

DESCRIPTION**Shock-absorbing seat having wall-mounted damping members**

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The invention relates to a 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.

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

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 exhibits improved shock absorption in comparison to conventional damping members. Another object of the invention is to provide a seat for a vehicle, by way of which seat the person is protected against external

25 impacts.

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

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

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.

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The absorption means proposed here is an elastic substance which returns to its initial position after action of force. According to the invention, the elastic substance has a force limit up to which the substance has an elastic action. If this force limit is exceeded, the absorption means is deformed. In this case, the deformation also absorbs the exerted force and converts it into deformation work.

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According to the invention, the absorption means is integrated into the damping member or the material of the damping member itself is designed as absorption means.

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The damping member is preferably designed from a wall holder. In this case, the damping member is arranged between the element which is to be damped and a wall. In this case, simple mounting on the wall and the element which is to be damped is rendered possible by the fastening elements.

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In a particular embodiment, the damping member is designed as a strap. In this case, the strap acts as an absorption means owing to its physical properties. To this end, the strap is preferably provided with an elasticity and/or is of multilayered design. Therefore, the material of the strap itself is the absorption means.

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Similarly, the absorption means can also consist of seams which connect at least two layers of the straps to one another. The possible deformation work of the absorption means takes effect here owing to the separation of the seams in the event of action of force. Therefore, the seams are the absorption means. These seams can be integrated into the strap at least in regions.

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The seams of the strap are preferably arranged so as to run parallel in relation to one another and transversely in relation to the strap. This creates a number of seams which run parallel in relation to one another and which run transversely in relation to the strap at a distance from one another. In this case, the distances can be of identical or different design for all seams. These seams are provided on a strap at least in regions.

In this case, a strap according to the invention can be connected in an articulated manner to a seat and/or to the chassis of a vehicle, in particular to the wall of the vehicle, by way of its engagement points. To this end, the strap can be arranged such that a person on the seat is protected or moving parts of the seat are damped. For example, the strap can be connected in an articulated manner to the sitting surface and the backrest of the seat in order to damp a foldable sitting surface. In the event of an exemplary action of force from below, the force is then exerted on the seat. If the seat has a moving or foldable sitting surface, an upward movement of the sitting surface can be damped by the inertia of the person on the seat when a damping member according to the invention is designed as a strap and is connected in an articulated manner to the sitting surface and the seat backrest. Similarly, connection in an articulated manner to the sitting surface and the chassis is conceivable for this purpose.

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.

The seat can be damped by way of at least one damping member being arranged between the seat and the vehicle wall. Similarly, the seat can also be equipped with corresponding straps. A combination of a strap and a wall holder is likewise possible.

According to the invention, the damping member consists of an elastically deformable material which is of plate-like design. The element which is to be damped, for example a seat, is arranged and fastened at a suitable point, for example on a vehicle, by means of this plate-like damping member.

In this case, the material properties are selected such that the plate-like damping member does not deform in the event of normal loading of the seat and in the event of normal stress during operation of the vehicle. This also applies in the event of fluctuations in the temperature, the atmospheric humidity and comparable environmental parameters of the vehicle.

The material of the plate-like damping member allows this region to be deformed and the energy of the impact to be reduced owing to the deformation, in order to protect the person sitting on the seat, only when there is an impact on the vehicle from the outside and therefore a specific force limit is exceeded. The plate-like damping member can have corresponding fastening elements, such as bores, brackets or the like for example, so that the seat can be arranged and fastened on the vehicle by means of the damping member.

As an alternative, the damping member is integrated into a strap, for example by way of which the person sitting on the seat can strap in. Provision is made here for at least two layers of the strap material to be arranged substantially congruently one above the other in the region in which the strap forms the damping member.

The abovementioned damping members can, of course, also be used in combination with one another for an element which is to be damped, for example a seat. The wall-mounted damping member and/or the damping member which is integrated into the strap can then be used for this purpose.

A plurality of seam lines which connect the two layers of strap material, which are arranged substantially so as to extensively cover one another, to one another are made transversely in relation to the extent of the strap at distances from one another.

