitted using a thread with elastomeric fibers.

According to a further aspect of the invention, a method of making trousers for use by cyclists including at least a piece of material insert for protecting cyclist body zones resting against one of a bicycle seat or a saddle, comprises fastening the insert at its borders to a fabric of the trousers, e.g. by way of stitching, the insert comprising a base layer made of expandable material, the base layer having a side adapted to be in direct contact with a body of a cyclist and fastening an elastic fabric, elastic in all directions, onto the side of the base layer, wherein the elastic fabric adapts itself in its dimensions to the movements of a body of a cyclist.

According to the invention, the fastening of the elastic fabric may comprise fastening the elastic fabric to the base layer of expandable material by using adhesives, the adhesive remaining elastic in a fixed state after application. Alternatively, the fastening of the elastic fabric may comprise fastening the elastic fabric to the base layer by way of stitching, using a stitch bonding process. Further yet, the fastening of the elastic fabric may comprise fastening the elastic fabric to the base layer by way of a hot vulcanizing process.

Other exemplary embodiments and advantages of the present invention may be ascertained by reviewing the present disclosure and the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

The present invention is further described in the detailed description which follows, in reference to the noted plurality of drawings by way of non-limiting examples of embodiments of the present invention, in which like reference numerals represent similar parts throughout the several views of the drawings, and wherein:

FIG. 1 shows a schematic perspective view of a cyclist (off his bicycle) wearing the inventive trousers;

FIG. 2 shows a detail according to FIG. 1 on an enlarged scale, showing the insert developed into a plane;

FIG. 3 shows a cross-section along the line A-A according to FIG. 2, of a variant realization of the present invention; and

FIG. 4 shows a variant, in the same view as the one shown in the FIG. 3, of another form of realization of the present invention.

DETAILED DESCRIPTION OF THE PRESENT INVENTION

The particulars shown herein are by way of example and for purposes of illustrative discussion of the embodiments of the present invention only and are presented in the cause of providing what is believed to be the most useful and readily understood description of the principles and conceptual aspects of the present invention. In this regard, no attempt is made to show structural details of the present invention in more detail than is necessary for the fundamental understanding of the present invention, the description taken with the drawings making apparent to those skilled in the art how the several forms of the present invention may be embodied in practice.

FIG. 1 illustrates a portion of trousers for cyclists, designated 1, and more precisely the portion corresponding to the groin zone, the person wearing the trousers standing on the ground. An insert, designated 2, made from a single piece is fixed at its borders 3 (better visible in FIG. 2) to the fabric of the trousers 1 for cyclists by a stitching seam. The seam 4 is indicated in FIG. 2 by a zigzag line. The shape of the insert, which as such is not an object of the present invention, can be e.g. pear-shaped, as indicated in FIG. 2, where the larger portion of the pear outline coincides, after being put on by the cyclist, with the anterior zone of the body, i.e. the zone of the sexual organs, which are particularly susceptible to mechanical stress, and thus merit effective protection. As underlined above, the pear shape of the insert 2 is not, however, necessary within the scope of the present invention, which can advantageously be applied also to inserts of other shapes, depending on the requirements and keeping the gender of the user in mind.

For a better understanding of the present invention, FIG. 3 will now be referred to, in which a cross-section along the line A-A according to FIG. 2 is shown. From FIG. 3 it can be seen how the insert 2 is composed of a base layer 5 of expanded soft material onto which, on the side directly contacting the body of the cyclist, a fabric 6, elastic in all directions, according to the definition given above concerning the concept of elasticity, is fastened or attached. Owing to the isotropic or homogeneous elasticity of the material covering the insert, the latter can adapt its dimensions to the movements of the body of the cyclist, and thus permits realization of the objective stated above for the present invention.

According to a first variant of realization of the present invention, the base layer 5 of expanded material consists of foam rubber: the advantage of this solution being mainly the price of this material, as the so-called foam rubber is a low-price material available practically everywhere.
[0032] According to a further variant of realization of the present invention, the fabric 6, elastic in all directions, is a fabric incorporating elastomer fibers, such as a fiber called Elastan, marketed under the Lycra trademark of the Du Pont de Nemours Corp.

