

Cushions with damping properties

The invention relates to a cushion with damping properties for bicycle pants comprising an outer shell and a core, as well as at least one layer positioned between the outer shell and the core.

Cushions with damping properties of various types are already known. In the simplest form, these cushions consist of a filling of foam material that is surrounded by textiles or plastics. They are generally used as seat cushions. In addition, simple air cushions, which consist only of an airtight outer shell and in which the damping is provided by the enclosed air, are already known. The inflatable cushions can be positioned in the objects to be cushioned, such as in sitting surfaces or the like, for example. Inflatable air cushions are also used as heat insulation in items of clothing.

The above-stated cushions are constructed simply in terms of their structure. As the result, they have only relatively slight damping properties or are difficult to handle, as the case may be. In particular, cushions filled with air have the problem that air can escape, so that the damping properties are lost upon damage to the outer shell. Damage frequently occurs, particularly in bicycle pants of the type considered here, because the cushions with the thin outer shell are positioned in the area of the crotch, which is subjected to extraordinarily high levels of stress.

The invention is intended to provide a remedy for this. The task that forms the basis for the invention is that of creating a cushion with damping properties for bicycle pants that has, on the one hand, a high level of damping and is, in addition, changeable in its damping properties. In accordance with the invention, this task is solved through the fact that the core and the layers, which have different levels of hardness, are formed from at least one filling material, and that the core and/or the layers can be changed in their damping properties by means of inflation.

A cushion for bicycle pants with damping properties that has changeable damping properties is created by means of the invention. Through the feeding of air into the inflatable layer with the filling material positioned therein, a possibility exists for increasing or reducing the damping properties. The feeding of air leads to an expansion of the cushion, through which an increase

of the damping properties is brought about. Conversely, a draining off of the air leads to a reduction of the damping properties, with a simultaneous reduction of the volume of the cushion.

In one configuration of the invention, the filling material is silicone. The use of silicone as a filling material offers the advantage that silicone, in various classifications, is available as a fluid, a rubber, or an elastomer, so that a broadly diversified spectrum is consequently available for the filling material.

In another configuration of the invention, the filling material is an open-pored foam. The use of the open-pored foam offers the possibility, in particular, of inflating it by feeding in air and thereby bringing about a change in the damping properties.

A valve is advantageously provided. The possibility of blowing air into the cushion by mouth is provided with the help of the valve. The possibility also exists for letting air out of the cushion with the help of the valve, as desired.

Advantageously, the core and/or the layers are self-inflating. In self-inflating cushions, no air is contained in the core and/or the layers in the compressed condition; as soon as the valve is opened, the elastic filling material used expands, as the result of which the cushion resumes its original shape. Air is thereby sucked into the filling material and remains in the filling material for as long as the valve is closed. Through the opening of the valves and the simultaneous exertion of pressure on the cushion, the air can escape from the core of the layer again.

Other further developments and configurations of the invention are stated in the remaining sub-claims. One embodiment of the invention is depicted in the diagrams, and is described in individual terms in the following. These depict the following:

Figure 1: A schematic representation of a cross-section through a cushion in accordance with the invention in the inflated condition; and:

Figure 2: A schematic representation of the cushion depicted in Figure 1 in an only partially inflated condition.

The cushion 1 selected as an embodiment comprises an outer shell 2 and a core 3. A layer 4 is positioned between the outer shell 2 and the core 3. The cushion 1 is provided with a valve 5, which passes through the outer shell 2 as well as the layer 4, and consequently projects into the core 3. The valve 5 is provided for inflation by mouth. In one modification of the embodiment, the valve 5 can also be constructed as a non-return valve.

In the embodiment, the outer shell 2 is constructed in an air-permeable manner. It is expandable, in order to be able to undergo a change of shape through stress as well as through an inflation of the cushion. The core 3 and the layer 4 are formed from at least one filling material. They have different levels of hardness. In the embodiment, the filling material for the layer 4 is a solid silicone; the filling material for the core 3 is a foamed silicone. The foamed silicone of the core 3 contains air pockets, which are marked in the figures with "6".

