US 20160295931A1

(19) **United States**

(12) **Patent Application Publication** (10) **Pub. No.: US 2016/0295931 A1**

Tsuei (43) **Pub. Date: Oct. 13, 2016**

(54) **HARD PROTECTIVE PAD FOR PANTS**

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(21) Appl. No.: **14/825,048**

(22) Filed: **Aug. 12, 2015**

(30) **Foreign Application Priority Data**

Apr. 7, 2015 (TW) 104205137

Publication Classification

(51) **Int. Cl.**

A41D 1/08 (2006.01)

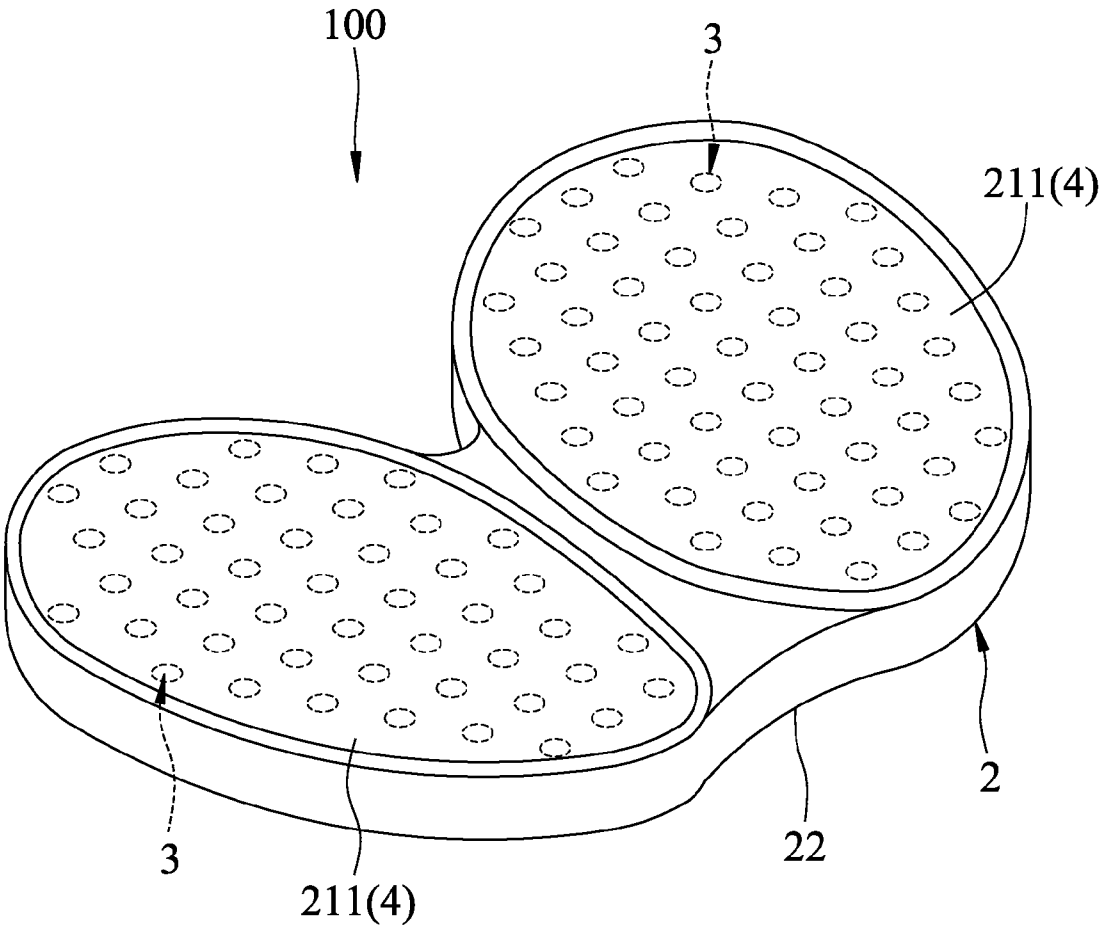
A41D 27/28 (2006.01)

(52) **U.S. Cl.**

CPC ***A41D 1/084*** (2013.01); ***A41D 27/28*** (2013.01)

(57) **ABSTRACT**

A hard protective pad for pants includes a support plate made of a rigid material. The support plate includes two spaced-apart concave portions extending inwardly from a top surface of the support plate and configured to match the shape of the buttocks of a user, and a fixing portion between the concave portions. The fixing portion extends arcuately inwardly from a bottom surface of the support plate and configured to match the shape of a bicycle seat.



