

**DESCRIPTION****Shock-absorbing seat comprising floor- or ceiling-mounted damping members**

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The invention relates to a shock-absorbing damping member and also to a seat for a land vehicle, which seat is equipped with at least one damping member according to the invention.

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Seats for land vehicles, in particular for military purposes, which have damping members in order to absorb shocks acting on the vehicle from the outside and therefore to provide protection to the occupants sitting on said seats are known. Shocks which act on the vehicle from the outside

15 are generally impacts from explosive materials, as are used, for example, in mines over which the vehicle drives.

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DE 10 2008 053 152 A1 discloses a deformation element for protecting a device, in particular a footrest plate in an, in particular, military vehicle, wherein the deformation element is of substantially U-shaped design.

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The invention is based on the object of providing a damping member which renders possible shock absorption with reasonable expenditure on manufacture. Another object of the invention is to provide a seat for a vehicle, by way of which seat the person is protected against external impacts.

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The invention proposes a damping member which has at least two engagement points in order to introduce forces, which occur in a pulsed manner, into the damping member.

According to the invention, the damping member consists of at least one spring element.

The damping member further has fastening elements by means of which the damping member can be fastened. The fastening elements are preferably arranged at the engagement points, so that the action of force on the damping member can take place through the fastening elements.

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The damping member according to the invention further has an absorption means which is capable of absorbing introduced forces and in this way can damp the actions of force which occur in a pulsed manner.

- 10 An absorption means of this kind can be a compressible substance or an elastic substance which returns to its initial state after action of force.

To this end, the absorption means can be integrated into the spring elements or the absorption means constitutes the material of the spring elements. A plurality of spring elements are preferably provided for one  
15 damping member.

The spring elements are configured such that they can absorb an action of force in order to damp forces which occur in a pulsed manner. To this end,  
20 the spring elements are of curved configuration. This curved shape firstly has the advantage that the spring elements are more stable than in the case of straight shapes since curved shapes can withstand greater forces than straight shapes. Secondly, a recess through which the spring elements can be deformed in the event of action of force can, however, be  
25 provided in the case of a curved shape.

The spring elements are initially of elastic configuration owing to the absorption means and their shaping. This means that they withstand a  
30 certain action of force without deformation. However, when this action of force becomes too great, the sides or ends of the spring elements can move toward one another at the recesses owing to deformation and thereby absorb and damp further forces.

Therefore, in a particular embodiment, a C-shape has proven advantageous for the spring elements.

5 The damping members are designed such that they can be used in a vehicle in order to cushion a vehicle seat against impact forces which are exerted on the seat. To this end, it is proposed to arrange at least one damping member according to the invention on the seat of the vehicle.

10 The seat can be damped by way of at least one damping member being arranged between the seat and the vehicle chassis. Similarly, the seat can also be arranged in a manner suspended from the ceiling of the passenger compartment. In this case, at least one damping member is provided between the suspension arrangement and the ceiling.

15 In order to adapt the damping property to a special seat or use, the invention proposes using a plurality of spring elements in one damping element.

20 To this end, a plurality of spring elements can be arranged parallel in relation to one another. They force to be absorbed by the damping member is increased owing to the arrangement of a plurality of spring elements.

25 An arrangement of a plurality of spring elements next to one another is also conceivable. The combination of a plurality of spring elements parallel in relation to one another and next to one another is recommended. For example, a plurality of rows of spring elements on one damping member could be used for this purpose.

30 Similarly, a plurality of spring elements one above the other can be used. This increases the travel of the deformation and a higher elasticity can be achieved.

The damping properties, such as elasticity and deformation travel, can be adapted to a specific purpose owing to the combination of the abovementioned arrangement options for the spring elements in one damping member.

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One advantage of the present invention is that the seat can be arranged in a vertically adjustable manner. The damping members according to the invention do not impede this vertical adjustment.

10 For vertical adjustment purposes, the seat comprises a pillar to which it is connected in an articulated manner. The seat can then be vertically adjusted on the pillar using suitable means. The damping members are then provided at the fastening of the pillar, either on the chassis of the vehicle or on the ceiling of the passenger compartment.

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In both cases, the damping member according to the invention is arranged between the fastening of the seat and the chassis or the ceiling. The damping member can be fitted between the seat and the chassis/ceiling by means of the fastening elements.

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For the fastening element of the damping member, the spring element can also be designed as a fastening element. The seat can be arranged, in particular arranged in a vertically adjustable manner, on said fastening element, wherein the fastening element can have a plurality of spring  
25 elements which can each be of C-shaped design and are connected to the chassis or the ceiling of the vehicle.

When C-shaped spring elements are used, the plurality of C-shaped spring elements can be deformed as a result of an impact on the vehicle  
30 from the outside and therefore considerably reduce the impact energy exerted on the seat, so that the person sitting on the seat is effectively protected against this external impact as a result.