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Moreover, the strap is usually connected firstly to the seat and secondly to the chassis or to the seat once again. However, the strap can also be connected to a wall.

- 10 The plurality of seam lines which are arranged parallel in relation to one another and one behind the other in the longitudinal extent of the strap create a kind of predetermined breaking point since the seams tear in succession as a consequence of the impact from the outside and in this way reduce the energy of the impact. During normal operation of the
- 15 vehicle, this plurality of seam lines which are arranged parallel in relation to one another are dimensioned such that they do not tear up to a maximum loading with which the seat may be loaded.

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

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figure I: shows a seat according to the invention having damping members and a rear-side suspension arrangement

- figure I.1: shows a front view of the seat
- 25 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 member according to the invention in a strap
- 30 figure I.6: shows a damping member according to the invention in the form of a wall suspension arrangement
- figure I.7 shows a seam arrangement of a damping member according to the invention in the form of a strap

A damping member 1 which has two engagement points 2 is provided in figure I. Fastening elements 3 are arranged at the engagement points 2 on each side of the damping member 1. An absorption means which implements the damping of the damping member 1 is located between the engagement points.

To this end, the absorption means can be designed as material of the damping member 1. However, it could also be arranged in a manner integrated into the damping member 1.

The damping member 1 and the absorption means have a force limit up to which the damping member exhibits elastic behavior. In the event of action of force, the damping is achieved by the elastic behavior. If the exerted force lies above the force limit, deformation of the damping member 1 takes place. In this case, at least a portion of the exerted force is converted into deformation work on the damping member.

A seat 10 is connected to a wall of a vehicle by means of the fastening elements 3 which are arranged on the damping member 1.

If there is an impact on the vehicle from the outside, the damping member 1 according to the invention renders possible absorption of the energy of the impact both owing to its elasticity and also owing to a possible deformation of the damping member 1.

Deformation is realized by way of the two longitudinal axes of the fastening elements 3 being sheared and this shearing having an elastic action up to a force limit and causing the deformation of the damping member 1 above the force limit.

The elasticity and also the deformation serve to reduce the deformation energy and therefore considerably attenuate the impact acting from the outside, so that the person sitting on the seat 10 is very well protected against this external influence.

In a further refinement, the damping member 1 is integrated in a strap 5 by way of which the person sitting on the seat 10 can strap in. Provision is made here for two layers of the strap material to be arranged substantially congruently one above the other in the region in which the strap 5 forms the damping member 1.

In this case, the strap 5 can be fastened to the seat, to the wall of the vehicle, to the chassis of the vehicle or in combination of the above.

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A plurality of seam lines which connect the two layers of strap material, which are arranged substantially so as to extensively cover one another, to one another are made transversely in relation to the extent of the strap 5 at distances from one another. Moreover, the strap 5 is usually connected firstly to the seat 10 and secondly to the chassis 11 or to the seat once again. To this end, the fastenings of the straps 5 form the fastening elements 3 of the damping member 1 and the ends of the strap 5 form the engagement points 2.

20 The plurality of seam lines which are arranged parallel in relation to one another and one behind the other in the longitudinal extent of the strap 5 create a kind of predetermined breaking point since the seams tear in succession as a consequence of the impact from the outside and in this way reduce the energy of the impact. During normal operation of the vehicle, this plurality of seam lines which are arranged parallel in relation to one another are dimensioned such that they do not tear in the normal case up to a maximum loading with which the seat 10 may be loaded.

Figure I shows a seat 10 of a vehicle, which seat is connected to the seat 10 by means of the damping member 1 by way of fastening elements 3 or the like. Secondly, the damping member 1 is likewise connected to a wall, not illustrated, of a vehicle by means of fastening elements or the like.

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The illustrated seat 10 is also equipped with the damping member 1 which is integrated in the strap 5.

