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(11) **EP 1 269 873 A1**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:  
**02.01.2003 Bulletin 2003/01**

(51) Int Cl.7: **A41D 1/08**

(21) Application number: **02405150.0**

(22) Date of filing: **01.03.2002**

(84) Designated Contracting States:  
**AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU  
MC NL PT SE TR**  
Designated Extension States:  
**AL LT LV MK RO SI**

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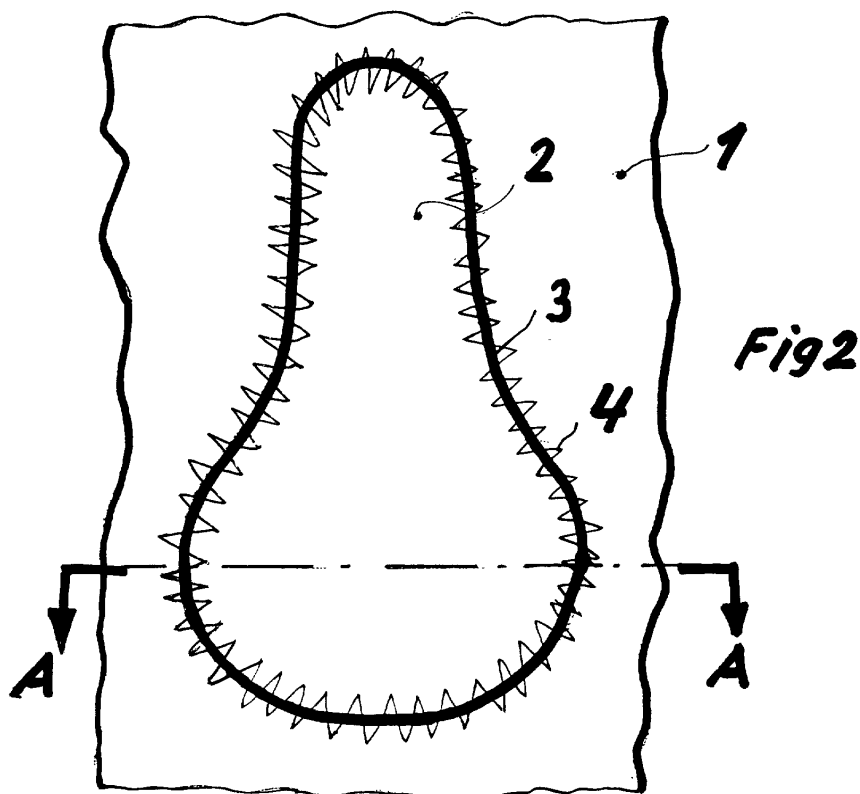
(30) Priority: **18.06.2001 CH 20011106**

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(54) **Trouser for cyclist**

(57) The present invention concerns trousers for cyclists (1) with an insert (2) protecting the body zones of the cyclist resting against the saddle of the bicycle. The inventive insert, in order to obtain its perfect adaptation to the movements of the cyclist, and for eliminating all abrasion effects for the skin, is composed of a base layer

(5) of expanded material, onto which a fabric (6), elastic in all directions, is fasted on the side directly contacting the body of the user. The base layer (5) is made e.g. of foam rubber, whereas the fabric (6) can be a woven fabric as well as a knitted fabric, preferably made using elastomer fibres presenting an elongation capacity of more than 5%.



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## Description

**[0001]** The present invention concerns trousers for cyclists with an insert protecting the body zones of the cyclist resting against the bicycle saddle, as described in the introductory portion of the claim 1.

**[0002]** Trousers for cyclists of similar type are known in practical use and are marketed worldwide e.g. by the company ASSOS SA at CH-6854 San Pietro di Stabio, Switzerland.

**[0003]** Also from the patent literature the use of trousers for cyclists with a protecting insert is known e.g. from EP-0776615-A2, published on June 4, 1997, by the same company submitting the patent application for the present invention.

**[0004]** In the case of the document cited, which represents the state of the art on which the present invention is based, the protecting insert is made from natural or synthetic leather and presents a very specific shape in order to prevent the seams, using which the insert is fastened to the fabric of the trousers, from disturbing the cyclist in his action and causing painful, or at least bothering, abrasion. This type of insert for trousers for cyclists has well proven itself with respect to the objectives it was laid out for. It has been found however, that the relatively stiff material from which the inserts are made, in the sense of limited extensibility, still can cause discomfort to the user, as the insert can not adapt sufficiently to the movements of the cyclist, especially to the movements of his legs, and thus tends to provoke undesirable stretching in certain zones of the cyclist's skin. This is due to the fact that the material chosen for the insert, i.e. the natural or synthetic leather, presents very low elasticity values, usually below 10% and in many cases reaching hardly even a few per cent elasticity. Repeated stretching of skin zones, which furthermore are very susceptible by nature anyhow, such as the groin zones, can finally cause local reddening and inflammation of the skin, which are very annoying for the cyclist.