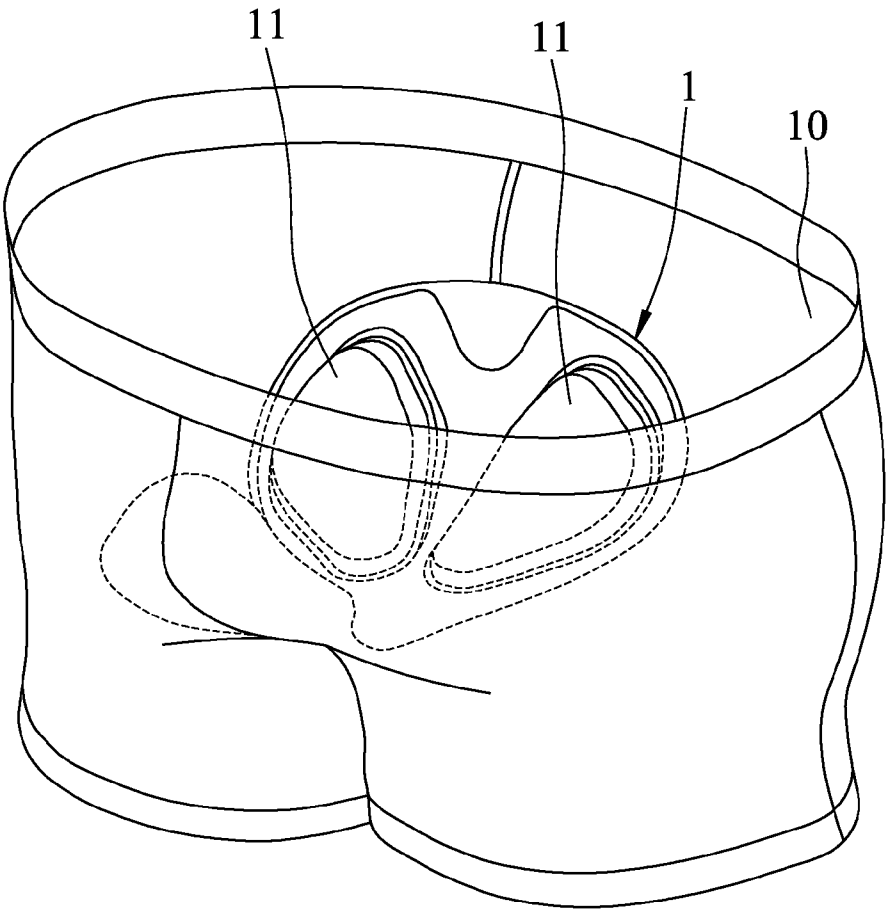


FIG.1
PRIOR ART

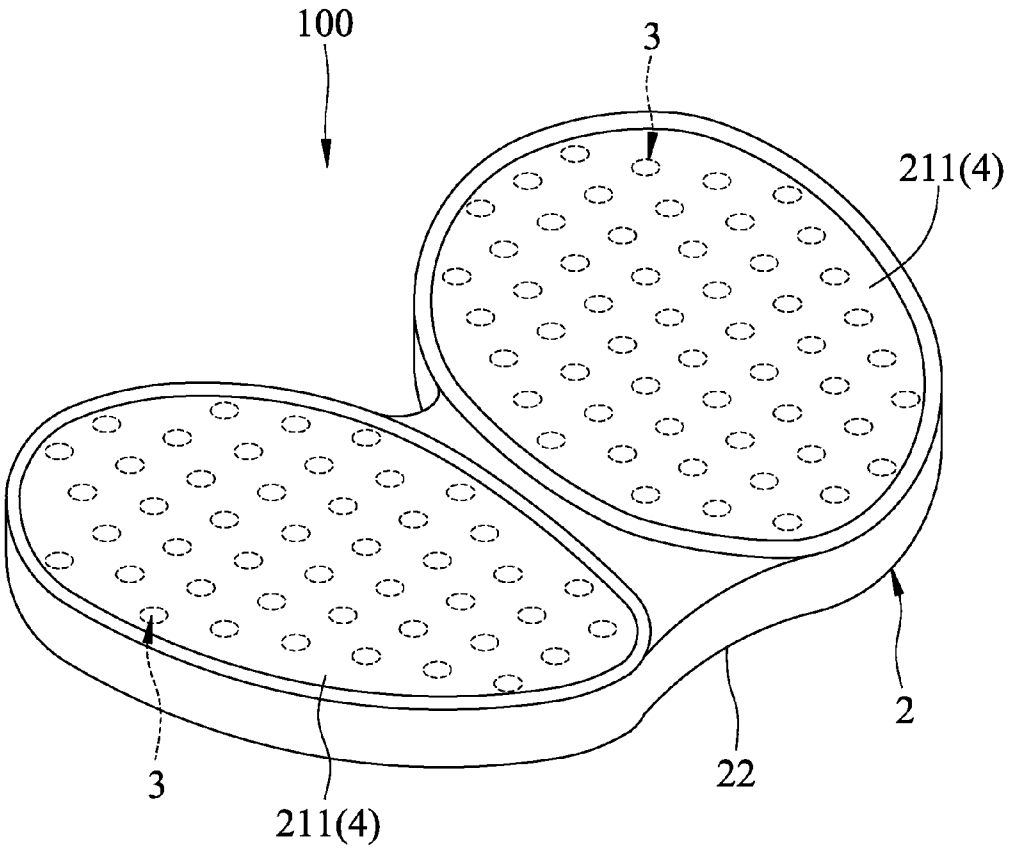


FIG.2

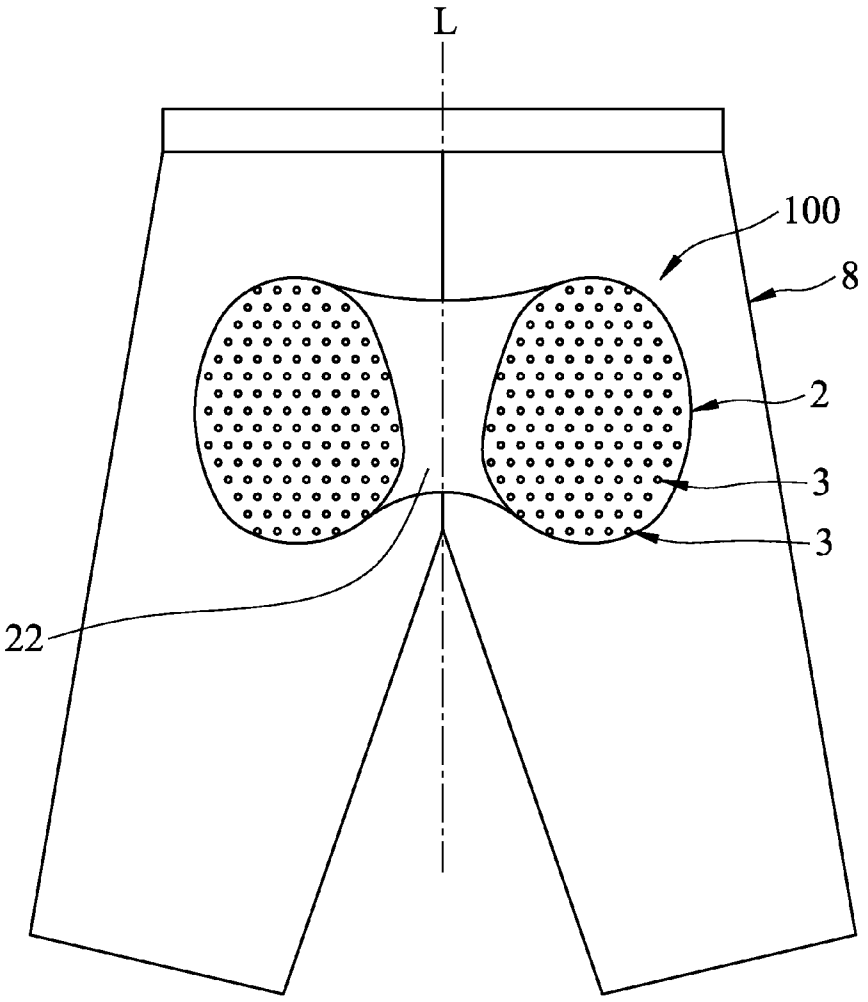


FIG.3