Figure 1.7 shows a possible seam arrangement for a damping member 1 according to the invention in the form of a strap 5. The seams which run parallel in relation to one another and transversely in relation to the strap 5 connect two layers of the strap 5 here. The strap 5 itself is multilayered in the region of the seams. This can be embodied by loops which the strap 5 forms in the region of the seams, but the strap 5 can also form the multilayered region by way of a plurality of strap pieces being laid one over the other in an overlapping manner.

In the event of action of force on the strap at the engagement points 2, a shear force is then exerted on the seams which can be separated as a result and implement the damping of the damping member 1. As shown, the seams can each connect two layers, but they can also be continuous through all layers. In this case, the different seams can be formed from different materials with different tearing behavior.

Figures 1.2 and 1.3 show a particularly preferred arrangement of the damping members 1 which are designed as the strap 5. In this case, the strap 5 is connected in an articulated manner to the seat 10 by way of its engagement points 2 in each case, wherein one end of the strap 5 is connected in an articulated manner to the backrest of the seat and the other end of the strap 5 is connected in an articulated manner to the seat 10. As a result, the seat 10 can be damped in the event of an action of force on the vehicle if the sitting surface of the seat 10 is of movable, for example foldable, design.

All the figures show that both the damping member 1 without the strap and the damping member 1 which is integrated into the strap 5 are used. The protective effect is considerably increased as a result. Secondly, it is also conceivable for only the damping member 1 without the strap or only the damping member 1 which is integrated into the strap 5 to be able to be

used in the representations of the seat 10 shown. The combination can also be considered.

The invention is not restricted to the abovementioned features. Rather,
5 further refinements are possible. For example, an additional absorption
element can be associated with the absorption element in order to
increase the damping. Plug connections at the engagement points and/or
fastening elements are likewise possible in order to render possible easy
replacement of the damping members. Finally, the use of a plurality of
10 damping members in parallel or in series would be possible in order to
adjust the damping in accordance with the intended use.

LIST OF REFERENCE SIGNS

	1	Damping member
	2	Engagement point
5	3	Fastening element
	4	Seam
	5	Strap
	10	Seat
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PATENT CLAIMS

1. A damping member (1) which has at least two engagement points (2),
5 **characterized**
in that the damping member (1) has an absorption means which has an elastic action,
in that fastening elements (3) are arranged on the damping member (1),
10 and in that the damping member (1) is of deformable design.
2. The damping member (1) as claimed in claim 1, **characterized** in that the damping member (1) is deformed only starting from a certain exerted force limit and is not deformed below this force limit.
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3. The damping member (1) as claimed in claim 1 or 2, **characterized** in that the absorption means is designed as material of the damping member (1).
- 20 4. The damping member (1) as claimed in one of claims 1 to 3, **characterized** in that the damping member (1) is integrated into at least one strap (5).
- 25 5. The damping member (1) as claimed in claim 4, **characterized** in that the strap (5) is fastened to the wall of a vehicle and/or to a vehicle seat at its engagement points (2).
- 30 6. The damping member (1) as claimed in one of claims 1 to 5, **characterized** in that the fastening elements (3) are designed for mounting on walls.
- 35 7. The damping member (1) as claimed in one of claims 1 to 6, **characterized** in that the damping member (1) has an elastic action up to a maximum action of force, without deformation of the damping member (1) being implemented.

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8. The damping member (1) as claimed in claim 7, **characterized** in that the damping member (1) is deformed starting from the maximum action of force.
9. The damping member (1) as claimed in one of claims 1 to 8, **characterized** in that the absorption means consists of at least two layers which lie one above the other.
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10. The damping member (1) as claimed in one of claims 1 to 9, **characterized** in that the damping member has seams (4) which cause the deformation of the damping member by way of tearing.
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11. The damping member (1) as claimed in one of claims 1 to 10, **characterized** in that the fastening elements (3) are arranged at the engagement points (2).
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12. 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 11.
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13. The seat (10) as claimed in claim 12, **characterized** in that the damping member (1) is arranged between the seat (10) and a wall of the land vehicle.
14. The seat (10) as claimed in either of claims 12 and 13, **characterized** in that the seat (10) comprises at least one strap (5) and at least one damping member (1) is integrated into the strap (5).