**[0005]** The present invention thus intends to eliminate these specific disadvantages of the trousers for cyclists provided with the known inserts and to permit realisation of clothing for cyclists, especially for racing competition cyclists - but not only - providing optimum comfort and reliably avoiding any remaining danger of abrasion of delicate body zones particularly exposed while practising this sport.

**[0006]** This objective is met using the present invention owing to the characteristics described in the characterising portion of the claim 1.

**[0007]** 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.

**[0008]** Before beginning the description of various preferred examples of realisation of the present invention two general aspects thereof are to be clarified more precisely, namely:

- 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 equal to the one provided in the abovementioned EP-0776615, but also can be of any other shape deemed advantageous.
- The term "fabric elastic in all directions" herein is understood, in a general sense, to designate a two-dimensional textile aggregate of fibre threads made from natural or synthetic fibres 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.

**[0009]** The present invention is described in more detail in the following with reference to various illustrated examples of realisation. It is shown in the:

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

Fig. 2 A detail according to the Fig. 2 at an enlarged scale, showing the insert developed into a plane;

Fig. 3 A cross-section along the line A-A according to the Fig. 2, of a variant realisation of the present invention;

Fig. 4 A variant, in the same view as shown in the Fig. 3, of another form of realisation of the present invention.

**[0010]** In the Fig. 1 a portion of trousers for cyclists, designated 1, is shown, 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 and fixed at its borders 3 (better visible in the Fig. 2) to the fabric of the trousers for cyclists 1 by means of a stitching seam. The seam 4 is indicated in the Fig. 2 with a zigzag line.

**[0011]** 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 the 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 ap-

plied also to inserts of other shapes, depending on the requirements and keeping the gender of the user in mind.

**[0012]** For better understanding of the present invention, the Fig 3 now is to be referred to, in which a cross-section along the line A-A according to the Fig. 2 is shown. From the 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. 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 realisation of the objective stated above of the present invention.

**[0013]** According to a first variant of realisation of the present invention, the base layer 3 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.

**[0014]** According to a further variant of realisation of the present invention it is provided that the fabric 6, elastic in all directions, is a fabric incorporating elastomer fibres, such as a fibre called Elasthan, marketed under the Lycra trademark of the Du Pont de Nemours Corp.

**[0015]** It is important however, within the scope of the present invention, that the elastomer fibre 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 realisation of the present invention.

**[0016]** According to another preferred form of realisation 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 3 to 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 to this respect in the abovementioned EP-0776615A2) 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 be not excessively soft. Thus there are limits to the softness of the insert, which should not be exceeded.

**[0017]** There are several possibilities of fastening 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, of the number of items to be produced, the materials applied, etc., particularly convenient solutions.

**[0018]** Thus, for relatively modest production runs it might prove economically feasible to realise fixation between the fabric 6 and the layer 5 of expanded material by means of adhesive fixation using an elastic adhesive, which also in its fixed state after application remains elastic, such as e.g. a contact adhesive. This type of work can be performed also in a craftsman-type workshop and thus is feasible for small production runs for limited series of trousers for cyclists.

**[0019]** Another solution, for larger production runs, is the one shown in the Fig. 4, indicating in which manner the fabric 6 is fastened to the base layer 5 of expanded material by stitch bonding, applying seams. In the Fig. 4 the seam or stitching threads, designated with the 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 can prove advantageous that also the stitching thread contains elastomer fibres.

**[0020]** According to another preferred form of realisation of the present invention, feasible for very large production runs and applicable only under determined 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 means of heat vulcanisation. Also this production method permits realisation 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.

**[0021]** According to a further preferred form of realisation 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 fibres. The advantages of weaving in producing large flat plane textile surfaces are well known.

**[0022]** 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 fibres. This solution, benefiting of the known properties of knitted fabrics, permits realisation fabrics of the highest degree of elasticity in all directions and thus is particularly suited for realising this form of the present invention.

**[0023]** 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 practise of other sports than cycling, where the same abrasion problems of the skin of the athlete persist.