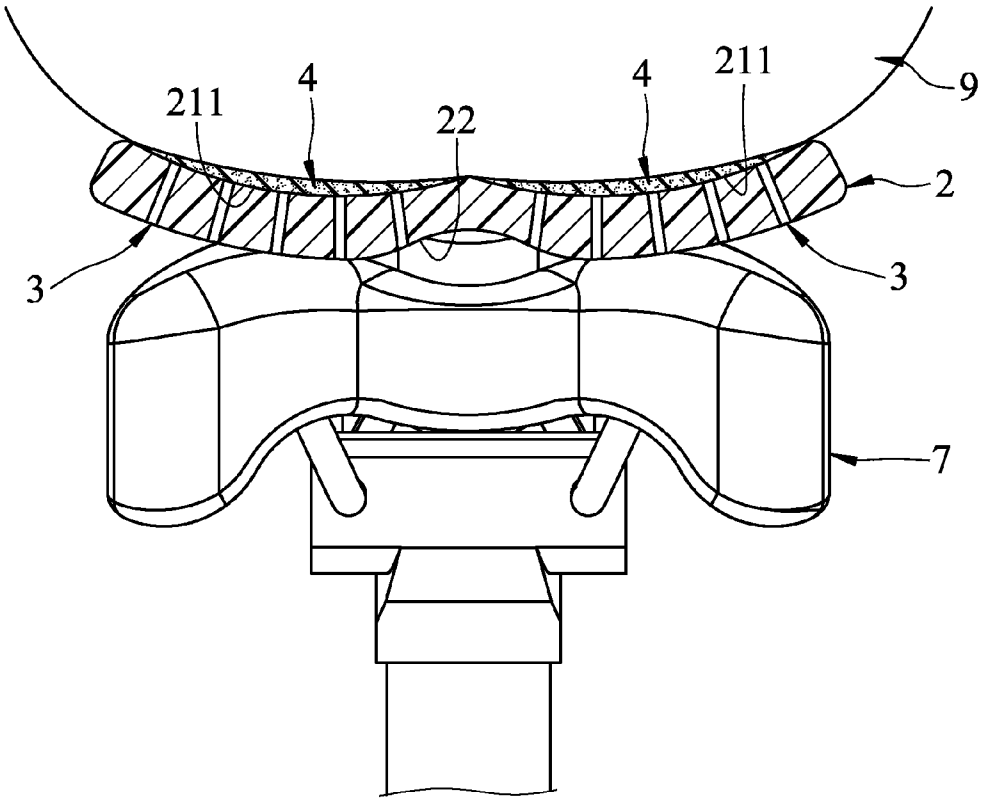


FIG.4

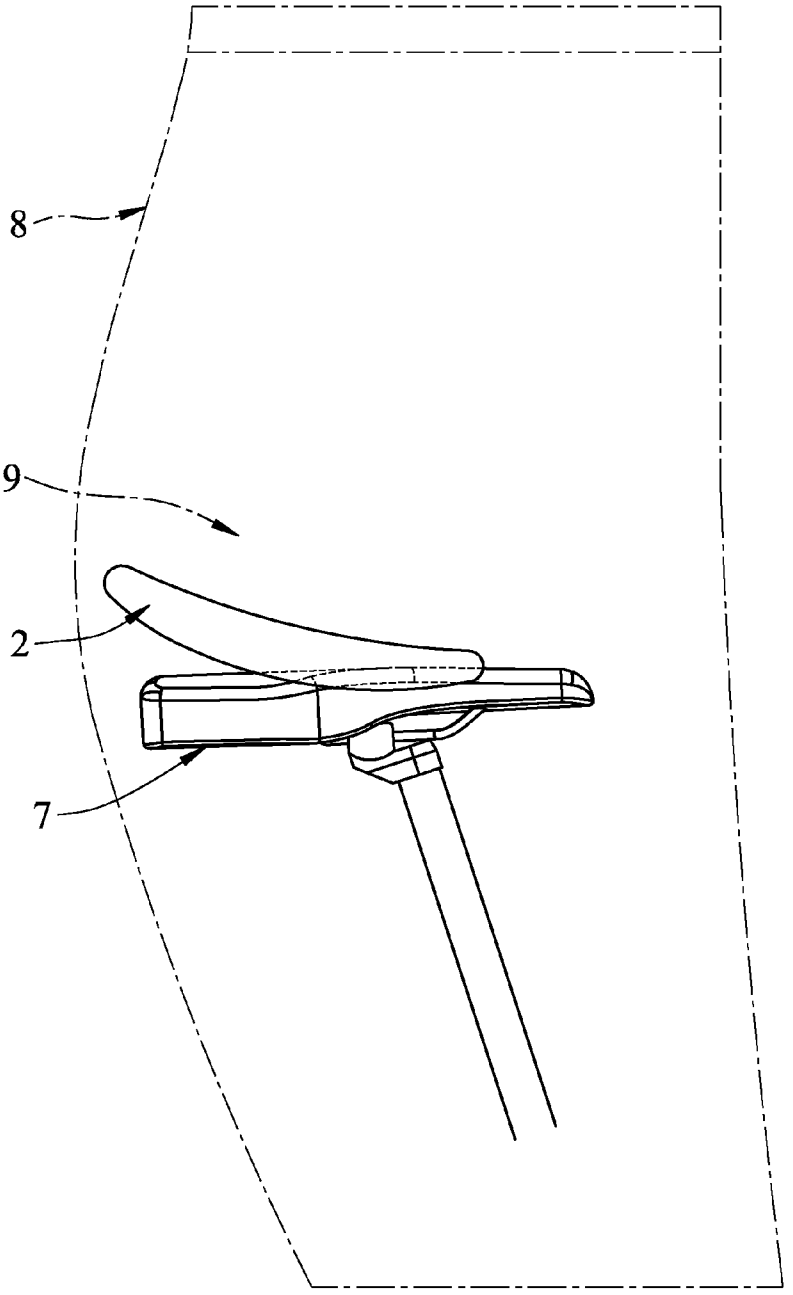


FIG.5

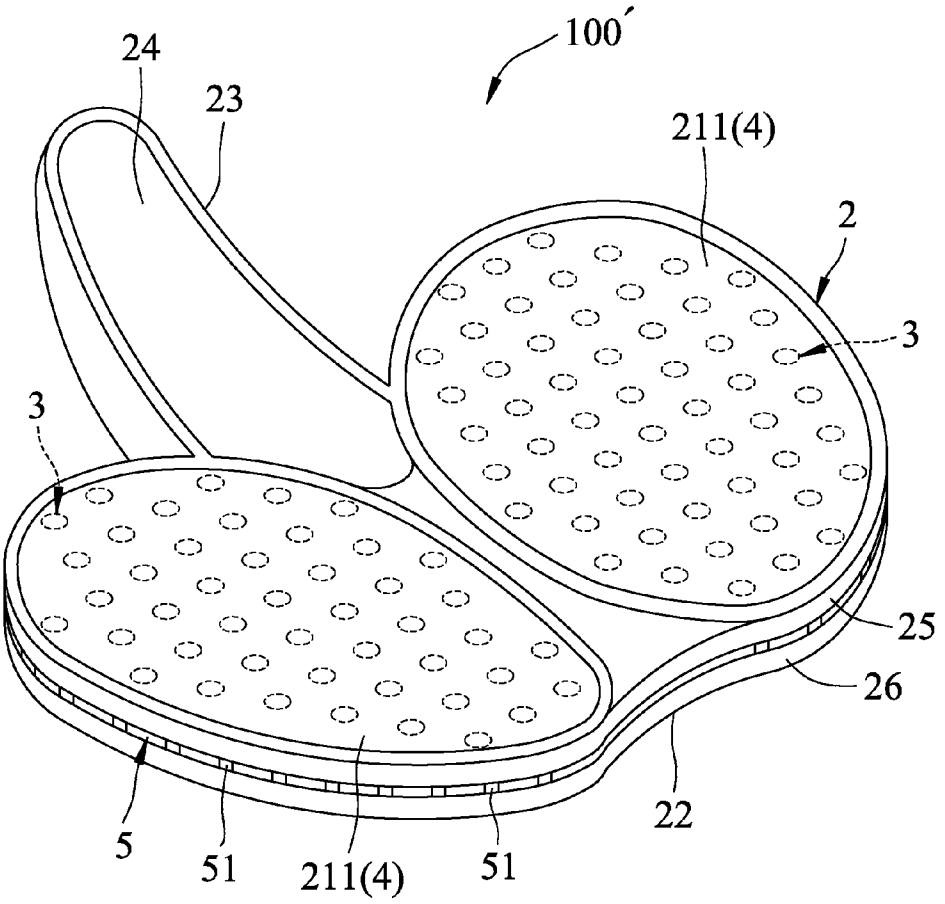


FIG.6