[0033] It is important however, within the scope of the present invention, that the elastomer fiber present a capacity of elongation of more than 5%. This indication intends to exclude from the field of application of the present invention all fibrous materials the elastic elongation of which is lower than 5% of their length in the absence of tensile tension. It is clear that every material has its specific coefficient of elasticity (called elasticity modulus), but within the frame of the present invention preferentially materials are to be chosen, which present a certain elasticity, as indicated in this specific preferred form of realization of the present invention.

[0034] According to another preferred form of realization of the present invention, aimed at ensuring maximum comfort to the user of the trousers, the base layer 5 of expanded material present, in its state free of load, i.e. not subject to any compressing effect, is to be of a thickness h (compare the FIG. 3) ranging from approximately 3 mm to approximately 5 mm. Experience has shown that these dimensions represent the limits of the thickness h ensuring optimum wearing comfort of the trousers while meeting the objectives of the present invention, and at the same time ensuring the required stability of the cyclist in the saddle. It is known (compare also the statements in this respect in the above-mentioned EP-0776615-A2) that good stability of the cyclist seated on the saddle represents a most important security aspect for the cyclist, and such stability — also called anchoring — requires that the support of the cyclist on the saddle not be excessively soft. Thus, there are limits to the softness of the insert, which should not be exceeded.

[0035] There are several possibilities of fastening or attaching the fabric 6 to the base layer 5 of expanded material, each of which presents its specific advantages and can constitute, according to the specific production facilities, the number of items to be produced, the materials applied, etc., particularly convenient solutions.

[0036] Thus, for relatively modest production runs it might prove economically feasible to realize fixation or attachment between the fabric 6 and the layer 5 of expanded material by way of adhesive fixation using an elastic adhesive, which in its fixed state after application, remains elastic, such as e.g. a contact adhesive. This type of fixation can also be performed in a craftsman-type workshop and thus is feasible for small production runs for limited series of trousers for cyclists.

[0037] Another solution, for larger production runs, is the one shown in FIG. 4, indicating the manner in which the fabric 6 is fastened to the base layer 5 of expanded material by stitch bonding, applying seams. In FIG. 4 the seam or stitching threads, designated by reference number 7, bind the layer of elastic fabric 6 onto the base layer below. The production of such stitch bonding items is known in practical application and is applied on large surfaces using continuously operating machines, called stitch bonding machines (usually of the Arachne or the Mali type) machines, producing endless tapes of widths of up to several meters at high speed. In such cases the inserts 2 must be stamped from the tape of material using suitably shaped templates. For ensuring the desired elasticity of the inserts obtained, as required according to the present invention, it may prove advantageous for the stitching thread to contain elastomer fibers.

[0038] According to another preferred form of realization of the present invention, feasible for very large production runs and applicable only under certain conditions, concerning the heat properties of the materials being processed, it provides that the fabric 6 be fastened to the base layer 5 of expanded material by way of heat vulcanization. Also, this production method permits production of inserts suitable for meeting the objectives of the present invention, being provided with the required mechanical properties, at much reduced cost and in great quantities.

[0039] According to a further preferred form of realization of the present invention, the fabric 6 is a woven fabric in which the weft threads as well as the warp threads are produced using elastomer fibers. The advantages of weaving in, producing large flat plane textile surfaces are well known.

[0040] According to another variant, better suited for manufacturing small surfaces of elastic fabric 6 of high elasticity, the fabric 6 is knitted from a thread produced with elastomer fibers. This solution, benefiting of the known properties of knitted fabrics, permits obtaining fabrics of the highest degree of elasticity in all directions and thus is particularly suited for realizing this form of the present invention.

[0041] The present invention has been described here merely in the sense of examples of application in trousers for cyclists, and more specifically in the zones subject to the danger of abrasion of the skin of the wearer. It is evident that the same solution can be adopted for other applications in connection with the practice of sports other than cycling, where the same abrasion problems of the skin of the athlete persist.

[0042] It is noted that the foregoing examples have been provided merely for the purpose of explanation and are in no way to be construed as limiting of the present invention. While the present invention has been described with reference to an exemplary embodiment, it is understood that the words which have been used herein are words of description and illustration, rather than words of limitation. Changes may be made, within the purview of the appended claims, as presently stated and as amended, without departing from the scope and spirit of the present invention in its aspects. Although the present invention has been described herein with reference to particular means, materials and embodiments, the present invention is not intended to be limited to the particulars disclosed herein; rather, the present invention extends to all functionally equivalent structures, methods and uses, such as are within the scope of the appended claims.