#### List of the Elements Referred to in the Figures

#### [0024]

- 1 Trousers for cyclists
- 2 Insert
- 3 Border of the insert
- 4 Stitching seam
- 5 Base layer
- 6 Elastic fabric
- 7 Stitching thread

#### Claims

1. Trousers for cyclists (1) with an insert (2) protecting the body zones of the cyclist resting against the bicycle seat or saddle, with an insert made from one single piece and fastened at its borders (3) to the fabric of the trousers

(1) by means of stitching,

#### characterised in that

the insert consists of a base layer (5) made of expanded material, onto which, on the side directly contacting the body of the cyclist, a fabric (6), elastic in all directions, is fastened in such a manner that it adapts itself in its dimensions to the movements of the body of the cyclist.

2. Trousers for cyclists according to the claim 1, **characterised in that** the base layer (5) of soft expanded material is made from foam rubber.

3. Trousers for cyclists according to the claim 1, **characterised in that** the fabric (6), elastic in all directions, is a fabric made with elastomer fibres with an elastic elongation capacity of more than 5%.

4. Trousers for cyclists according to the claim 1 or 2, **characterised in that** the layer (5) of soft expand material, in its load-free relaxed state, is of a thickness (h) ranging from 1 to 8 mm, and preferentially ranging from 3 to 5 mm.

5. Trousers for cyclists according to the claim 1 or 3,

#### characterised in that

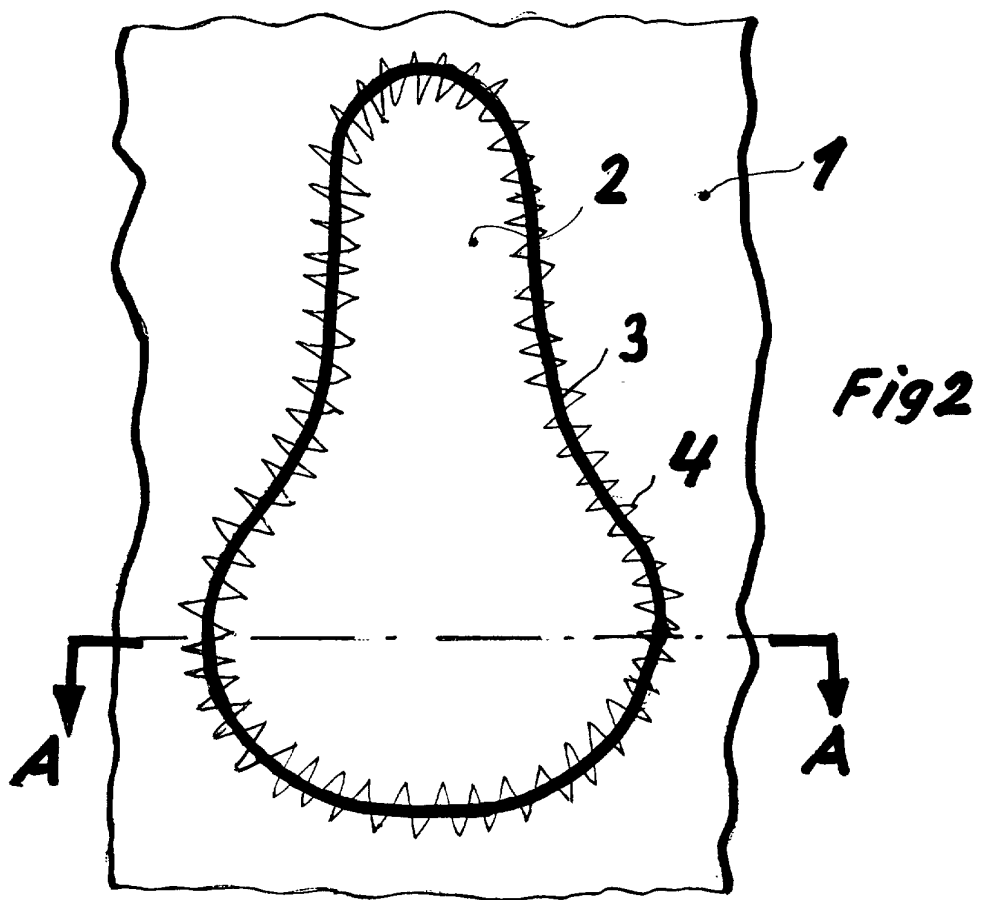
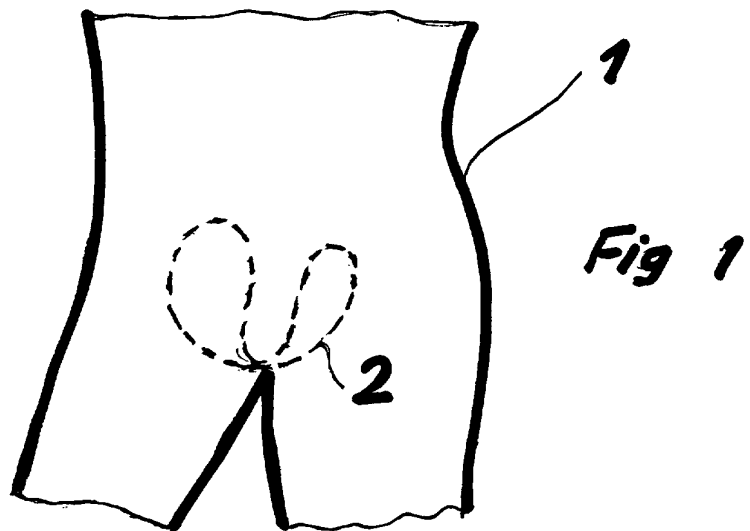
the fabric (6) is fastened to the base layer (5) of expanded material using adhesives, the adhesive applied being elastic also in its fixed state after application.