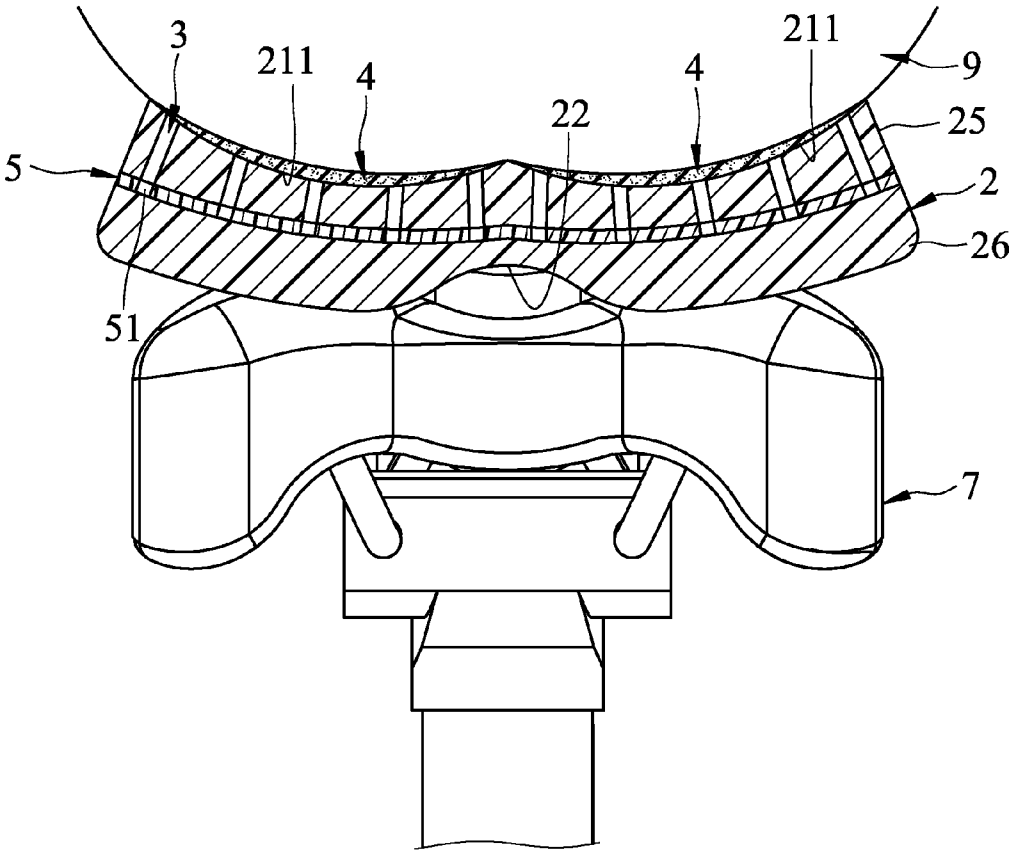


FIG.7

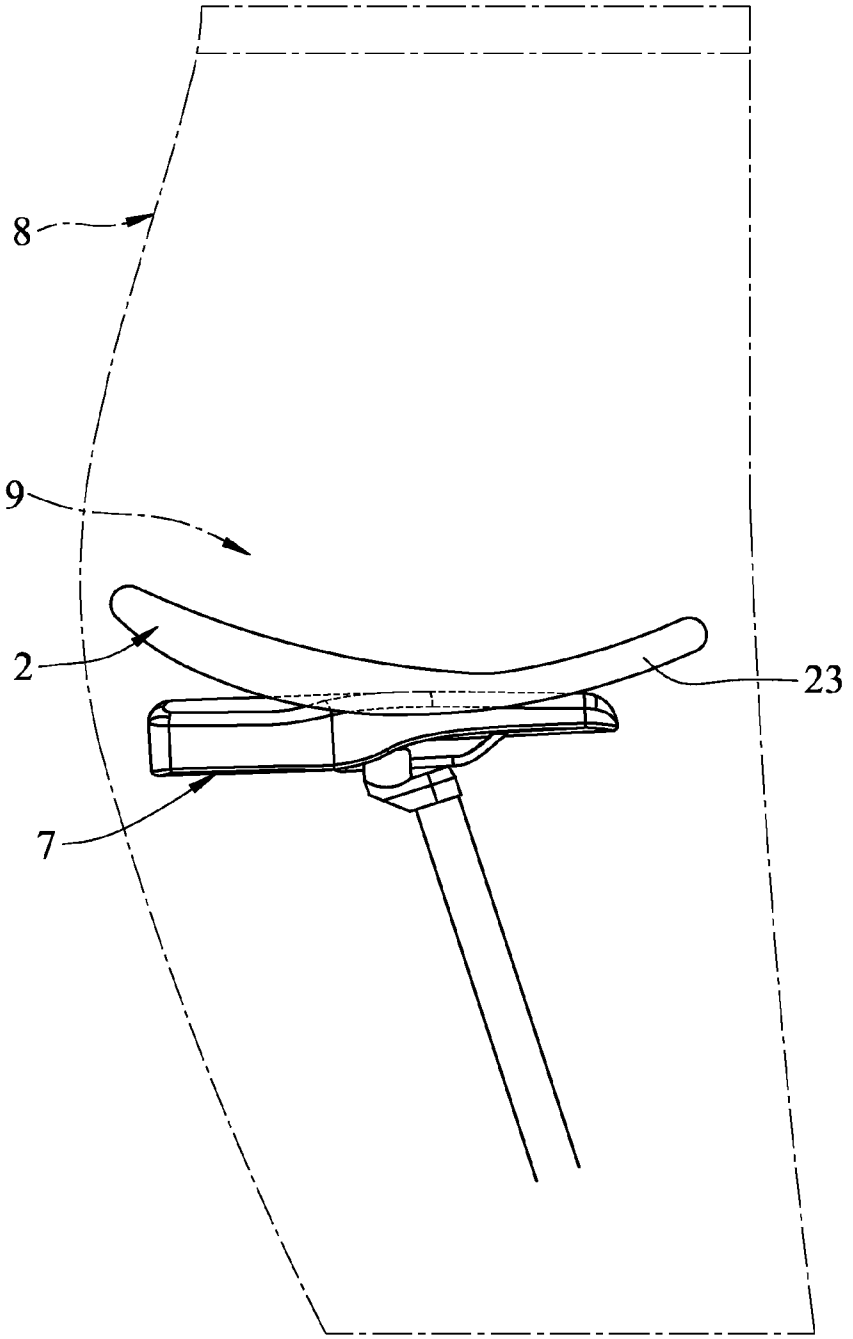


FIG.8

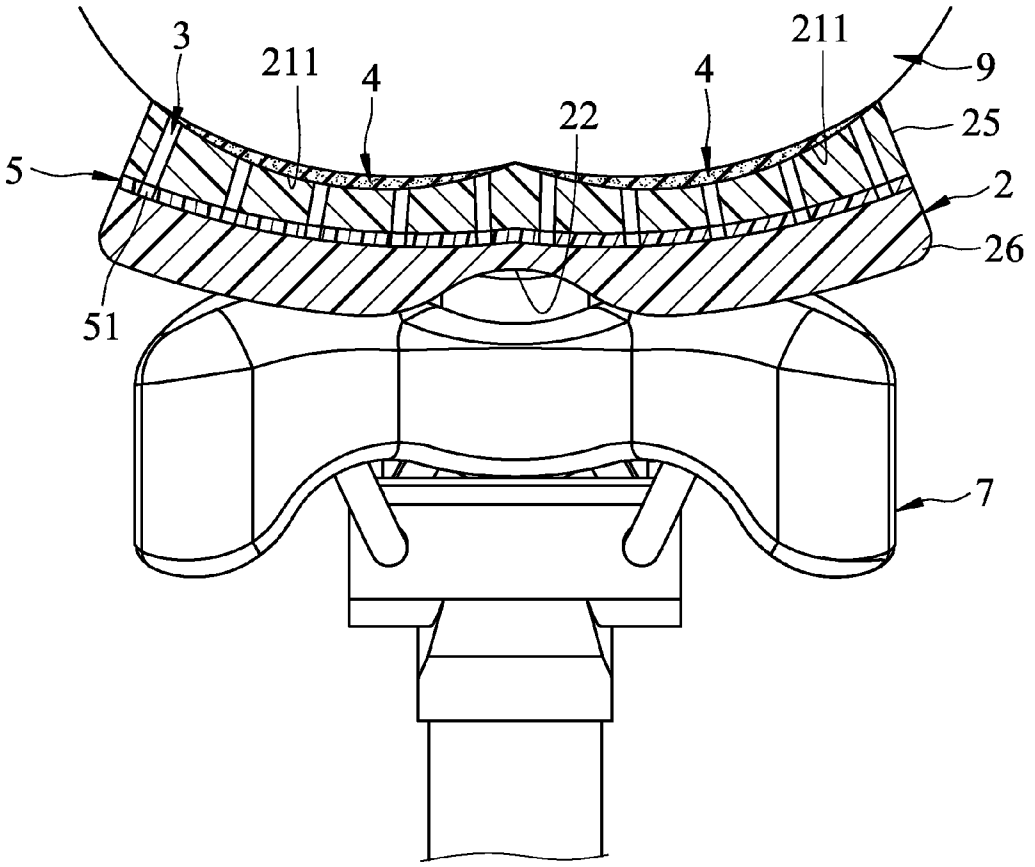


FIG.9

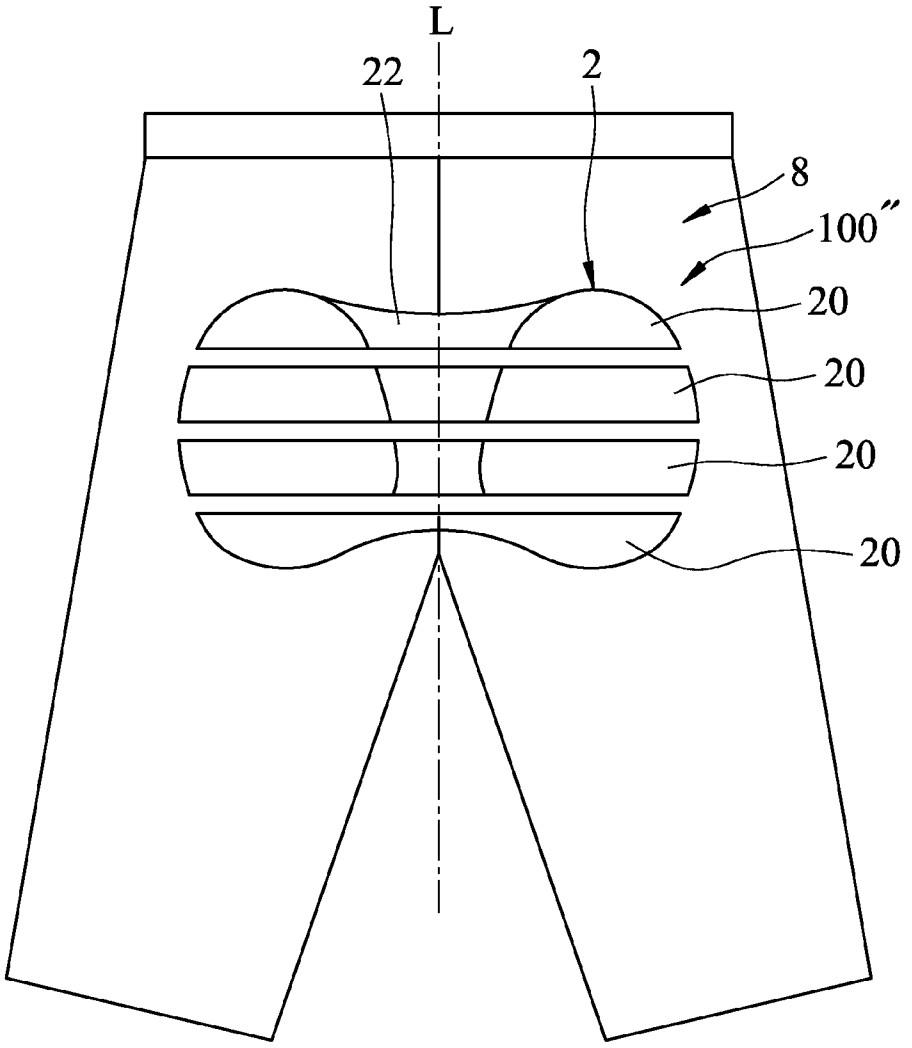


FIG.10

HARD PROTECTIVE PAD FOR PANTS

CROSS REFERENCE TO RELATED APPLICATION

[0001] This application claims priority of Taiwanese Patent Application No. 104205137, filed on Apr. 7, 2015.

FIELD

[0002] The disclosure relates to a protective pad, more particularly to a hard protective pad for pants.