In one modification of the embodiment, it is possible to provide several layers 4 between the outer shell 2 and the core 3. In this case, the individual layers can likewise have differing levels of hardness. It is thus possible, for example, in a way comparable to the embodiment depicted in the figures, to produce the core 3 from foamed silicone, and to produce the external layer adjacent to the outer shell 2 from solid silicone. An additional layer -- not depicted --, which has fluid silicone as its filling material, can be positioned between the core 3 and the layer 4, which is then on the outside. In one modification of the embodiment, the possibility also exists for using an open-pored foam instead of the foamed silicone, which can be a polyurethane foam, for example. The use of polyether foams is also possible.

The core 3 in the embodiment can be changed in its damping properties by means of inflation. For this purpose, air can be blown into the core through the valve 5 corresponding to the arrow 7 depicted in Figure 1. The cushion is thereby inflated, as the result of which its damping properties are improved. In the reverse way, air can, in order to reduce the volume and to reduce the damping properties of the cushion, be let out through the valve 5, as indicated by the arrow 8 depicted in Figure 2. It is possible to develop the core 3 and/or the layers 4 in a self-inflating manner. In this case, the valve 5 can easily be opened in order to make possible an enlargement of the volume of the cushion 1. Thus, for the purpose of transport, for example, the

cushion can be compressed and the valve can be closed. In order to use the cushion 1, the valve 5 is opened, through which the filling material in the core 3 is, in accordance with the embodiment, expanded in accordance with its natural expansion and air is sucked into the core 3. After closing the valve, an improved damping property of the cushion is consequently also brought about.

The cushion 1 is used as a cushion in bicycle pants. It is positioned in the crotch of the bicycle pants. Such an arrangement is known from US 6 928 665 B1, for example. In its simplest form, the cushion then has a perineal area that covers the crotch portion of the bicycle pants. A buttocks area, which covers the saddle area 5 of the pants, is also provided. In addition to the improvement of the damping properties *per se*, a varying of the damping properties is made possible in the cushion in accordance with the invention through the feeding of the air into the inflatable layer with the filling material positioned therein. The adjustment of the damping properties to the sensitivity of the specific cyclist is consequently made possible for the first time, whereas a change in the damping is not possible in the known cushions in cycling pants.

Patent claims

1. Cushion with damping qualities for bicycle pants comprising an outer shell and a liner, as well as at least one layer disposed between the outer shell
5 and the liner characterized in that the liner (3) and the layer (4) are composed of at least one cushioning material displaying varying degrees of hardness, and the liner (3) and/or the layer (4) are modifiable in their damping characteristics by inflation whereby the layer (4) is completely surrounded by the outer shell (2), and the liner (3) is completely surrounded by the layer (4).
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2. Cushion according to Claim 1, characterized in that the cushioning material is silicon.
3. Cushion according to Claim 1, characterized in that the cushioning
15 material is an open-pore foam.
4. Cushion according to one or more of the foregoing claims, characterized in that a valve (5) for oral inflation is provided.
- 20 5. Cushion according to one or more of the foregoing claims, characterized in that the valve (5) is a check valve.
6. Cushion according to one or more of the foregoing claims, characterized in that the liner (3) and/or the layer (4) are self-inflating.
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7. Cushion according to one or more of the foregoing claims, characterized in that the outer shell (2) is air-permeable.

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8. Cushion according to one or more of the foregoing claims, characterized in that between the outer shell (2) and the liner (3) several layers (4) are provided.
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9. Cushion according to claim 8, characterized in that the individual layers (4) display varying degrees of hardness.
10. Usage of cushion according to one of the foregoing claims as a cushion
- 10 in cycling pants.
11. Usage according to Claim 10, characterized in that the cushions are disposed in the crotch.
- 15 12. Cycling pants comprising at least one cushion as a cushion according to one of Claims 1 to 9.
13. Cycling pants according to Claim 12, characterized in that the cushions are disposed in the crotch.