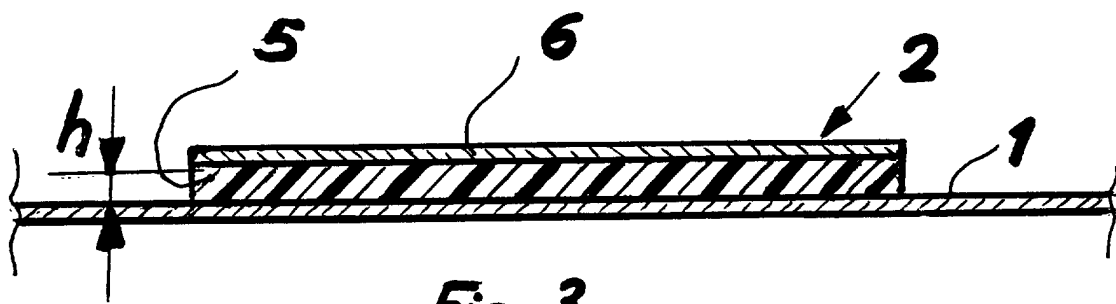
6. Trousers for cyclists according to the claim 1 or 3, **characterised in that** the fabric (6) is fastened to the base layer (5) of expanded material by means of stitching, using a stitch bonding process.

7. Trousers for cyclists according to the claim 1 or 3, **characterised in that** the fabric (6) is fastened to the base layer (5) of expanded material by means of a hot vulcanising process.

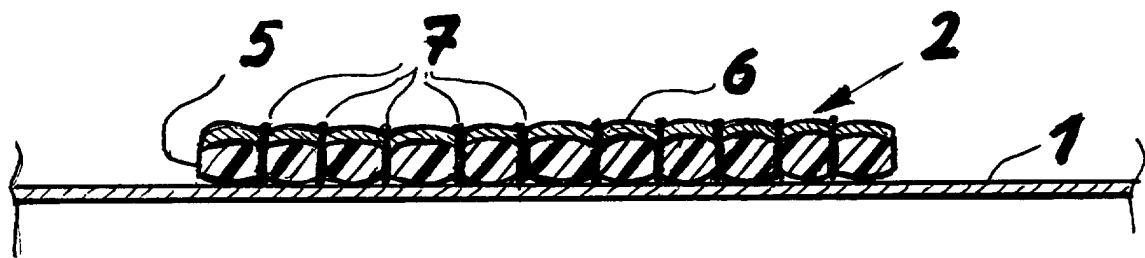
8. Trousers for cyclists according to the claim 1 or 3, **characterised in that** the fabric (6) is a woven fabric, using threads with elastomer fibres in the weft as well as in the warp.

9. Trousers for cyclists according to the claim 1 or 3, **characterised in that** the fabric (6) is a knitted fabric, knitted using a thread with elastomer fibres.





*Fig 3*



*Fig 4*



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Application Number  
EP 02 40 5150

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| Place of search<br><b>MUNICH</b>   |  | Date of completion of the search<br><b>9 August 2002</b> | Examiner<br><b>Uhlig, R</b>                  |
| CATEGORY OF CITED DOCUMENTS<br>X : particularly relevant if taken alone<br>Y : particularly relevant if combined with another document of the same category<br>A : technological background<br>O : non-written disclosure<br>P : intermediate document<br>T : theory or principle underlying the invention<br>E : earlier patent document, but published on, or after the filing date<br>D : document cited in the application<br>L : document cited for other reasons<br>& : member of the same patent family, corresponding document |  |  |  |

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