BACKGROUND

[0003] Referring to FIG. **1**, a conventional protective pad for cycling pants **10** is typically made of a multi-layered soft material, and is sewn to an inner side of the cycling pants **10**. The protective pad **1** includes a plurality of buffer blocks **11** formed on a top surface thereof. The reason for using the soft material in manufacturing this type of protective pad **1** is mainly to avoid constant rubbing of the thighs and buttocks against a bicycle seat that cause discomfort while riding the bicycle. However, the protective pad **1** becomes slippery because of perspiration, so that it cannot provide a stable support. Further, because the protective pad **1** is made of the soft material, when in a long distance riding, the protective pad **1** is prone to collapse and deform, so that the rider is likely to suffer pain in the buttocks because of the uneven stress and inadequate support of the protective pad **1**. Hence, there is need for improvement of the protective pad **1**.

SUMMARY

[0004] Therefore, an object of this disclosure is to provide a hard protective pad for pants that is capable of overcoming at least one of the aforesaid drawbacks of the prior art.

[0005] According to this disclosure, a hard protective pad for pants comprises a support plate made of a rigid material. The support plate includes two spaced-apart concave portions extending inwardly from a top surface of the support plate and configured to match the shape of the buttocks of a user, and a fixing portion between the concave portions. The fixing portion extends arcuately inwardly from a bottom surface of the support plate and configured to match the shape of a bicycle seat.

BRIEF DESCRIPTION OF THE DRAWINGS

[0006] Other features and advantages of the disclosure will become apparent in the following detailed description of the embodiments with reference to the accompanying drawings, of which:

[0007] FIG. **1** is a perspective view of a conventional protective pad for cycling pants;

[0008] FIG. **2** is a perspective view of the first embodiment of a hard protective pad according to the disclosure;

[0009] FIG. **3** is a schematic view for illustrating the first embodiment being connected to the pants;

[0010] FIG. **4** is a sectional view of the first embodiment in a state of use;

[0011] FIG. **5** is a schematic side view of FIG. **4**;

[0012] FIG. **6** is a perspective view of the second embodiment of a hard protective pad according to the disclosure;

[0013] FIG. **7** is a sectional view of the second embodiment in a state of use;

[0014] FIG. **8** is schematic side view of FIG. **7**;

[0015] FIG. **9** is a view similar to FIG. **7**, but illustrating upper and lower plate layers being made of different materials; and

[0016] FIG. **10** is a schematic view, illustrating the third embodiment of a hard protective pad according to the disclosure being connected to the pants.

DETAILED DESCRIPTION

[0017] Before the present invention is described in greater detail with reference to the accompanying embodiments, it should be noted herein that like elements are denoted by the same reference numerals throughout the disclosure.

[0018] Referring to FIGS. **2** to **5**, the first embodiment of a hard protective pad **100** according to the disclosure is configured to be connected to the pants **8** which is exemplified herein as cycling pants having a longitudinal center line (L) . The hard protective pad **100** comprises a support plate **2**, a plurality of spaced-apart breathable holes **3**, and two cushion members **4**.

[0019] The support plate **2** is made of a rigid material, and includes two spaced-apart concave portions **211** and a fixing portion **22** between the concave portions **211**. The concave portions **211** extend inwardly from a top surface of the support plate **2**, are configured to be located on two opposite sides of the center line (L), and are configured to match the shape of the buttocks **9** of the user. The fixing portion **22** extends arcuately inwardly from a bottom surface of the support plate **2** and is configured to match the shape of a bicycle seat **7**. The concave portions **211** can be custom-made according to a body shape of an individual. For example, a mold corresponding to the shape of a user's buttocks is first prepared, after which the concave portions **211** are made according to that mold.

[0020] The aforementioned rigid material is hard plastic selected from the group consisting of polymethyl methacrylate, polycarbonate, polystyrene, polypropylene, acrylonitrile-butadiene-styrene copolymer and styrene-acrylonitrile copolymer.

[0021] The breathable holes **3** extend through the top and bottom surfaces of the support plate **2**.

[0022] The cushion members **4** are respectively disposed in the concave portions **211** for preventing direct contact friction between the user's buttocks and the support plate **2** which may cause discomfort to the user. Each of the cushion members **4** is made of a breathable material selected from the group consisting of a breathable fiber material (non-woven fabric, cotton, etc.) and a netted porous material [polyurethane (PU) foam resin, water-in-oil (W/O) emulsion resin, etc.].

[0023] The hard protective pad **100** of this disclosure can be directly connected to an outer side of the pants **8** using a hook-and-loop fastener, an adhesive glue, a sewing method, or any other suitable connecting method.

[0024] With reference to FIGS. **4** and **5**, when the user rides a bicycle, the fixing portion **22** can be stably fitted to the bicycle seat **7**. Further, because the concave portions **211** matchingly correspond to the shape of the buttocks **9** of the user, they can evenly share the stress and support the buttocks **9**, and will not easily collapse and deform to cause discomfort to the buttocks **9** of the user even in a long ride. Moreover, heat and sweat generated during riding can be expelled through the cushion members **4** and the breathable holes **3**. Hence, through the presence of the hard protective

pad **100** on the pants **8** of the user, comfort during a long distance riding can be enhanced.

[0025] It is worth to mention herein that the user can also sit on a chair (not shown) when wearing the pants **8** with the hard protective pad **100** of this disclosure, so that the buttocks **9** of the user can be prevented from long direct contact with a planar seat surface of the chair which can cause discomfort to the buttocks **9**.

[0026] Referring to FIGS. **6** to **8**, the second embodiment of the hard protective pad **100'** according to this disclosure is shown to be generally identical to the first embodiment. However, in this embodiment, the support plate **2** further includes an intermediate layer **5** dividing the support plate **2** into an upper plate layer **25** having the concave portions **211** and a lower plate layer **26** having the fixing portion **22**. In this embodiment, the upper and lower plate layers **25**, **26** have the same material. In an alternative embodiment, as shown in FIG. **9**, the upper and lower plate layers **25**, **26** may have different materials.