If a plurality of C-shaped spring elements which are arranged one behind the other are used, these are designed with one of their turning points as a fastening element on which the seat is arranged. By way of their other turning point, the spring elements are fastened to the chassis of the vehicle, or to corresponding carrier elements. With particular preference, not only are a plurality of C-shaped spring elements arranged one behind the other in series, but rather two or even more than two rows of spring elements of this kind are arranged parallel in relation to one another, as a result of which the shock-absorbing action of the entire damping member can be adjusted.

Further features of the present invention are shown in the figures, in which:

figure I: shows a seat according to the invention having damping elements and a pillar for vertically adjusting the seat

figure I.1: shows a front view of the seat

figure I.2: shows a side view of the seat

figure I.3: shows a perspective illustration of the seat

figure I.4: shows a plan view of the seat

figure I.5: shows a damping element according to the invention on the pillar.

Figure I illustrates an embodiment of a damping member 1 in which the seat 10 is connected to the chassis 11 of the vehicle, not illustrated, by means of this damping member 1.

It can be seen that the seat 10 is arranged, for example in a vertically adjustable manner, on a pillar 12, wherein the pillar 12 can form a constituent part of the damping member 1 or the pillar 12 is arranged on a portion of the damping member 1.

A plurality of spring elements 3 of curved shape 4, for example C-shaped spring elements 3, are positioned at least in one row, here in two rows parallel in relation to one another, in the direction of some fastening elements, that is to say, for example, in the direction of the floor of the vehicle. In this case, the spring elements 3 together form the damping member 1.

There is no, or no appreciable, deformation of the C-shaped spring elements 3 in the event of normal loading of the seat 10. Said C-shaped spring elements can deform and thereby absorb the impact energy only in the event of an impact on the vehicle from the outside. This takes place by way of the C-shaped spring elements 3 deforming and in the process the free ends of the large C being able to move toward one another. In this case, the impact energy is introduced into the damping members through engagement points 2.

The present invention is not restricted to the abovementioned features. Rather, further refinements are possible. Therefore, the spring elements can be arranged not only on the suspension arrangement or on the pillar of the seat, but rather also in the pillar itself. The vertically adjustable seat is specially damped as a result. Therefore, an individual degree of damping can be set by combining damping members in the pillar and the suspension arrangement of the seat.

**LIST OF REFERENCE SIGNS**

|    |    |                  |
|----|----|------------------|
|    | 1  | Damping member   |
| 5  | 2  | Engagement point |
|    | 3  | Spring element   |
|    | 4  | Curved shape     |
|    | 10 | Seat             |
| 10 | 11 | Chassis          |
|    | 12 | Pillar           |

**CLAIMS**

1. A damping member (1) which has at least two engagement points (2),  
**characterized**  
in that the damping member (1) comprises at least one spring element (3),  
in that the spring elements (3) have an absorption means,  
in that the spring elements (3) have a curved shape (4),  
and in that the curved shape (4) of the spring elements (3) has a recess (4) which renders possible deformation of the spring elements (3) and  
**characterized** in that a plurality of spring elements (3) are arranged next to one another.
2. The damping member (1) as claimed in claim 1, **characterized** in that the absorption means is arranged within the spring elements (3).
3. The damping member (1) as claimed in claim 1, **characterized** in that the absorption means is embodied as material of the spring elements (3).
4. The damping member (1) as claimed in one of claims 1 to 3, **characterized** in that at least one spring element (3) is of C-shaped configuration.
5. The damping member (1) as claimed in one of claims 1 to 4, **characterized** in that fastening elements are arranged at the engagement points (2).
6. The damping member (1) as claimed in one of claims 1 to 5, **characterized** in that fastening elements are arranged on each spring element (3).

7. The damping member (1) as claimed in one of claims 1 to 6, **characterized** in that the absorption means consists of an elastically deformable material.
8. The damping member (1) as claimed in one of claims 1 to 7, **characterized** in that a plurality of spring elements (3) are arranged parallel in relation to one another.
9. The damping member (1) as claimed in one of claims 1 to 8, **characterized** in that a plurality of spring elements (3) are arranged one above the other.
10. A seat (10) for a land vehicle, **characterized** in that the seat (10) comprises at least one damping member (1) as claimed in one of claims 1 to 9.
11. The seat (10) as claimed in claim 10, **characterized** in that the damping member (1) is arranged between the seat (10) and a chassis (11) of the land vehicle.
12. The seat (10) as claimed in claim 11, **characterized** in that the damping member (1) is arranged between the seat (10) and the ceiling of the land vehicle.
13. The seat (10) as claimed in one of claims 11 to 13, **characterized** in that the seat (10) comprises a pillar (12) by means of which the seat (10) can be vertically adjusted.