List of the Elements Referred to in the Figures

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What is claimed:

1. Trousers for use by cyclists including an insert for protecting cyclist body zones resting against one of a bicycle seat or a saddle, said insert comprising at least one piece of material fastened at its borders to a fabric of the trousers by way e.g. of stitching, said insert comprising:

   a base layer made of expandable material, said base layer having a side adapted to be in direct contact with a body of a cyclist;

   an elastic fabric, elastic in all directions, fastened onto said side of the base layer, wherein said elastic fabric adapts itself in its dimensions to the movements of a body of a cyclist.

2. The trousers according to claim 1, wherein the base layer is made from foam rubber or other shock absorbing material.

3. The trousers according to claim 1, wherein the elastic fabric comprises a fabric made with elastomer fibers with an elastic elongation capacity of more than 5%.

4. The trousers according to claim 1, wherein the base layer comprises a soft expandable material.

5. The trousers according to claim 4, wherein the soft expandable material, in its load-free relaxed state, is of a thickness (b) ranging from approximately 1 mm to approximately 8 mm.

6. The trousers according to claim 5, wherein the soft expandable material, in its load-free relaxed state, is of a thickness (b) ranging from approximately 3 mm to approximately 5 mm.

7. The trousers according to claim 1, wherein the elastic fabric is fastened to the base layer of expandable material by using adhesives, the adhesive remaining elastic in a fixed state after application.

8. The trousers according to claim 1, wherein the elastic fabric is fastened to the base layer by way of stitching, using a stitch bonding process.

9. The trousers according to claim 1, wherein the elastic fabric is fastened to the base layer by way of a hot vulcanizing process.

10. The trousers according to claim 1, wherein the elastic fabric comprises a woven fabric, using threads with elastomeric fibers in a weft as well as in a warp.

11. The trousers according to claim 1, wherein the elastic fabric comprises a knitted fabric, knitted using a thread with elastomeric fibers.

12. Trousers for use by cyclists including an insert for protecting cyclist body zones resting against one of a bicycle seat or a saddle, said insert comprising at least one piece of material fastened at its borders to a fabric of the trousers e.g. by way of stitching, said insert comprising:

   a base layer made of soft expandable material, said base layer having a side adapted to be in direct contact with a body of a cyclist;

   an elastic fabric, elastic in all directions, fastened onto said side of the base layer, wherein said elastic fabric adapts itself in its dimensions to the movements of a body of a cyclist,

   wherein the soft expandable material, in its load-free relaxed state, is of a thickness (h) ranging from approximately 1 mm to approximately 8 mm.

13. The trousers according to claim 12, wherein the elastic fabric is fastened to the base layer of expandable material using adhesives, the adhesive remaining elastic in a fixed state after application.

14. The trousers according to claim 12, wherein the elastic fabric is fastened to the base layer by way of stitching, using a stitch bonding process.

15. The trousers according to claim 12, wherein the elastic fabric is fastened to the base layer by way of a hot vulcanizing process.

16. The trousers according to claim 12, wherein the elastic fabric comprises a woven fabric, using threads with elastomeric fibers in a weft as well as in a warp.

17. The trousers according to claim 12, wherein the elastic fabric comprises a knitted fabric, knitted using a thread with elastomeric fibers.

18. A method of making trousers for use by cyclists including at least a piece of material insert for protecting cyclist body zones resting against one of a bicycle seat or a saddle, said method comprising:

   fastening said insert at its borders to a fabric of the trousers by way e.g. of stitching, said insert comprising a base layer made of expandable material, said base layer having a side adapted to be in direct contact with a body of a cyclist; and

   fastening an elastic fabric, elastic in all directions, onto said side of the base layer, wherein said elastic fabric adapts itself in its dimensions to the movements of a body of a cyclist.

19. The method according to claim 18, wherein the fastening of the elastic fabric comprises fastening the elastic fabric to the base layer of expandable material by using adhesives, the adhesive remaining elastic in a fixed state after application.

20. The method according to claim 18, wherein the fastening of the elastic fabric comprises fastening the elastic fabric to the base layer by way of stitching, using a stitch bonding process.

21. The method according to claim 18, wherein the fastening of the elastic fabric comprises fastening the elastic fabric to the base layer by way of a hot vulcanizing process.

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