[0027] The intermediate layer **5** is sandwiched between the upper and lower plate layers **25**, **26**, and is made of a buffering material. The intermediate layer **5** is formed with a plurality of intersecting grooves **51** each having two opposite ends communicating with an external atmosphere. The buffering material is selected from the group consisting of foam and rubber. Because the intermediate layer **5** can provide buffering and shock-absorbing effects, use of the hard protective pad **100'** of this embodiment can further enhance the user's comfort during riding.

[0028] The breathable holes **3** are in direct communication with the grooves **51** of the intermediate layer **5**, so that heat and sweat generated during riding can be directly expelled to the external atmosphere through the grooves **51**, thereby increasing the overall breathability.

[0029] In this embodiment, the support plate **2** further includes an extension portion **23** extending outwardly and forwardly from a front central portion of the support plate **2**. The extension portion **23** has a crotch-shaped concave section **24** extending inwardly from a top surface of the extension portion **23** for supporting a crotch portion of the user.

[0030] Hence, in addition to the advantages described in the first embodiment, the second embodiment can also support the crotch portion of the user through the crotch-shaped concave section **24** of the extension portion **23** and achieve the buffering and shock-absorbing effects through the presence of the intermediate layer **5**.

[0031] Referring to FIG. **10**, the third embodiment of the hard protective pad **100"** according to this disclosure is shown to be generally identical to the first embodiment, and differs in that the support plate **2** is constructed from a plurality of substantially parallel spaced-apart strips **20**. The strips **20** are configured to extend along a direction transverse to the center line (L) of the pants **8**. For the strips **20** to have sufficient supporting forces, the strips **20** are not formed with the breathable holes **3** (see FIG. **2**).

[0032] The support plate **2** can be made first, after which it is cut into a plurality of the strips **20**. Finally, the strips **20** are sequentially connected to the pants **8**. It is worth to mention herein that the strips **20** may first be connected to a soft material, such as a cloth (not shown), in sequence to form the support plate **2** of the third embodiment, after which the support plate **2** is connected to the pants **8**.

[0033] Because the strips **20** connected to the pants **8** have the structure of the support plate **2** which includes the concave portions **211** (see FIG. **4**) and the fixing portion **22** (see FIG. **4**), and are also made of the rigid materials, the third embodiment can similarly achieve the advantages described in the first embodiment. It should be noted that each of the strips **20** may be further provided with the intermediate layer **5** (see FIG. **7**) as described in the second embodiment, so that the strips **20** may have a buffering function.

[0034] The third embodiment not only can achieve the advantages described in the first embodiment, but also has disclosed a modification of the support plate **2**. Because the support plate **2** is cut along the direction transverse to the center line (L) to form into a plurality of the strips **20**, the user in action can enjoy a high degree of freedom when wearing the pants **8** connected with the strips **20**, and heat and sweat generated during riding can be directly expelled through clearances among the strips **20**. Hence, an overall breathability is achieved.

[0035] While the disclosure has been described in connection with what are considered the most practical embodiments, it is understood that this disclosure is not limited to the disclosed embodiments but is intended to cover various arrangements included within the spirit and scope of the broadest interpretation so as to encompass all such modifications and equivalent arrangements.

What is claimed is:

1. A hard protective pad for pants, comprising:

a support plate made of a rigid material and including

two spaced-apart concave portions extending inwardly from a top surface of said support plate and configured to match the shape of the buttocks of a user, and

a fixing portion between said concave portions, said fixing portion extending arcuately inwardly from a bottom surface of said support plate and configured to match the shape of a bicycle seat.

2. The hard protective pad as claimed in claim **1**, further comprising a plurality of spaced-apart breathable holes extending through said top and bottom surfaces of said support plate.

3. The hard protective pad as claimed in claim **1**, further comprising two cushion members respectively disposed on said concave portions.

4. The hard protective pad as claimed in claim **1**, wherein said support plate further includes an intermediate layer dividing said support plate into an upper plate layer having said concave portions, and a lower plate layer having said fixing portion, said intermediate layer being sandwiched between said upper and lower plate layers and being made of a buffering material.

5. The hard protective pad as claimed in claim **4**, wherein said intermediate layer is formed with a plurality of intersecting grooves.

6. The hard protective pad as claimed in claim **1**, wherein said support plate further includes an extension portion extending outwardly and forwardly from a front central portion of said support plate, said extension portion having a crotch-shaped concave section extending inwardly from a top surface of said extension portion for supporting a crotch portion of the user.

7. The hard protective pad as claimed in claim **1**, wherein said support plate is constructed from a plurality of substan-

tially parallel spaced-apart strips, said strips being configured to extend along a direction transverse to a longitudinal center line of the pants.

8. The hard protective pad as claimed in claim **1**, wherein said hard protective pad is configured to be sewn onto the pants.

9. The hard-type hard protective pad as claimed in claim **1**, wherein said hard protective pad is configured to be connected to the pants using a hook-and-loop fastener.

10. The hard protective pad as claimed in claim **1**, wherein said hard protective pad is configured to be connected to the pants using an adhesive glue.

11. The hard protective pad as claimed in claim **1**, wherein said rigid material is hard plastic selected from the group consisting of polymethyl methacrylate, polycarbonate, polystyrene, polypropylene, acrylonitrile-butadiene-styrene copolymer and styrene-acrylonitrile copolymer.

12. The hard protective pad as claimed in claim **3**, wherein each of said cushion members is made of a breathable material selected from the group consisting of a breathable fiber material and a netted porous material.

13. The hard protective pad as claimed in claim **4**, wherein said buffering material is selected from the group consisting of foam and rubber.

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